

Administrative Action
Environmental Assessment
US Department of Transportation, Federal Highway Administration
North Carolina Department of Transportation

**NC 12 Replacement of
Herbert C. Bonner Bridge**
(Bridge No. 11) over Oregon Inlet

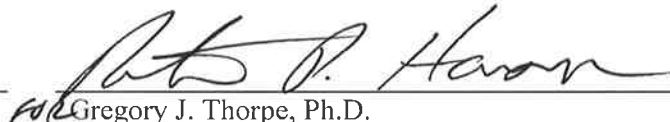
Federal-Aid No. BRS-2358(15)
NCDOT Project Definition: 32635
TIP Project No. B-2500
Dare County, North Carolina

Submitted Pursuant to the National Environmental Policy Act 42 USC 4332(2)(c) and 49 USC 303


Cooperating Agencies

US Coast Guard/US Army Corps of Engineers
US Fish and Wildlife Service/National Park Service

5/7/10
Date


for Gregory J. Thorpe, Ph.D.
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The proposed project is the construction of a bridge to replace the Herbert C. Bonner Bridge in Dare County, the demolition and removal of Bonner Bridge, and improvements to NC 12 between the community of Rodanthe and Oregon Inlet. This EA identifies and assesses changes that have occurred since the approval of the Final Environmental Impact Statement/Final Section 4(f) Evaluation on September 17, 2008.

Comments on this EA are due by _____ and should be sent to Gregory J. Thorpe, Ph.D. at the above address.

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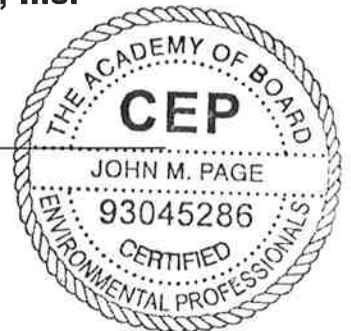
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NC 12 Replacement of the Herbert C. Bonner Bridge

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Project Commitments

The following text lists the Project Commitments from the September 2008 Final Environmental Impact Statement (FEIS) along with any revisions to those commitments. As indicated below, revisions were made to several of the FEIS commitments and one new commitment has been added.

Highway Design Branch and Technical Services Division

1. Navigation Span Location. One navigation zone would be built to serve boats passing through Oregon Inlet. The location of the zone would be determined in coordination with the US Army Corps of Engineers (USACE).
2. Bicycle Accommodations (revised). The Cape Hatteras National Seashore (Seashore) management plan supports the use of bicycles along NC 12. All bridges associated with the detailed study alternatives (including the Preferred Alternative) would have 8-foot (2.4-meter) wide shoulders that would be safer for bicycle and pedestrian traffic than Bonner Bridge's 2-foot (0.6-meter) wide shoulders. In addition, a bicycle-safe bridge rail on the bridges also would provide increased safety for bicyclists. New roadway would have 4-foot (1.2-meter) paved shoulders, which would be safer for use by bicycle and pedestrian traffic than the existing NC 12's unpaved shoulders.

Highway Design Branch and Division 1

3. Use of Work Bridges (revised). During construction of the project, steps taken to minimize turbidity (when possible and practicable) would include the use of work bridges (rather than barges, which would require dredging) for movement of construction equipment in shallow areas where submerged aquatic vegetation (SAV) is present. If SAV is in waters deep enough to float a barge without dredging, the use of a work bridge would not be necessary. Work bridges also would be used to carry construction equipment over intertidal marsh areas (black needlerush and smooth cordgrass). Dredging generally would only be used in depths less than 6 feet (1.8 meters) where SAV is not present. Work bridges will be used to cross SAVs. Neither dredging nor haul roads would be used in SAVs.
4. Sedimentation and Erosion Control. All waters in the project area are classified as SA waters (Class A salt waters) with a supplemental classification of High Quality Waters (HQW). The most stringent application of the Best Management Practices (BMPs) is expected where highway projects affect receiving waters of special designation, such as HQW. Also, impacts to adjacent areas of SAV and/or wetlands should be minimized. Therefore, sedimentation

and erosion control measures shall adhere to the Design Standards in Sensitive Watersheds [15A NCAC 04B.0124(b)-(e)]. Prior to construction, the design-build contractor will submit the proposed sediment and erosion control plans for each stage of construction to the North Carolina Department of Transportation (NCDOT) and permitting agencies for review.

5. Pile Placement (revised). Bridge piles in open water would be jetted to the tip elevation (depth of the tip of the pile). Bridge piles over land would be jetted or driven. Potential damage to wetlands, SAV, and Oregon Inlet from jetting spoils will be minimized to the extent practicable.
6. Use of Bridge Demolition Debris for an Artificial Reef. NCDOT would work with the North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries (NCDENR-DMF) to accommodate this desire during demolition planning. Coordination also would be conducted with the National Marine Fisheries Service (NMFS) in association with their regulation of several protected species.
7. Oregon Inlet Fishing Access (new). NCDOT will ensure that access to fishing at the north end of Hatteras Island is restored once construction of the new Oregon Inlet bridge is complete. The catwalks on the existing Bonner Bridge will remain open during construction as long as is safely feasible.

Highway Design Branch, Project Development and Environmental Analysis Branch, and Division 1

8. Design Coordination (revised). NCDOT would invite NPS and USFWS, as well as the other agencies represented on the project's National Environmental Policy Act/Section 404 of the Clean Water Act (NEPA/Section 404) Merger Team (a full list of agencies on the Merger Team is shown on page 8-6 of the FEIS), to participate in the development of project design and mitigation strategies as a part of the permit application process for each phase of the project.
9. Dredging. To avoid construction impacts to protected turtles, NCDOT's contractor would use pipeline or clamshell dredging. A hopper dredge would not be used for bridge construction or Bonner Bridge demolition.
10. Disposal of Dredged Material (revised). Prior to construction, during the permit preparation process, FHWA and NCDOT would work with appropriate environmental resource and regulatory agencies to identify the characteristics of dredged material from bridge construction in open water and develop a disposal plan that would minimize harm to natural resources. The appropriate location for dredged material disposal would be determined based on the character of the materials dredged, the availability of disposal sites, and coastal conditions near the time of construction. In addition, as noted in Commitment 25c, the terms and conditions outlined in the *Biological and Conference Opinions* (USFWS, 2008) related to piping plovers specify that "all dredge spoil excavated for construction barge access must be used to augment either existing dredge-material islands or to create new dredge-material islands for use by foraging plovers. This must be accomplished as per the specifications of the North Carolina Wildlife Resources Commission."

11. Night-time Construction. Because construction activities could occur 24-hours-a-day, construction areas could be lit to daylight conditions at night. NCDOT would work with NCDENR-DMF, NMFS, NPS, and USFWS to determine other areas near project construction where night lighting would need to be avoided or limited. Night lighting also would not be used close to areas where people sleep, including the campground at the northern end of the project area and the Rodanthe area at the southern end. Night lighting also will meet the requirements specified to protect sea turtles contained within Commitment 2628.a.
12. Manatee Protection. Construction contracts would require compliance with USFWS's Guidelines for Avoiding Impacts to the West Indian Manatee: Precautionary Measures for Construction Activities in North Carolina Waters (June 2003).
13. Sea Turtle and Smalltooth Sawfish Protection. NCDOT will comply with NMFS's March 23, 2006, *Sea Turtle and Smalltooth Sawfish Construction Conditions* (NMFS, 2006) that restrict in-water construction-related activities when these protected species are observed in the project area. However, NMFS and NCDOT agree that bridge construction or demolition activities do not need to stop when a protected species is sighted in the proximity of construction if the construction activities are not in the water. The in-water moratorium prohibits pile installation and removal and activities associated with bridge construction and demolition when listed species are present in the water, but does not restrict terrestrial activity.
14. Terminal Groin Removal (revised). NCDOT would apply for a permit to retain the groin to protect the south end of the Oregon Inlet bridge.
15. Archaeological Resources Discovered During Construction. If any historic archaeological resources (i.e., historic watercraft) are encountered in the area west of Bodie Island during construction, construction work affecting the resource will cease immediately until the resource can be identified and assessed for National Register of Historic Places eligibility.
16. Construction of Future Phases (revised). In phasing the construction of the Parallel Bridge Corridor alternatives (including the Preferred Alternative), it is NCDOT's intent to place a high priority on the monitoring and need for implementation of improvements in the three potential hot spot areas. This intent recognizes the need to build in the Rodanthe 'S' Curves, Sandbag Area, and Canal Zone hot spots. Final phasing decisions will be developed through interagency collaboration and under the requirements of NEPA as project area conditions warrant.
17. Monitoring Program (revised). NCDOT considers the 2060 high erosion shoreline a reasonable assumption for current planning purposes, but also recognizes that decisions related to implementation of future phases and the specific location of future phases would likely need to evolve with actual geomorphological change relative to the NC 12 easement. With this in mind, NCDOT would implement a monitoring program on Hatteras Island in the project area, as described in Section 2.3.2.2 of this EA.
18. Breach Response-Related Data Gathering Program (revised). Recognizing the possibility that a breach could occur at the southern part of the Refuge prior to completion of Phase II and that four other locations exist in the project area that are geologically susceptible to a breach,

NCDOT would conduct a breach response-related data gathering program focusing on the southern end of the Refuge.

19. Reduce the Potential Impacts from NC 12 Maintenance Prior to the Completion of Each Phase (revised). Recognizing that storm-related NC 12 maintenance will occur before completion of future phases, particularly before the implementation of improvements in the three hot spot areas, NCDOT would continue to work with the Refuge to reduce potential impacts to the Refuge and NC 12 resulting from NC 12 storm-related maintenance.
20. Shortnose Sturgeon. Conservation measures to protect shortnose sturgeon would include no hopper dredging and measures to minimize habitat degradation. Such measures would include BMPs involving use, storage, and disposal of construction/demolition materials to minimize short-term turbidity or water quality degradation during over water construction in Oregon Inlet and during periodic maintenance. Construction and demolition activities associated with Phase I of the project would be completed as quickly as possible in order to minimize deterring spawning sturgeon from entering Oregon Inlet. In addition, the project would incorporate BMPs to reduce habitat degradation from stormwater runoff pollution.

**Highway Design Branch, Project Development and Environmental Analysis Branch,
Division 1, Right-of-Way Branch, and Technical Services Division**

21. Utilities. Project development and construction activities would be coordinated with utility providers in the project area in order to prevent interruption of local utility services. The following utility providers currently serve the project area: Dare County (water service); Sprint Communications (telephone service); Charter Communications (cable television service); and Cape Hatteras Electric Membership Association (electric power service).

**Highway Design Branch, Project Development and Environmental Analysis Branch,
Division 1, and Geotechnical Unit**

22. Use of Explosives During Construction. The use of explosives during construction is not anticipated. If explosives were needed to remove Bonner Bridge's piles, NCDOT would coordinate with the appropriate environmental resource and regulatory agencies to develop a blasting program that would minimize adverse effects to the natural environment.

Project Development and Environmental Analysis Branch

23. Programmatic Agreement (revised). Prior to the release of the Record of Decision (ROD), FHWA will complete a Programmatic Agreement with the State Historic Preservation Office (HPO) and the Advisory Council on Historic Preservation (ACHP) in consultation with other consulting parties, as per the requirements of Section 106 of the National Historic Preservation Act of 1966.
24. Seabeach Amaranth (revised). Since the favored habitat of the seabeach amaranth is highly ephemeral, a survey of the project area would be conducted for the habitat of this species at least one year prior to initiating bridge construction activities. It would occur as needed for each construction phase.

**Highway Design Branch, Project Development and Environmental Analysis Branch,
Division 1, and Bridge Management Unit**

25. Piping Plover (revised). NCDOT will implement the following nondiscretionary measures that include the terms and conditions outlined in the *Biological and Conference Opinions* (USFWS, 2008):

- a. All construction equipment and personnel must avoid all bird closure areas within the Seashore and Refuge.

All future routine maintenance activities of bridge structures that would occur within or adjacent to current or future plover nesting areas must occur outside the nesting season (April 1 to July 15).

All future repair work on bridge structures that would occur within or adjacent to current or future plover nesting areas must occur outside the nesting season (April 1 to July 15) unless emergency or human safety considerations require otherwise. In this event, the area must be surveyed for nesting plovers and avoided to the extent possible.

- b. During the construction of Phases II, III and IV of the Phased Approach/Rodanthe Bridge Alternative (or if selected for implementation under the NC 12 Transportation Management Plan [Preferred]), keep all construction equipment and activity within the existing right-of-way.

Do not moor any construction barges within 300 feet (91.4 meters) of the following islands: Green Island, Wells Island, Parnell Island, Island MN, Island C, the small unnamed island immediately east of Island C, Island D, and Island G (see Figure 1 in the *Biological and Conference Opinions* in Appendix E of the FEIS).

- c. All dredge spoil excavated for construction barge access must be used to augment either existing dredge-material islands or to create new dredge-material islands for use by foraging plovers. This must be accomplished as per the specifications of the North Carolina Wildlife Resources Commission. The point of contact is Sue Cameron at 910-325-3602. If the dredge material is used outside the current defined action area, the action area is assumed to be expanded to cover the beneficial placement of the material.
- d. To the maximum extent practical, while ensuring the safety of the traveling public, limit or avoid the use of road signs or other potential predator perches adjacent to plover nesting or foraging areas. Where signs or other structures are necessary, determine if alternative designs would be less conducive for perching on by avian predators (gulls, crows, grackles, hawks, etc.). For example, minimize or avoid the use of large cantilever signs in favor of smaller and shorter designs.

26. Sea Turtles (green sea turtle, leatherback sea turtle, and loggerhead sea turtle) (revised). NCDOT will implement the following nondiscretionary measures that include the terms and conditions outlined in the *Biological and Conference Opinions* (USFWS, 2008):

- a. All construction equipment and personnel must avoid all marked sea turtle nests.

Construction material and equipment staging areas must not be located seaward of the artificial dune.

All future routine maintenance activities of bridge structures that would occur within or adjacent to current or future sea turtle nesting habitat, and which would require vehicles or equipment on the beach or the use of night lighting (excluding navigation lights required by the US Coast Guard), must occur outside the nesting season (May 1 to November 15).

All future repair work of bridge structures that would occur within or adjacent to current or future sea turtle nesting habitat, and which would require vehicles or equipment on the beach or the use of night lighting (excluding navigation lights required by the US Coast Guard) must occur outside the nesting season (May 1 to November 15) unless emergency or human safety considerations require otherwise. In this event, the area must be surveyed for sea turtle nests and avoided to the extent possible.

- b. Provide an opportunity for USFWS or a USFWS designee to educate construction contractor managers, supervisors, foremen and other key personnel and resident NCDOT personnel with oversight duties (division engineer, resident engineer, division environmental officer, etc.) as to adverse effects of artificial lighting on nesting sea turtles and hatchlings, and to the importance of minimizing those effects.
- c. During turtle nesting season (May 1 to November 15), use the minimum number and the lowest wattage lights that are necessary for construction.

During turtle nesting season, portable construction lighting must be of the low-pressure sodium-vapor type.

During turtle nesting season, utilize directional shields on all portable construction lights, and avoid directly illuminating the turtle nesting beach at night.

During turtle nesting season, all portable construction lights must be mounted as low to the ground as possible.

During turtle nesting season, turn off all lights when not needed.

- d. For Phases II, III and IV if developed as defined by the Phased Approach/Rodanthe Bridge Alternative (or if selected for implementation under the NC 12 Transportation Management Plan [Preferred]), on the ocean side, design the bridge structure in a manner which will shield the beach on the east side from direct light emanating from passenger vehicle headlights. For the small portion of Phase I over land on Hatteras Island, retrofit the bridge structure at the time that Phase II connects with Phase I. The specific design of the bridge will be developed in consultation with USFWS prior to re-evaluation of the environmental document for Phase II.
- e. Avoid retrofitting the bridges and approach roads with permanent light fixtures in the future (excluding navigation lights required by the US Coast Guard).

In addition, NCDOT does not anticipate the use of explosives during construction or demolition of the existing bridge. NCDOT's contractor will use pipeline or clamshell dredging, rather than a hopper dredge to minimize effects to sea turtles. No permanent light fixtures will be installed on the bridge or the approaches (with the exception of navigation lights as required by the US Coast Guard).

Photogrammetry Unit and Project Development and Environmental Analysis Branch

27. Submerged Aquatic Vegetation (SAV) Survey (revised). The dynamic nature of the area around Oregon Inlet results in ephemeral habitats, particularly in shallow water and shoreline areas. Consequently, NCDOT would obtain new SAV information for use by the contractor in construction access planning. All surveys for SAV in the vicinity of Oregon Inlet will follow protocols endorsed by the National Oceanic and Atmospheric Administration (NOAA) Fisheries.

Table of Contents

PROJECT COMMITMENTS	iii
1.0 INTRODUCTION.....	1-1
1.1 Purpose of the Environmental Assessment.....	1-1
1.2 History of Project Documentation	1-1
1.2.1 1993 Draft Environmental Impact Statement.....	1-1
1.2.2 2005 Supplemental Draft Environmental Impact Statement.....	1-2
1.2.3 2007 Supplement to the 2005 Supplemental Draft Environmental Impact Statement.....	1-2
1.2.4 2008 Final Environmental Impact Statement.....	1-2
1.3 What is New/What has Changed?	1-2
1.3.1 Design Modifications to Detailed Study Alternatives	1-2
1.3.2 Findings of the March 2010 NC Coastal Resource Commission’s Science Panel on Coastal Hazards	1-3
2.0 CHANGES TO ALTERNATIVES CONSIDERED	2-1
2.1 2009 Updates to the Parallel Bridge Corridor Alternatives	2-1
2.2 Elimination of the Pamlico Sound Bridge Corridor as a Detailed Study Alternative	2-10
2.3 Preferred Alternative.....	2-12
2.3.1 Development of the Preferred Alternative	2-12
2.3.2 Characteristics of the Preferred Alternative	2-13
2.3.3 Impact Assessment.....	2-22
2.3.4 Basis for Selection of the Preferred Alternative.....	2-28
2.3.5 Does the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) result in “Segmentation” under NEPA?	2-31
2.3.6 Minimizing Impacts of NC 12 Maintenance with the Preferred Alternative.....	2-32
2.3.7 Costs.....	2-33
2.3.8 Conclusion.....	2-36
3.0 COMMENTS AND COORDINATION.....	3-1
3.1 Comments on the September 2008 FEIS.....	3-1
3.2 Comments on the October 2009 Revised Final Section 4(f) Evaluation.....	3-2
3.3 Merger Team Meetings Since Release of the FEIS	3-3
3.3.1 November 13, 2008, Merger Team Meeting	3-3
3.3.2 March 26, 2009, Merger Team Meeting	3-4
3.3.3 May 21, 2009, Merger Team Meeting	3-4
3.3.4 September 17, 2009, Merger Team Meeting.....	3-5
3.4 Section 106 Meetings Since Release of the FEIS	3-6

Table of Contents (concluded)

3.5	Coordination with USFWS Related to the Refuge Since Release of the FEIS	3-7
3.5.1	March 19, 2009, Meeting	3-7
3.5.2	May 28, 2009, Teleconference Meeting.....	3-7
3.5.3	July 15, 2009, Site Visit	3-8
3.5.4	September 2, 2009, Meeting	3-8
3.5.5	Meetings on the Terminal Groin	3-8
3.5.6	November 2009 Rodanthe Storm Repair	3-9
3.6	Endangered Species Act Consultation Since Release of the FEIS	3-9
3.6.1	November 2008 Endangered Species Act Update	3-9
3.6.2	April 2009 Consultation with USFWS.....	3-9
3.6.3	May 2009 ESA Consultation with NOAA Fisheries.....	3-10
3.6.4	August 2009 ESA Consultation with USFWS	3-10
3.7	December 2009 Coordination Meeting with Council on Environmental Quality	3-10
3.8	Public Involvement	3-10
4.0	CONCLUSION	4-1
APPENDIX A: NEPA/404 MERGER TEAM CONCURRENCE FORMS		A-1
APPENDIX B: REVISED FINAL SECTION 4(F) EVALUATION		B-1
APPENDIX C: AMENDED DESCRIPTION OF PARALLEL BRIDGE CORRIDOR ALTERNATIVES WITH NC 12 MAINTENANCE SELECTED FOR DETAILED STUDY		C-1
APPENDIX D: RESPONSE TO COMMENTS ON THE FINAL ENVIRONMENTAL IMPACT STATEMENT		D-1
APPENDIX E: FINAL ENVIRONMENTAL IMPACT STATEMENT COMMENT LETTERS		E-1
APPENDIX F: RESPONSE TO COMMENTS ON THE REVISED FINAL SECTION 4(F) EVALUATION		F-1
APPENDIX G: REVISED FINAL SECTION 4(F) EVALUATION COMMENT LETTERS		G-1
APPENDIX H: REVISED RELOCATION REPORTS		H-1

List of Tables

Table 2-1.	Comparison of FEIS and EA Human Environment Impacts with Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge Alternatives in the Rodanthe Area	2-7
Table 2-2.	Comparison of FEIS and EA Natural Environment Impacts with Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge Alternatives in the Rodanthe Area	2-10
Table 2-3.	Comparison of FEIS and EA Alternatives Human Environment Impacts for Phase I (Oregon Inlet Bridge).....	2-24
Table 2-4.	Comparison of FEIS and EA Alternatives Natural Environment Impacts for Phase I (Oregon Inlet Bridge).....	2-25
Table 2-5.	Phase I Shading, Fill, and Pile Placement Impacts to Wetlands and Waters for the Parallel Bridge Corridor Alternatives	2-26
Table 2-6.	Total (All Phases) Shading, Fill, and Pile Placement Impacts to Wetlands and Waters for the Parallel Bridge Corridor Alternatives.....	2-27
Table 2-7.	Parallel Bridge Corridor Highway Cost to 2060 (Low).....	2-34
Table 2-8.	Parallel Bridge Corridor Highway Cost to 2060 (High)	2-35

List of Figures

Figure 2-1.	Parallel Bridge Corridor Alternatives in Rodanthe Assessed in EA.....	2-2
Figure 2-2.	Parallel Bridge Corridor Alternatives in Rodanthe Assessed in FEIS	2-3
Figure 2-3.	Phased Approach/Rodanthe Bridge Alternative Ramp and Frontage Roads in Rodanthe	2-5
Figure 2-4.	Rodanthe Area Assessed in Table 2-2	2-8
Figure 2-5.	Change in Proposed Phase I Easement Since Revised Final Section 4(f) Evaluation	2-15
Figure 2-6.	Parallel Bridge Corridor Alternatives – Phase I.....	2-16
Figure 2-7.	Hot Spot Locations	2-21

1.0 Introduction

1.1 Purpose of the Environmental Assessment

The purpose of this Environmental Assessment (EA) is to document the following:

- The decision to add a new detailed study alternative (Parallel Bridge Corridor with NC 12 Transportation Management Plan) and select it as the Preferred Alternative;
- Refinements made to the detailed study alternatives since the release of the September 2008 Final Environmental Impact Statement (FEIS);
- The elimination of the Pamlico Sound Bridge Corridor alternatives as detailed study alternatives;
- An assessment of impacts for the new detailed study alternative and an assessment of changes to several of the remaining detailed study alternatives at the community of Rodanthe and at the northern end of Hatteras Island; and
- New information obtained since the publication of the FEIS.

The findings contained within this document and subsequent public review of this document shall determine whether or not these changes or circumstances would result in significant environmental impacts not evaluated in the FEIS and whether a Supplemental Final Environmental Impact Statement (SFEIS) is needed. If the agency conclusion is that these changes or circumstances would result in significant environmental impacts not evaluated in the FEIS, then a SFEIS will be prepared.

The Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) are making this document available for a period of 30 days to provide resource agencies and the public an opportunity to review it. Comments received will be reviewed and taken into account prior either to the determination to prepare a supplement to the FEIS or to the approval of a Record of Decision (ROD).

1.2 History of Project Documentation

1.2.1 1993 Draft Environmental Impact Statement

In 1990, NCDOT began studying replacement alternatives for Bonner Bridge (TIP No. B-2500). The coordination for the project, including agency scoping, was initiated with a scoping letter to government agencies in May 1990 at the start of a Bonner Bridge replacement feasibility study. A Draft Environmental Impact Statement (DEIS) was released for review in November 1993. The DEIS assessed a single preferred alternative, the Parallel Bridge Corridor across Oregon Inlet. After the release of the DEIS, combined (corridor and design) Public Hearings were held in

early 1994. Comments were received regarding the DEIS from the public and from federal, state, and local agencies.

A preliminary FEIS was prepared in 1996; however, it was never signed because formal consultation with the US Fish and Wildlife Service (USFWS) under Section 7 of the Endangered Species Act was not completed. Because it had been more than seven years since completion of the DEIS, a re-evaluation was conducted in 2001 to determine if the preliminary FEIS remained a valid assessment of project impacts. A decision was made in 2001 to prepare a Supplemental DEIS.

1.2.2 2005 Supplemental Draft Environmental Impact Statement

Work on the Supplemental Draft Environmental Impact Statement (SDEIS) began in 2002 with a new study of potential Bonner Bridge replacement alternatives. The study area was expanded south to encompass NC 12 south to Rodanthe because NC 12 had begun to be regularly threatened by shoreline erosion and overwash. Three areas on NC 12, or “hot spots,” between Oregon Inlet and Rodanthe are especially vulnerable. The SDEIS was completed and signed in September 2005. The SDEIS assessed five alternatives in two corridors, the Pamlico Sound Bridge Corridor and the Parallel Bridge Corridor. Two Public Hearings were held in November 2005.

1.2.3 2007 Supplement to the 2005 Supplemental Draft Environmental Impact Statement

A proposal made during the comment period following the release of the SDEIS led to the development of two additional Parallel Bridge Corridor alternatives. These alternatives were assessed in the Supplement to the SDEIS, which was signed on February 14, 2007. Two Public Hearings were held in March 2007.

1.2.4 2008 Final Environmental Impact Statement

A Final Environmental Impact Statement was signed on September 17, 2008. It identified the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge as the Preferred Alternative and addressed comments received on the SDEIS and SSDEIS.

1.3 What is New/What has Changed?

1.3.1 Design Modifications to Detailed Study Alternatives

Several modifications were made to the detailed study alternatives and the impact assessment since the release of the FEIS. These modifications were made to respond to comments on the FEIS and take into account factors related to the history of the creation and maintenance of NC 12 in the Seashore and the Refuge. These changes are:

1. The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative was added and selected as the Preferred Alternative. This alternative is a variation of the Parallel Bridge Corridor alternatives assessed in the FEIS. It calls for Phase I (Oregon Inlet bridge) to be built as soon as possible, followed by construction of later phases whose details would be determined, reevaluated, and documented through interagency collaboration as project area

conditions warrant. This change was made based on discussions at a May 21, 2009, National Environmental Policy Act/Section 404 of the Clean Water Act (NEPA/Section 404) Merger Team meeting, during which several agency representatives stated that it was not appropriate to determine the specifics of future phases of a Parallel Bridge Corridor Alternative at this time. Though the team did not doubt the quality of the coastal studies conducted for the project, they recognized that there is a great deal of uncertainty in even the best models of future shoreline conditions.

2. A Revised Final Section 4(f) Evaluation was issued by NCDOT and FHWA in October 2009 (see Appendix B) in response to comments received on the FEIS/Final Section 4(f) Evaluation, collection of new information on the history of transportation on the islands and the development of Cape Hatteras National Seashore and Pea Island National Wildlife Refuge, and the selection of a new Preferred Alternative.

The Revised Final Section 4(f) Evaluation determined that the Pamlico Sound Bridge Corridor alternatives were not feasible and prudent avoidance alternatives to the use of a Section 4(f) property.

3. Modifications to the conceptual designs, which eliminated adverse impacts to the Chicamacomico Life Saving Station and the Rodanthe Historic District, were made for the Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge alternatives.
4. Based on an agreement made as part of the NEPA/Section 404 Merger Process Concurrence Point 2A in November 2008, the Oregon Inlet bridge terminus of the Nourishment, Road North/Bridge South, and Phased Approach (Phase I) alternatives was extended to the south by approximately 2,000 feet (610 meters) to account for potential sound-side erosion at the north end of Hatteras Island.

1.3.2 Findings of the March 2010 NC Coastal Resource Commission's Science Panel on Coastal Hazards

In March 2010, the NC Coastal Resource Commission's Science Panel on Coastal Hazards released a report entitled "North Carolina Sea-Level Rise Assessment Report," which presented a review of the known condition of sea level rise in the state. The report surveyed four studies regarding the rates of sea level rise in North Carolina; it noted that the amount of sea level rise varies by latitude, with higher rates of rise more likely in the northern coastal region. The report also noted that the rate of sea level rise has varied in the past and will likely do so again in the future. The Science Panel recommended that a sea level rise of 1 meter (39 inches) by the year 2100 be adopted for policy development and planning purposes for the state. This recommendation is within the range of projected sea level rise considered in the FEIS and does not negate the conclusions of the Climate Change Peer Exchange meeting held in May 2008 that was also utilized in the project's coastal conditions analysis. The Peer Exchange participants concluded that the use of the high erosion shoreline for planning purposes will account for a large portion of future sea level rise, and that an alternative that includes a coastal monitoring program will allow new information to be incorporated into the project's design. This report, along with other future relevant statewide studies, will be reviewed as part of the coastal monitoring program proposed with the NC 12 Transportation Management Plan.

2.0 Changes to Alternatives Considered

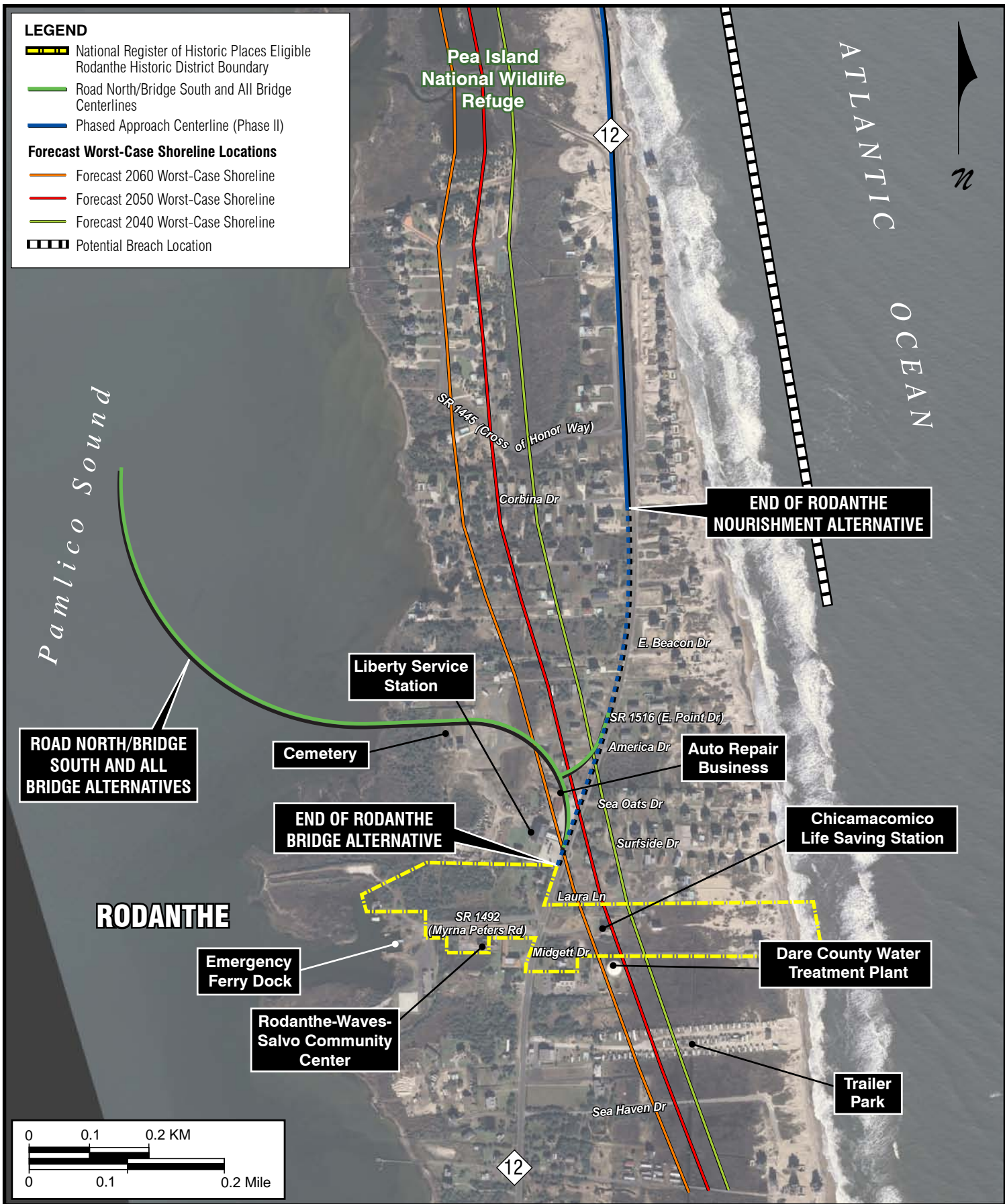
Chapter 2 of the Final Environmental Impact Statement (FEIS) described the alternatives considered for detailed study. This section analyzes changes made to those alternatives based on comments received on the FEIS/Final Section 4(f) Evaluation and additional coordination with state and federal agencies. It includes:

- A description of the studies completed in 2009 that resulted in design modifications to the alternatives in Rodanthe at the southern end of the project, beginning on page 2-1. This section adds to descriptions of the project alternatives studies presented in Sections 2.2 to 2.8 of the FEIS.
- The reasons why the Pamlico Sound Bridge Corridor alternatives are now eliminated from consideration as detailed study alternatives, beginning on page 2-10.
- A description of the new detailed study alternative, as well as the reason for its selection as the Preferred Alternative, beginning on page 2-12. This section of the Environmental Assessment (EA) replaces Section 2.15 of the FEIS.

2.1 2009 Updates to the Parallel Bridge Corridor Alternatives

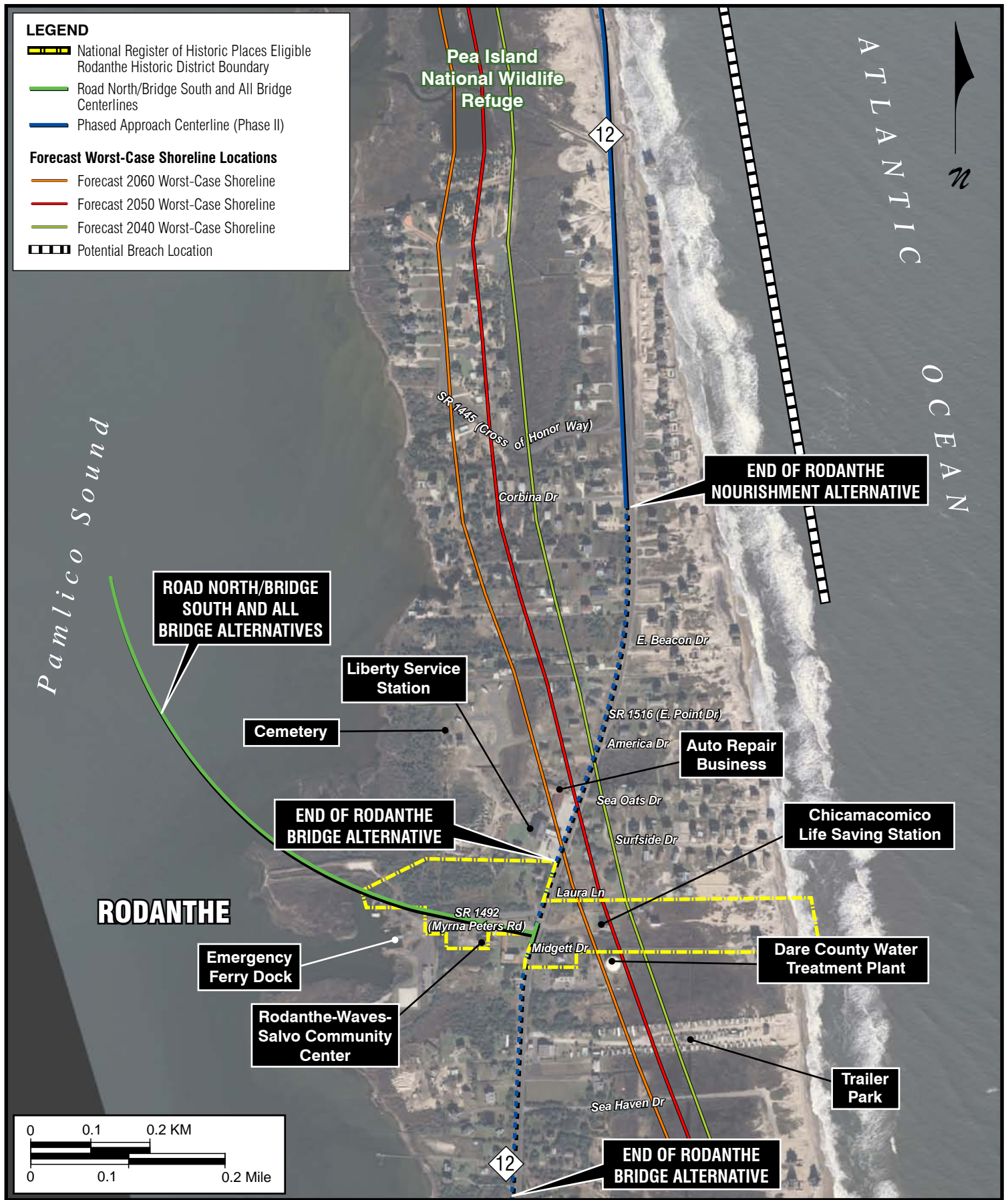
To address the concerns expressed in agency comments on the FEIS about the impacts to the Rodanthe Historic District and the Chicamacomico Life Saving Station, the North Carolina Department of Transportation (NCDOT) modified the conceptual designs for the Phased Approach/Rodanthe Bridge, Road North/Bridge South, and All Bridge alternatives, all of which were previously found to have an Adverse Effect on the station and the district under Section 106 of the National Historic Preservation Act. The designs were revised to remove the presence of the alternatives from within the district boundaries. The revised alignments are shown in Figure 2-1. The locations of the original alignments are illustrated in Figure 2-2. These alignment revisions can be incorporated into the Preferred Alternative (see Section 2.3) when a future phase is constructed in Rodanthe in the vicinity of these historic resources. Because the FEIS conceptual designs for the Nourishment and Phased Approach/Rodanthe Nourishment alternatives do not involve road construction, beach nourishment, or dune construction within or in proximity to the Rodanthe Historic District or the Chicamacomico Life Saving Station, these alternatives were found to have No Effect on these historic resources. As a result, there were no agency concerns expressed about the impacts of these alternatives on these historic resources, so no modifications in the Rodanthe area were necessary.

After re-initiating consultation with the State Historic Preservation Office (HPO), the Advisory Council on Historic Preservation (ACHP), and other consulting parties to the Section 106 Programmatic Agreement (see Section 3.4) to present the revised alignments, the modified conceptual designs for the Phased Approach/Rodanthe Bridge, Road North/Bridge South, and All Bridge alternatives were found to have No Adverse Effect on the Rodanthe Historic District and the Chicamacomico Life Saving Station. These modifications result in a lessening of the adverse



**PARALLEL BRIDGE CORRIDOR ALTERNATIVES
IN RODANTHE ASSESSED IN EA**

Figure
2-1



**PARALLEL BRIDGE CORRIDOR ALTERNATIVES
IN RODANTHE ASSESSED IN FEIS**

Figure
2-2

environmental impacts evaluated in the FEIS without causing any additional or new significant environmental impacts that were not included in the FEIS, as documented in this section.

The revised designs were presented to representatives of HPO on March 24, 2009, and the Merger Team during the March 26, 2009, informational meeting (see Chapter 3). The revisions involved:

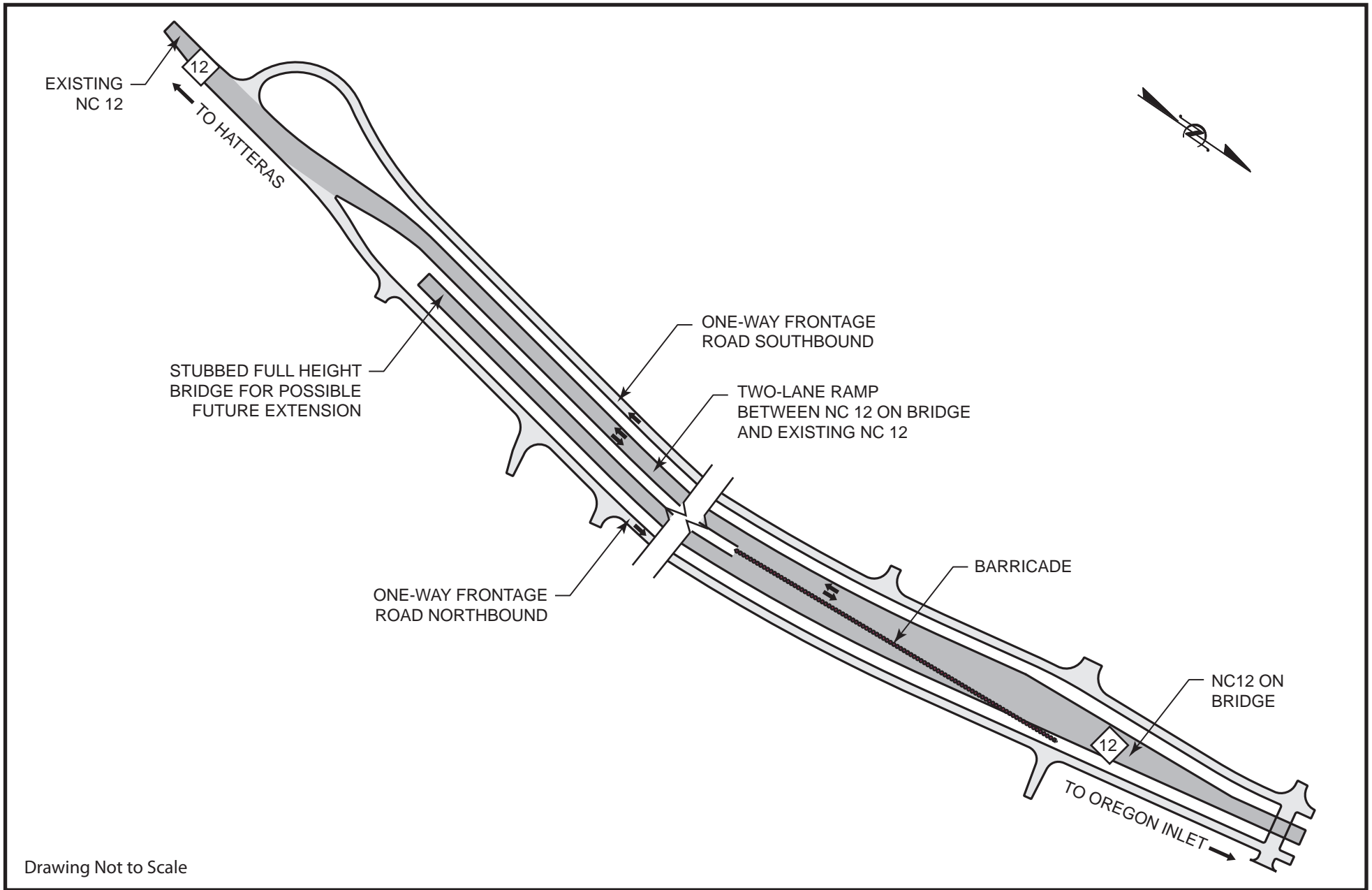
- Road North/Bridge South and All Bridge Alternatives. The Rodanthe bridge portion of these alternatives was revised to locate the intersection with NC 12 approximately 530 feet (161.5 meters) north of the Rodanthe Historic District. The southern terminus is a curved intersection, similar to that designed for the Pamlico Sound Bridge Corridor with Curved Rodanthe Terminus considered in the FEIS. NC 12 traffic would be at-grade as it enters the Rodanthe Historic District. The section of NC 12 roadway between the southern terminus of the bridge portion north to the Pea Island National Wildlife Refuge (Refuge) boundary would be maintained as a service road to provide property access to homes and businesses north of the bridge.

The original alignment terminated within the district and had been developed for the 2005 Supplemental Draft Environmental Impact Statement (SDEIS) prior to a revision to the district boundaries with HPO concurrence in 2006. Moving the alternative from within the historic district places the southern terminus of the alternative between the forecast 2050 and 2060 high erosion shoreline. However, the proposed NC 12 alignment could be relocated again if the forecast 2060 high erosion shoreline were to occur. The 2060 high erosion shoreline places almost all of the Chicamacomico Life Saving Station and approximately one-half of the Rodanthe Historic District in the Atlantic Ocean. The Federal Highway Administration (FHWA) and NCDOT would reassess the condition of these historic resources prior to the implementation of subsequent phases in order to determine whether the proposed NC 12 alignment could be modified.

The northern terminus of the Rodanthe area bridge with the Road North/Bridge South and the All Bridge alternatives would remain the same, with bridging beginning approximately 2 miles (3.2 kilometers) north of the Refuge's southern boundary and extending into Pamlico Sound before rejoining NC 12 in Rodanthe (see Figure C-2 and Figure C-3 in Appendix C).

- Phased Approach/Rodanthe Bridge Alternative. The original design of the Phased Approach/Rodanthe Bridge Alternative included a bridge in Rodanthe that was contained within the existing 100-foot (30.5-meter) easement, with one-way service roads on either side of the bridge being used to provide local access. The alternative terminated approximately 1,560 feet (475.5 meters) south of the Rodanthe Historic District. The bridge was within the district boundaries and adjacent to the boundary of the Chicamacomico Life Saving Station. Because of the visual impacts of the bridge, as well as concerns over the impact of the associated change in access both to the Chicamacomico Life Saving Station and across the Rodanthe Historic District, the Rodanthe area bridge was shortened to stop at a point approximately 420 feet (128.0 meters) north of the district. The southern end of this bridge would not be brought down to grade; instead, traffic would access the bridge via a two-lane ramp on the west side of the bridge. NC 12 traffic would be at-grade through the Rodanthe Historic District. (See Figure 2-3.)

The main bridge would not be brought down to grade because of the risk of shoreline erosion (see Figure 2-1). In order to keep the bridge outside the Rodanthe Historic District, it must drop below the elevation of the storm surge in the general area of the 2020 high erosion



**PHASED APPROACH/RODANTHE BRIDGE ALTERNATIVE
RAMP AND FRONTAGE ROADS IN RODANTHE**

Figure
2-3

shoreline and reach existing grade between the forecast 2040 and 2050 high erosion shorelines. Thus, placing this ramp back to grade on one side and continuing the bridge at full height above the storm surge to a point between the forecast 2040 and 2050 high erosion shorelines would reduce the risk to NC 12 of high erosion or an island breach. If high erosion rates manifest themselves or a breach occurs that puts the ramp-to-grade at risk, then, following additional environmental analysis, a new ramp could be built off the full height bridge and/or the full height bridge could be extended as originally proposed. Again, the 2060 high erosion shoreline places almost all of the Chicamacomico Life Saving Station and approximately half of the Rodanthe Historic District in the Atlantic Ocean. FHWA and NCDOT will reassess the condition of these historic resources prior to the implementation of subsequent phases to determine whether the proposed NC 12 alignment could be modified.

The northern terminus of the Rodanthe bridge with the Phased Approach/Rodanthe Bridge Alternative would remain the same; bridging would begin at a point north of the Rodanthe ‘S’ Curves Hot Spot within the Refuge and extend south into Rodanthe while remaining within the existing 100-foot (30.5-meter) easement (see Figure C-4 in Appendix C).

Table 2-1 presents a comparison of the updated human environment impacts in the Rodanthe area for the detailed study alternatives. For this comparison, the Rodanthe area was defined as the area beginning at the Chicamacomico Life Saving Station and extending north to a point approximately 2 miles (3.2 kilometers) north of the Refuge’s southern boundary where the “bridge south” component of the Road North/Bridge South Alternative terminates. This area is illustrated in Figure 2-4.

Note that one change in the affected human environment described in the FEIS has occurred and is reflected in the impact material presented in this section. Several additional homes have been built in the Rodanthe portion of the project area. These additional homes are reflected in the relocation and noise impacts found in Table 2-1 for both the FEIS and the EA alternatives. In general, the revisions to the alternatives result in unchanged or lower impacts to the human environment, including impacts to Rodanthe community cohesion and accessibility, visual impacts, cultural resource impacts, and parks and recreation impacts. However, relocation and noise impacts would increase.

The business relocations shown in Table 2-1 for the revised (EA) Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge alternatives are higher than for the same alternatives as designed in the FEIS. Residential relocations are also higher with the Phased Approach/Rodanthe Bridge Alternative. Because these alternatives were redesigned to end north of the Rodanthe Historic District, they have a greater impact on the partially developed area north of the district. However, the increase in the number of relocations does not represent a new significant impact for two reasons:

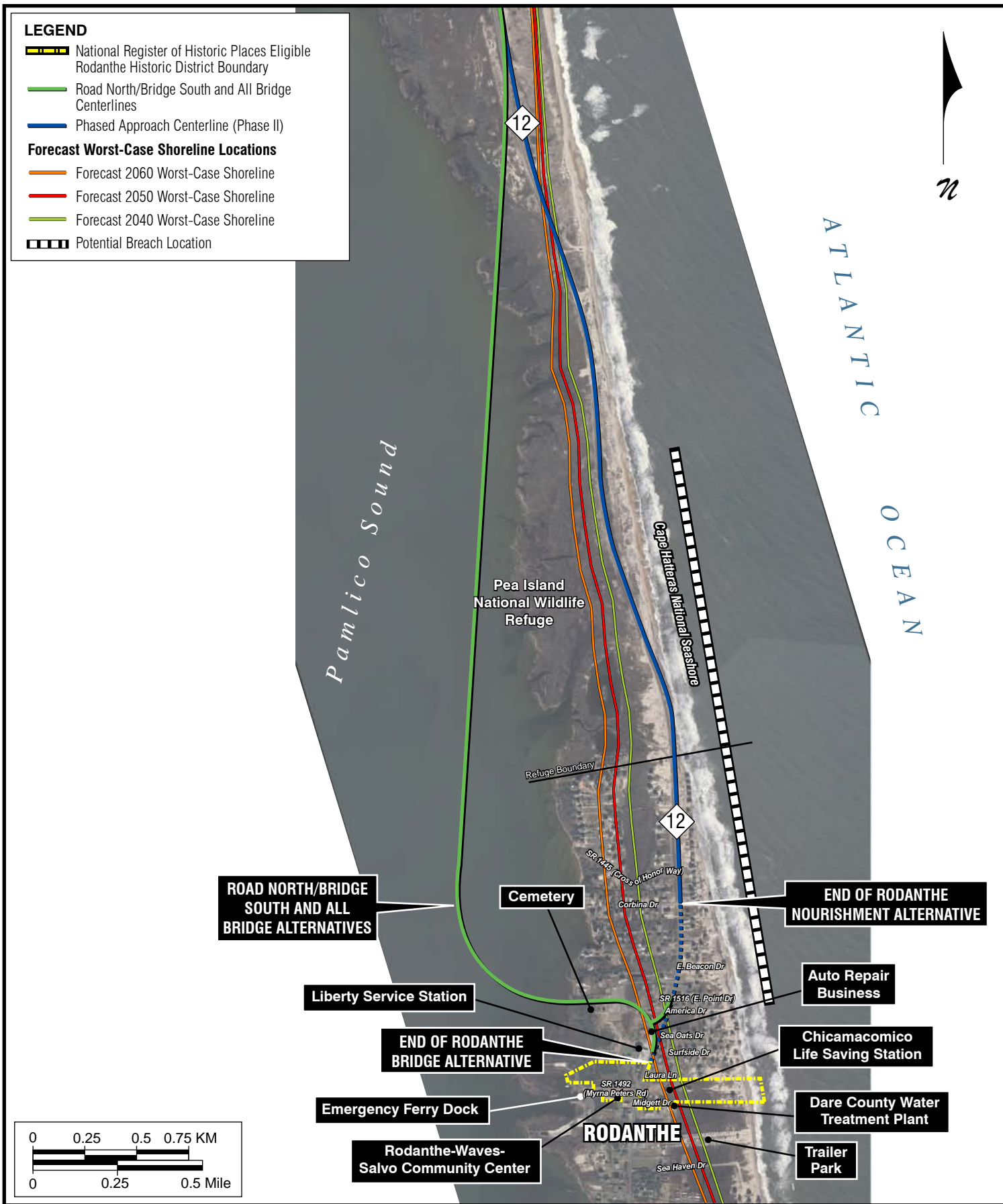
1. The relocation impacts for these alternatives remain within the range of impacts presented for the detailed study alternatives assessed in the FEIS. They are similar to or less than those presented in the FEIS for the Pamlico Sound Bridge Corridor alternatives, which affected the same area north of the Rodanthe Historic District as the revised Parallel Bridge Corridor alternatives. Taking into account home construction since relocation studies were completed for the Pamlico Sound Bridge Corridor, the Pamlico Sound Bridge Corridor alternatives would displace six to 11 homes (up from five to six in the FEIS) and one to six businesses.
2. Properties purchased would be purchased at fair market value, and residents and businesses would be relocated as a part of NCDOT’s relocation program described in Section 4.1.1 of

Table 2-1. Comparison of FEIS and EA Human Environment Impacts with Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge Alternatives¹ in the Rodanthe Area

	Road North/Bridge South and All Bridge		Phased Approach/Rodanthe Bridge	
	FEIS	EA	FEIS	EA
Community and Visual Impacts				
Residential Relocations	2	2	3	6
Business Relocations	0	5	1 (plus 2 partially affected)	7
Cemetery Impacts	None	Proposed right-of-way would cross cemetery, but no known gravesites would be affected.	None	
Rodanthe Community Cohesion and Accessibility	No impact.		1.1 miles (1.8 kilometers) of bridge would bisect community and make vehicle access more circuitous.	0.8 mile (1.3 kilometers) of bridge would bisect community and make vehicle access more circuitous.
Noise Impact (estimated number of sensitive receptors affected)	2 residential receptors exceeding FHWA NAC	3 residential receptors exceeding FHWA NAC, and 3 residential receptors (including 1 of the 3 exceeding FHWA NAC) and 1 business receptor with substantial noise increases	2 residential receptors exceeding FHWA NAC	3 residential receptors exceeding FHWA NAC
Visual Impact	Panoramic views of Pamlico Sound from homes along shoreline in Rodanthe would be affected.		1.1 miles (1.8 kilometers) of elevated structure would substantially affect views in Rodanthe.	0.8 mile (1.3 kilometers) of elevated structure would substantially affect views in Rodanthe.
Cultural Resource Impacts				
Rodanthe Historic District and Chicamacomico Life Saving Station	Adverse Effect; would use land from district passing 14 feet (4.3 meters) and 320 feet (97.5 meters) away from station and one other contributing structure, respectively.	No Adverse Effect; the alternatives would end outside the district, so cultural resources would not be directly affected; alternatives would be within view of resources, but view also currently includes modern commercial and residential structures.	Adverse Effect; alternative would be contained within existing highway right-of-way, but alternative would bisect district along existing NC 12 and future access would be from one-way frontage roads. Elevated structure would bisect views across NC 12 within the district.	No Adverse Effect; the alternative would end outside the district, so cultural resources would not be directly affected; alternative would be within view of resources, but view also currently includes modern commercial and residential structures.
Pea Island National Wildlife Refuge	The two alignments are the same in the Refuge; Adverse Effect because the alternatives would leave the existing NC 12 easement, and because of the elevation of the bridge as it passes through the Refuge.		The two alignments are the same in the Refuge; Adverse Effect because of the elevation of the bridge as it passes through the Refuge.	
Parks and Recreation Impacts				
General Refuge Access	Bridge through Pamlico Sound in southern portion of Refuge would reduce access in that area.		Bridge in existing NC 12 easement in southern portion of Refuge would reduce access in that area.	
Length of NC 12 Outside the Existing Easement within the Refuge	0.7 mile (1.1 kilometers)		None.	

¹The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) could include implementation of the shared Road North/Bridge South and All Bridge alignment or the Phased Approach/Rodanthe Bridge alignment as a part of a future phase in the Rodanthe area. The FEIS proposes improvements in the Rodanthe area to be implemented as a part of Phase II of the project.

NOTE: There were no modifications made to the FEIS conceptual designs for the Nourishment and Phased Approach/Rodanthe Nourishment alternatives in the Rodanthe area.



RODANTHE AREA ASSESSED IN TABLE 2-2

Figure 2-4

the FEIS. Conceptual stage relocation studies (see Appendix H) concluded that: after project construction, business services would be available; suitable business sites are available for relocated businesses; decent, safe, and sanitary housing would be available during the relocation period; and there would be no problem in finding relocation housing within the means of current residents.

As indicated in Table 2-1, the right-of-way for the revised Road North/Bridge South and All Bridge alternatives would cross a cemetery in Rodanthe; however, no marked gravesites would be affected. If a future phase uses this corridor, additional research and/or field surveys would be conducted to affirm no unmarked graves would be affected. If unmarked graves would be affected, the right-of-way boundary could be adjusted to avoid the graves without affecting the location of the bridge passing adjacent to the cemetery.

The additional receptors affected by increased traffic noise with the revised alternatives do not represent a new significant impact because:

1. In the case of the Phased Approach/Rodanthe Bridge Alternative, the impact to one additional receptor is within the range of impacts presented for the detailed study alternatives assessed in the FEIS.
2. The revised Road North/Bridge South and All Bridge alternatives place the Rodanthe Bridge terminus in the same general area as the FEIS' Pamlico Sound Bridge Corridor. The FEIS identified noise impacts at three to four receptors with the Pamlico Sound Bridge Corridor alternatives, whereas the revised Road North/Bridge South and All Bridge alternatives would affect six receptors. However, the revised Road North/Bridge South and All Bridge alternatives have fewer residential relocations (i.e., 2 residential relocations with the revised alternatives versus 6 to 11 residential relocations with the Pamlico Sound Bridge Corridor alternatives).

Although increases in noise and displacement impacts would occur with the revised alternatives, as indicated in Table 2-1 the revisions represent a substantial reduction in impacts to the National Register-eligible Rodanthe Historic District and the National Register-listed Chicamacomico Life Saving Station. Therefore, based on the data presented in Table 2-1, the design changes in Rodanthe would result in no new significant impacts to human environment resources.

Table 2-2 presents a comparison of key natural environment impact issues associated with the Rodanthe area (shown in Figure 2-4) for the FEIS and revised alternatives.

Table 2-2 indicates that there would be at-grade portions of NC 12 less than 230 feet (70.1 meters) west of the forecast 2060 high erosion shoreline, whereas there were none with the detailed study alternatives presented in the FEIS. The length of the at-grade portions of NC 12 west of the 2060 high erosion shoreline would be approximately 1,310 feet (399.3 meters) with the Road North/Bridge South and All Bridge alternatives, and approximately 764 feet (232.9 meters) with the Phased Approach/Rodanthe Bridge Alternative. For the Road North/Bridge South and All Bridge alternatives, there also would be an increase in wetlands impacts of approximately 0.8 acre (0.3 hectare) in comparison to the detailed study alternatives presented in the FEIS, although there also would be a reduction in aquatic bottom impacts of approximately 0.4 acre (0.2 hectare). For the Phased Approach/Rodanthe Bridge Alternative, there would be an increase of approximately 1.6 acres (0.7 hectare) in biotic communities impacts in comparison to the alternative presented in the FEIS, but all of the increased impact would be to upland areas.

Table 2-2. Comparison of FEIS and EA Natural Environment Impacts with Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge Alternatives¹ in the Rodanthe Area

	Road North/Bridge South and All Bridge		Phased Approach/Rodanthe Bridge	
	FEIS	EA	FEIS	EA
Coastal Conditions Impacts				
Potential for Breach and Need for Closing Breach to Maintain NC 12	Potential breach area north of Rodanthe bridged. No expected need to close future breaches.		Potential breach area north of Rodanthe bridged. No expected need to close future breaches.	
At-Grade Portions of NC 12 less than 230 feet (70.1 meters) West of 2060 High Erosion Shoreline	None.	1,310 feet (399.3 meters)	None.	764 feet (232.9 meters)
Natural Resources Impacts				
Biotic Communities Fill and Pile Impacts, acres (hectares)				
Submerged Aquatic Vegetation (SAV)	0.1 (0.1)	0.1 (0.1)	0.0 (0.0)	0.0 (0.0)
Wetlands	0.9 (0.4)	2.0 (0.8)	0.0 (0.0)	0.0 (0.0)
Uplands – Natural and Man Dominated	5.3 (2.1)	5.6 (2.2)	5.0 (2.0)	7.2 (2.9)
Impoundments	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Aquatic Bottom	0.3 (0.1)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Total	6.6 (2.7)	7.7 (3.1)	5.0 (2.0)	7.2 (2.9)
Wetlands and SAV Shaded, acres (hectares)				
• Wetlands	1.6 (0.6)	1.5 (0.6)	0.0 (0.0)	0.0 (0.0)
• SAV	5.4 (2.2)	5.3 (2.1)	0.0 (0.0)	0.0 (0.0)
Protected Species Adversely Affected	None likely.	None likely.	None likely.	None likely.

¹The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) could include implementation of the shared Road North/Bridge South and All Bridge alignment or the Phased Approach/Rodanthe Bridge alignment as a part of a future phase in the Rodanthe area. The FEIS proposes improvements in the Rodanthe area to be implemented as a part of Phase II of the project.

NOTE: There were no modifications made to the FEIS conceptual designs for the Nourishment and Phased Approach/Rodanthe Nourishment alternatives in the Rodanthe area.

Based on the data presented in Table 2-2, the design changes in Rodanthe would result in no new significant impacts to natural resources.

2.2 Elimination of the Pamlico Sound Bridge Corridor as a Detailed Study Alternative

The Pamlico Sound Bridge Corridor was not identified as the Preferred Alternative in the FEIS. On August 27, 2007, senior representatives of NCDOT, FHWA, USACE, and the North Carolina Department of Environment and Natural Resources (NCDENR), meeting as the Merger 01 Dispute Resolution Board for the National Environmental Policy Act/Section 404 of the Clean Water Act (NEPA/Section 404) Merger Process, concluded that the Pamlico Sound Bridge Corridor was not a practicable alternative based on cost estimates and available funding. The Dispute Resolution Board also selected the Parallel Bridge Corridor with Phased Approach/

Rodanthe Bridge Alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA). The Dispute Resolution Board met to make these decisions under the terms of the Merger Dispute Resolution Process because the full NEPA/Section 404 Merger Team could not reach a consensus. The Merger Process, including the dispute/conflict resolution process, is used to streamline the project development and permitting processes for NCDOT projects. This process for project decision-making is detailed in Section 8.3.1 of the FEIS. Generally, the Merger Process provides environmental resource and regulatory agencies with the opportunity formally to concur with key decisions in the impact assessment process; these decisions are known as Concurrence Points. In the event that the Merger Team cannot agree on a specific issue, the Merger Process includes a dispute resolution procedure in which conflicts are resolved by management staff of the primary transportation and permitting agencies. The Merger Process is agreed to by US Army Corps of Engineers (USACE), NCDENR (Division of Water Quality and Division of Coastal Management), FHWA, and NCDOT and supported by other partnering agencies and local units of government.

The US Department of the Interior (USDO) did not agree with the Dispute Resolution Board's decision and included in its comments on the FEIS that "Even though the information presented in the FEIS and Section 4(f) Evaluation is proposing a Parallel Bridge Corridor alternative, it still demonstrates that the implementation of any of the Parallel Bridge Corridor Alternatives may violate Section 4(f) because the Pamlico Sound alternative would appear to be a feasible and prudent alternative and would minimize harm to the Refuge (a section 4(f) property)."

FHWA did not consider the Pamlico Sound Bridge Corridor as an avoidance alternative for the Refuge and Cape Hatteras National Seashore (Seashore) in the FEIS/Final Section 4(f) Evaluation because, at that time, FHWA found the Pamlico Sound Bridge Corridor used land from the Seashore (a Section 4(f) property). However, FHWA and NCDOT subsequently obtained information showing that a public vehicular thoroughfare pre-dates the establishment of the Seashore and that both were concurrently and jointly planned and developed to co-exist. In a Revised Final Section 4(f) Evaluation completed in October 2009, FHWA revised its use determination for the Seashore to say that Section 4(f) is not applicable because the impacts resulting from relocating NC 12 from its current alignment through the Seashore would not be considered a use as defined in Title 23 *Code of Federal Regulations* Section 774.17. Thus, the Pamlico Sound Bridge Corridor must be analyzed as a feasible and prudent avoidance alternative for the Refuge under Section 4(f).

The Revised Final Section 4(f) Evaluation included a feasible and prudent Refuge avoidance alternative analysis for the Pamlico Sound Bridge Corridor (see the Revised Final Section 4(f) Evaluation document's Appendix G). The complete Revised Final Section 4(f) Evaluation is included as Appendix B in this EA. FHWA determined that the Pamlico Sound Bridge Corridor is not a feasible and prudent avoidance alternative to using the Refuge as an historic property, as the cost of either of the Pamlico Sound Bridge Corridor alternatives would be of an extraordinary magnitude based on the funding currently available and reasonably expected to be available in the future to NCDOT to operate, improve, and maintain its state highway system.

To summarize the detailed Refuge avoidance alternative analysis contained in Appendix G of the Revised Final Section 4(f) Evaluation, implementation of any of the Pamlico Sound Bridge Corridor alternatives would require financing in its entirety a single construction phase costing between \$942.9 million and \$1.441 billion (2006 dollars). The project could not be financed by phasing construction (i.e., spreading out the cost over many years) because much of the 17.5-mile (28.2-kilometer) long bridge would be approximately 5 miles (8 kilometers) west of Hatteras Island in Pamlico Sound, so there would be no point at which to tie a partial bridge into existing

NC 12 to make it operational. Funding construction of a 17.5-mile (28.2-kilometer) long bridge would create a unique maintenance problem of extraordinary magnitude for NCDOT as it would have to defer much needed improvements on the remainder of the state highway system in North Carolina for a significant period of time. The Pamlico Sound Bridge Corridor also would have severe adverse impacts to the public's access to the Refuge and portion of the Seashore between Rodanthe and Oregon Inlet, land area shared by the Refuge and the Seashore. Therefore, the Pamlico Sound Bridge Corridor alternatives are not carried forward as detailed study alternatives because they are not feasible and prudent avoidance alternatives.

In conclusion, FHWA's determination that the Pamlico Sound Bridge Corridor is not a feasible and prudent Refuge avoidance alternative does not result in new information or circumstances relevant to environmental concerns and bearings on the proposed action or its impacts that would result in significant environmental impacts not evaluated in the FEIS. The FEIS, based on the outcome of the Merger Process, already concluded that the Pamlico Sound Bridge Corridor was not the LEDPA/Preferred Alternative based on cost estimates and available funding.

2.3 Preferred Alternative

FHWA and NCDOT propose a new alternative within the Parallel Bridge Corridor for detailed study, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative. It also has been selected as the new Preferred Alternative. It proposes to proceed with construction of Phase I of the Parallel Bridge Corridor as soon as possible. Phase I of the Parallel Bridge Corridor would consist of a parallel replacement structure on the west side of the existing Bonner Bridge, similar to the structure proposed for the other Parallel Bridge Corridor alternatives. The NC 12 Transportation Management Plan Alternative (Preferred) does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I, but includes a process for determining the implementation timing and extent of future phases. Several aspects of this alternative, including the phasing and the coastal monitoring program, are similar to the Phased Approach/Rodanthe Bridge Alternative, which was selected as the Preferred Alternative in the FEIS.

2.3.1 Development of the Preferred Alternative

Following the approval of the FEIS/Final Section 4(f) Evaluation in September 2008, FHWA and NCDOT decided to pursue the Road North/Bridge South Alternative as the new LEDPA/Preferred Alternative. There were two primary factors that led to this decision. First, FHWA and NCDOT obtained information documenting the existence of a public vehicular thoroughfare and records for public roads dating back to the time when the Refuge and Seashore were established. The research indicated that NC 12 had been relocated four times as a result of shoreline erosion caused by storm events, and the Refuge had approved these relocations with no documented significant effects. Second, in their comment letter on the FEIS/Final Section 4(f) Evaluation (Appendix E), USDO I stated that impacts to the Refuge would be lessened with an at-grade road (which the Road North/Bridge South Alternative provides) rather than the elevated roadway included in the Phased Approach/ Rodanthe Bridge Alternative (the Preferred Alternative in the FEIS/Final Section 4(f) Evaluation). In its comment letter (Appendix E), the North Carolina Department of Cultural Resources (NCD CR) also stated concerns regarding the visual impact of the Phased Approach bridges to both the Refuge and the Rodanthe Historic District. Though not central to the decision to pursue the Road North/Bridge South Alternative as the new LEDPA/Preferred Alternative, there also would be substantial cost savings with the Road North/

Bridge South Alternative in comparison to the Phased Approach/Rodanthe Bridge Alternative (see Section 2.3.7).

During the May 21, 2009, Merger Team meeting (see Section 3.3.3), the representatives of several member agencies stated that they could not concur with the Road North/Bridge South Alternative as the new LEDPA/Preferred Alternative because of the amount of wetland impacts caused by the road relocation component. The US Environmental Protection Agency (USEPA) representative then recommended that NCDOT move forward with the construction of the replacement of Bonner Bridge along the Parallel Bridge Corridor over Oregon Inlet, but not prescribe a solution for the balance of the project at this time since it is very difficult to predict the timing and impact of storm events on the shoreline. For later phases, the USEPA representative recommended that an interagency, collaborative adaptive management strategy be developed. The Merger Team agreed that the USEPA representative's proposal fit within the terms of the August 27, 2007, Concurrence Point 3 Agreement (LEDPA) in that:

1. It would involve replacement of the Oregon Inlet bridge as Phase I; and
2. The alternative recognizes that completion of Phase I alone would not meet the purpose and need of the project and represented a commitment by all parties to develop and implement the entire action from Rodanthe to Bodie Island.

Following the meeting, FHWA and NCDOT developed a description of the new Preferred Alternative, eventually titled the Parallel Bridge Corridor with NC 12 Transportation Management Plan, and circulated it to the Merger Team on June 18, 2009, for review and comment. The description of this alternative in the following sections is based on the initial description, as well as comments made by Merger Team members during subsequent meetings and comments on the Revised Final Section 4(f) Evaluation.

2.3.2 Characteristics of the Preferred Alternative

2.3.2.1 Phase I

Phase I of the NC 12 Transportation Management Plan Alternative (Preferred) is a variation of the Oregon Inlet bridge proposed for the other Parallel Bridge Corridor alternatives in the FEIS. The only changes proposed to the Oregon Inlet bridge are at the southern end of the structure and are as a result of negotiations with US Fish and Wildlife Service (USFWS) on the exact location of the southern terminus.

In June 2009, FHWA and NCDOT began coordination with the Refuge on the alignment for Phase I. NCDOT submitted revised designs for the southern terminus of the Oregon Inlet bridge components of the Parallel Bridge Corridor with Nourishment, Road North/Bridge South, and Phased Approach alternatives. Each of these alternatives were extended to the south by approximately 2,000 feet (610 meters) as a part Oregon Inlet bridge construction (Phase I) to account for potential sound-side erosion at the north end of Hatteras Island (see Figure 2-6), based upon discussions at the November 2008 Merger Team meeting (Section 3.3.1).

In making the above revisions, the length of the navigation zone for all of the Parallel Bridge Corridor alternatives is 3,300 feet (1,006 meters) in order to lower the Oregon Inlet bridge height as it enters Hatteras Island. The navigation zone for the Phased Approach alternatives, already 3,300 feet (1,006 meters) in length, did not change. A final navigation zone will be determined during final design of Phase I in coordination with the USACE and the US Coast Guard (USCG).

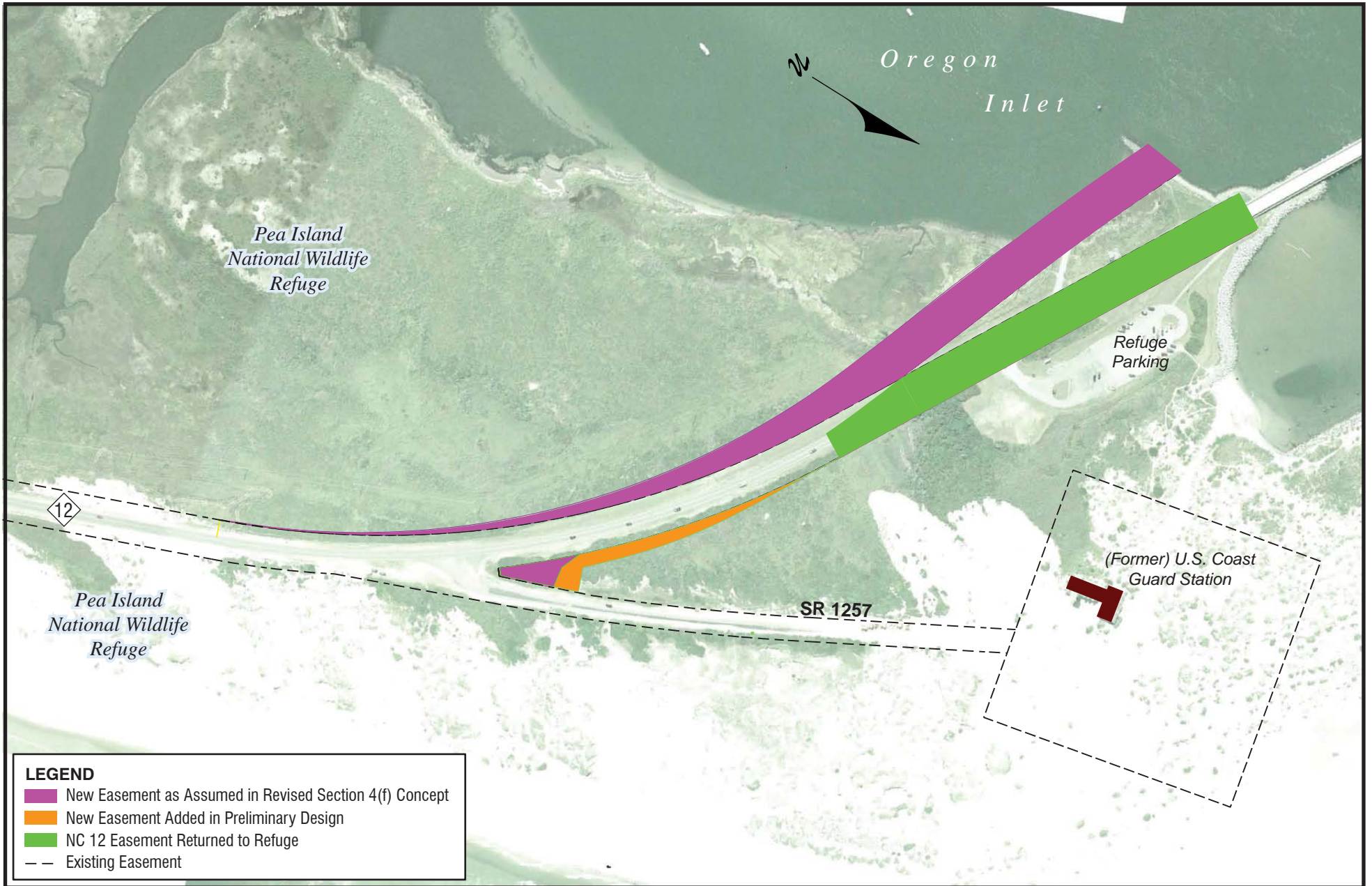
On July 15, 2009, FHWA and NCDOT met with Refuge representatives in the Refuge to discuss the June 2009 modifications to the FEIS Phase I alignments described above. As an alternative to the concepts presented by FHWA and NCDOT, Refuge representatives presented a map showing limits of what the Refuge would consider to be a minor revision of the easement for Phase I roadway improvements in the Refuge that would not require a compatibility determination for compliance with the National Wildlife Refuge System Improvement Act of 1997.

Subsequently, NCDOT developed a conceptual design that stayed within the limits provided by the Refuge. NCDOT also developed a second conceptual design in which the alignment traversed just west of the limits provided by the Refuge and tied into NC 12 south of these limits. The latter conceptual design was developed to provide a safer distance between existing NC 12 and the new Oregon Inlet bridge during construction, as well as improved access to the National Park Service (NPS) parking lot on the east side of NC 12 at the northern end of Hatteras Island.

On September 2, 2009, FHWA and NCDOT presented the two conceptual designs discussed above to Refuge representatives at a meeting at USFWS's Alligator River National Wildlife Refuge Office in Manteo, North Carolina. FHWA and NCDOT recommended that the conceptual design located just west of the limits provided by the Refuge be approved because of their concerns related to traffic control during construction and access to the parking lot located at Oregon Inlet. In correspondence to NCDOT representatives dated September 24, 2009, the Refuge indicated that the conceptual design that was beyond the original limits provided to FHWA and NCDOT in July was acceptable and likely represented the limits of what could be considered a minor modification of the existing easement. This conceptual design was adopted as Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) as evaluated in the Revised Final Section 4(f) Evaluation, which was approved on October 9, 2009 (see Appendix B). The area of new easement needed for this alignment would be approximately 3.5 acres (1.4 hectares), while the amount of existing NC 12 easement returned to the Refuge would be approximately 2.7 acres (1.1 hectares). These amounts are slightly different from those presented in the Revised Final Section 4(f) Evaluation; it was determined during preliminary design that additional easement area was needed in order to provide access from NC 12 to the access road that leads to the (former) Oregon Inlet US Coast Guard Station and to provide access to the NPS parking lot. The original NC 12 Transportation Management Plan Alternative (Preferred) drawing, which indicated that 3.08 acres (1.25 hectares) of new easement was needed and 2.7 acres (1.1 hectares) of existing NC 12 easement would be returned, was based on a conceptual design. The preliminary design added additional design detail related to the ending of the bridge approach fill and its intersection with the access road. This detail revealed the need for additional easement to bring the access road shoulder from the access road elevation to the elevation of the surrounding terrain. The change is reflected in Figure 2-5.

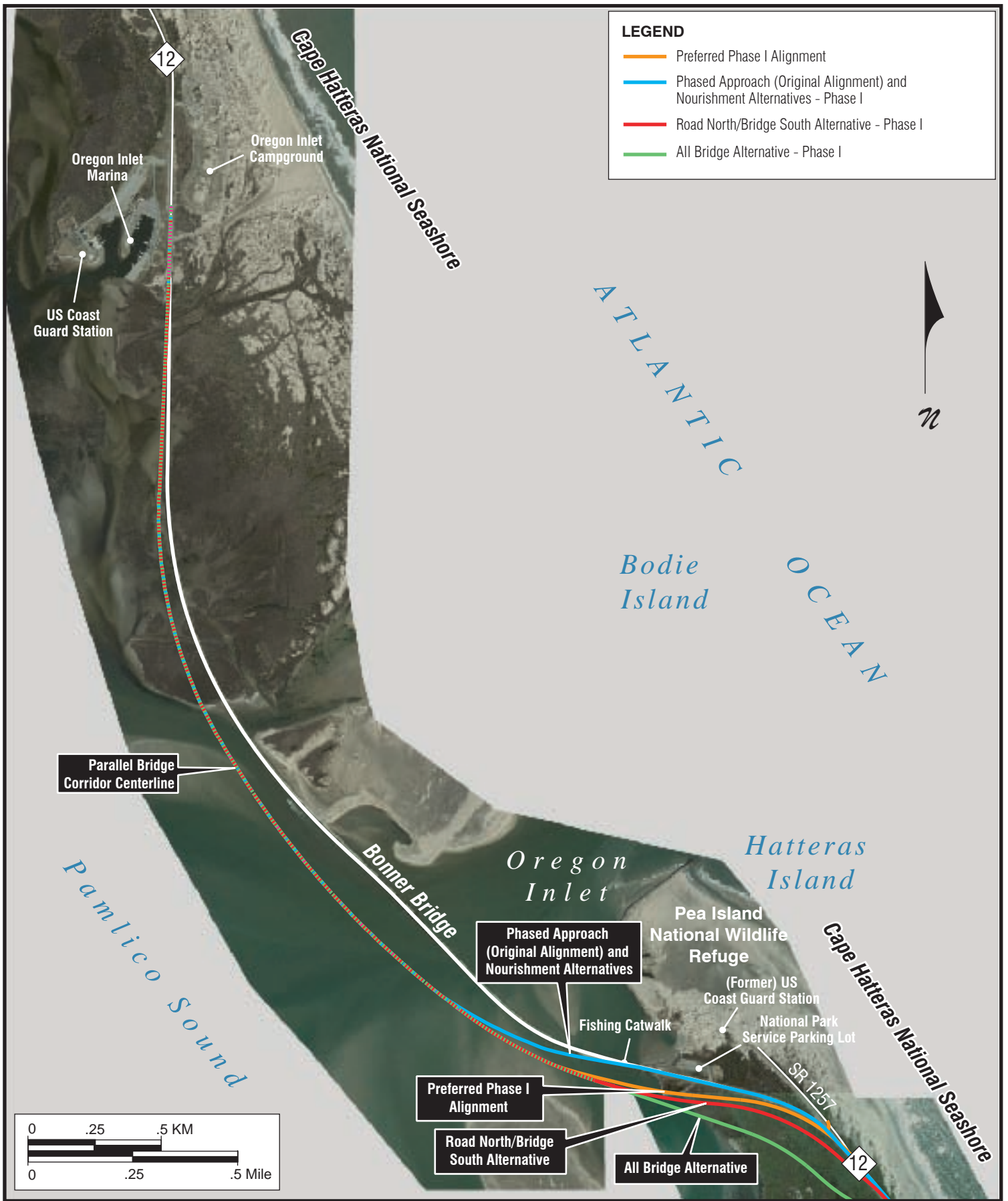
As shown in Figure 2-6, the adopted alignment of Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) would enter the north end of Hatteras Island approximately 212 feet (64.6 meters) west of Bonner Bridge and the existing NC 12 easement, but it would fully return to the existing easement approximately 2,640 feet (804.7 meters) south of the point the bridge enters Hatteras Island. With this alignment, the Oregon Inlet bridge would end approximately 700 feet (213.4 meters) south of the end of Phase I of the Phased Approach alternatives as presented in the FEIS. The Phase I alignment of the NC 12 Transportation Management Plan Alternative (Preferred) falls within the termini of the other Parallel Bridge Corridor alternatives.

A single conceptual alignment for Phase I is under consideration at the Bodie Island terminus of the proposed project. It is unchanged from that presented in the FEIS and is the same for the



**CHANGE IN PROPOSED PHASE I EASEMENT
SINCE REVISED FINAL SECTION 4(F) EVALUATION**

Figure
2-5



PARALLEL BRIDGE CORRIDOR ALTERNATIVES - PHASE I

Figure 2-6

NC 12 Transportation Management Plan Phase I. The final design in this location would be developed in coordination with NPS so as to minimize adverse impacts to Seashore resources.

The main bridge structure for the new Oregon Inlet bridge would be designed in coordination with USACE and USCG, including finalizing the location of the navigation zone. All aspects of Phase I would be designed to conform to North Carolina highway specifications as approved by FHWA and NCDOT to ensure the safe construction and operation of the highway. In addition, other state and federal environmental resource and regulatory agencies would have an opportunity to review and comment on the final design prior to authorization of construction.

The impacts of Phase I of the NC 12 Transportation Management Plan alignment are reflected in the impact findings presented in Section 0, and the project costs are presented in Section 2.3.7.

As discussed in Section 4.5.3.2 of the FEIS, NCDOT maintains catwalks on the southern end of Bonner Bridge. The catwalks provide access to the public to fish at Oregon Inlet. Because of the design modifications made to Phase I of all of the Parallel Bridge Corridor alternatives, all of the possible Oregon Inlet bridges would be approximately 25 feet (7.6 meters) above mean high water (33.5 feet [10.2 meters] at the top of the bridge deck) as they enter Hatteras Island. Catwalks attached to the new structure for any of the alternatives would be approximately 33.5 feet (10.2 meters) above the mean high water line; a catwalk at this height increases the likelihood of serious, if not fatal, injuries as a result of falls. With the NC 12 Transportation Management Plan Alternative, options for providing fishing access include:

- Leave a portion of the existing Bonner Bridge open for use as a fishing pier;
- Construction of a “boardwalk” on top of the riprap currently located on the northern shore of Hatteras Island; and
- Widening a short section of the new structure to provide pedestrian access, separated from traffic by a barrier.

Fishing from the terminal groin itself is still not considered a viable option because of the rapid currents adjacent to the groin and the uneven surface of the groin itself. The type of access provided will be determined during the final design of Phase I; however, NCDOT is committed to restoring access to fishing at the northern end of Hatteras Island once construction of Phase I is complete. The existing catwalks will remain open to the public during construction as long as it is safely viable.

2.3.2.2 Later Phases (NC 12 Transportation Management Plan)

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I because of the inherent uncertainty in predicting future conditions within the dynamic coastal barrier island environment. Instead, the alternative addresses the study and selection of future actions on Hatteras Island beyond the limits of Phase I through a comprehensive NC 12 Transportation Management Plan. By actively monitoring the conditions and delaying decision-making, the environmental impacts can be better quantified, minimized, and mitigated. This process is somewhat analogous to a tiered NEPA study, in that the entire end-to-end impacts have been studied but the detailed selection of a portion of the action is being delayed. If the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) is selected,

the details of the NC 12 Transportation Management Plan would be finalized through commitments made in the Record of Decision.

The alternative includes the following measures:

- NCDOT will fund and implement a coastal monitoring program on Hatteras Island within the project study area. The results of the monitoring program will be used to determine when planning of future phases of the project should begin.
- NCDOT and FHWA will utilize the results of the coastal monitoring program to determine when the environmental review for each phase should be initiated.
- The NEPA/Section 404 Merger Process will be utilized to study, select, and finalize future phases.

The NC 12 Transportation Management Plan set forth in this section incorporates the baseline coastal conditions identified in the FEIS (in section 3.6.2, “Existing Coastal Conditions”) and then provides a detailed plan to closely monitor the coastal conditions for environmental changes over the next 50 years along with changes in associated road maintenance activities. Formal reports of the monitoring findings and updates to the forecasted shoreline predictions would be generated annually. Regular coordination with interested federal, state, and local agencies and the public would be conducted. When the coastal monitoring program identifies specified conditions at a location, then the NC 12 Transportation Management Plan would provide for the initiation of an environmental review of a future phase action at that location. The NC 12 Transportation Management Plan then describes the process for decision-making regarding the future phase actions.

Public and agency comments submitted about this proposed NC 12 Transportation Management Plan may be submitted during the EA comment period. All comments received will be fully considered, and the proposed NC 12 Transportation Management Plan may be modified in response to such comments.

Coastal Monitoring Program

The NC 12 Transportation Management Plan would include a comprehensive coastal monitoring program, similar to but more refined than that proposed for the Phased Approach alternatives (see Section 2.10.2.5 of the FEIS). The coastal monitoring program would measure changes in the conditions on NC 12 and the surrounding environment as compared to baseline coastal conditions, for the purpose of guiding NCDOT’s planning for future phases of action through 2060. NCDOT would implement the coastal monitoring program immediately after the Record of Decision is signed.

As indicated above, the baseline coastal conditions for the NC 12 Transportation Management Plan are set forth in section 3.6.2 of the FEIS, “Existing Coastal Conditions.” In Section 3.6.3, the FEIS summarizes the predicted average and high erosion future shorelines in the project area for each decade through the year 2060 and assesses the potential likelihood, location, depth, and width of a breach to open in the project area through the year 2060. Section 4.6.8.6 of the FEIS describes the five characteristic types of maintenance activities needed to keep NC 12 clear and open to traffic in detail and sets forth the baseline conditions for each. Based on past experience, the five characteristic types of maintenance activities are: road scraping, dune maintenance, dune rebuilding, sandbag-based dune and berm replenishment, and dune translation. The coastal

monitoring program detailed below would be used to update the predicted shorelines and other coastal data discussed in the FEIS.

NCDOT would gather the following data within the project area on Hatteras Island:

- Geomorphological characteristics of the corridor including the width and elevation of the island, dune height and vegetation, shoreline position, and nearshore bathymetry;
- Relative distance from NC 12 to critical geomorphological features including the shoreline, dune, and estuarine shoreline for each section of the corridor;
- The extent and location of overwash occurrences for each section of the corridor;
- NC 12 roadway maintenance data, including the activities needed to maintain traffic and the manpower and cost involved, amount of time NC 12 is closed or reduced to one-lane traffic following storm events, etc.;
- Dredge disposal and beach nourishment projects undertaken by any party within the corridor or the adjacent nearshore area including the volume of sand involved and the location and method of placement; and
- Data about major storm events.

The data gathered would be compared to the baseline conditions, and any changes noted would be tracked and assessed. The majority of the physical information would be collected utilizing NCDOT aerial photography, which would be generated biannually and immediately following storm events as needed. This is consistent with current NCDOT practice; in recognition of the dynamic conditions within the project area, NCDOT has generated aerial photography biannually and following major storm events since 2002. Roadway maintenance data would be generated by NCDOT maintenance staff. Data regarding disposal or nourishment projects would be requested from the appropriate federal or state agencies overseeing those projects. Storm data would be compiled from agencies that track meteorological events, including the National Oceanic and Atmospheric Administration (NOAA), the National Hurricane Center, the State Climate Office, and other agencies as appropriate.

A report detailing the findings of the coastal monitoring program would be prepared on an annual basis. The erosion rates used to generate the baseline shoreline predictions also would be reassessed annually. NCDOT would provide a draft of each annual report to the Refuge manager for review. The draft report may be refined based on Refuge input. NCDOT would submit the final annual coastal monitoring reports to the Merger Team and would also post the reports on the internet for public review. An additional report that combines the monitoring findings with other geologic and biological datasets from other ongoing agency or university studies would be prepared every five years.

These efforts would be combined with the existing shoreline monitoring program that is underway as required by the existing terminal groin permit; any future monitoring efforts required as part of any new terminal groin permit also would be combined with the coastal monitoring. The coastal monitoring would be conducted by NCDOT staff (those with experience in aerial photography, coastal hydraulics, surveying, and roadway maintenance) and qualified coastal engineering consultants approved by NCDOT.

Environmental Review for Future Phases

The purpose of the environmental review is to determine, in coordination with all interested agencies and with an opportunity for public involvement, whether additional environmental study of a proposed future phase is needed prior to undertaking the future phase action. The environmental review would study the proposed action and the status of compliance with environmental laws that may be applicable to the proposed phase of action including, but not limited to, Section 4(f), the National Historic Preservation Act, the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, the Coastal Area Management Act, the National Wildlife Refuge System Improvement Act of 1997, and the Clean Water Act. FHWA and NCDOT also would complete the appropriate NEPA documentation for each future phase of action in accordance with 23 CFR 771.129-130. Environmental conditions and the timing of each phase would be the primary factors in determining what type of NEPA documentation (a re-evaluation, a supplement, or a separate NEPA process) is the most appropriate.

The results of the coastal monitoring program and the updated shoreline erosion predictions would be used by NCDOT and FHWA, in consultation with representatives of the Refuge, to determine when an environmental review for each individual future phase of action would be initiated, the limits of the action area, potential actions that should be considered for the location and measures to minimize and mitigate impacts. Based on previous NCDOT experience, findings that may warrant initiating an environmental review of a future phase include:

- An area with weak dunes (e.g., low dunes that lack vegetation) that potentially requires higher levels of storm-related NC 12 maintenance activity, proximity of the dune to NC 12, and the rate dunes may be advancing towards NC 12 (this recognizes that the frequency of dune maintenance is highest when a dune is less than 25 feet (7.6 meters) from the road);
- Significant increases in erosion rates over past trends;
- Significant increases in NC 12 storm-related maintenance frequency or activity over previous years;
- A determination that the distance between the active shoreline (mean high water) and NC 12 is below the critical buffer distance of 230 feet (70.1 meters) within the next five years; or
- A determination that shoreline and dune conditions are such that the need for storm-related maintenance is likely to escalate significantly in the next five years.

As of the publication of this EA, sections of the Canal Zone, Sandbag Area, and Rodanthe hot spot areas (see Figure 2-7) may already meet one or more of the listed criteria. The Rodanthe hot spot area was especially affected by a major storm event in November 2009 (Section 3.5.6). The coastal monitoring program will provide the information needed to determine when future phases of action will be initiated in these areas.

Selection of Future Phases for Implementation

Once NCDOT and FHWA decide to initiate an environmental review of a later phase in consultation with the Refuge as described above, the study, selection, and finalizing of that phase will follow the provisions of the NEPA/Section 404 Merger Process that is currently utilized by NCDOT. Because the purpose and need (Concurrence Point 1) of the overall project will not



HOT SPOT LOCATIONS

Figure
2-7

change, NCDOT and FHWA would likely reconvene the Merger Team at Concurrence Point 2, the selection of Detailed Study Alternatives.

2.3.3 Impact Assessment

2.3.3.1 FEIS Phase I Alignment Modification Impacts

The modifications to the FEIS Phase I alignments discussed in Section 2.3.2.1 primarily would change the visual impact of the bridge within the Refuge and near the (former) Oregon Inlet US Coast Guard Station. The historic resource impact in the Oregon Inlet area is related to the visual impact (as discussed on pages 4-36 to 4-39 of the FEIS). The visual change at the north end of Hatteras Island would increase with a longer bridge for the Road North/Bridge South and Nourishment alternatives. The visual change associated with these revised alternatives would be similar to the visual change with the Phased Approach alternatives, as well as with the All Bridge Alternative, which both already include a longer Oregon Inlet bridge by definition. All of the Phase I bridges would enter Hatteras Island approximately 25 feet (7.6 meters) above mean high water, which is lower than the 75-foot (22.9-meter) height proposed in the FEIS. Even though all of the proposed Phase I bridges would still be higher and longer than the existing structure, thereby introducing additional bridging next to the (former) Oregon Inlet US Coast Guard Station and the Refuge, the change in visual impact between the FEIS and the EA is not substantial. Recreational facility access would be maintained in the area with these changes to the FEIS Phase I alternatives.

Impacts to biological resources associated with these changes to the FEIS Phase I alternatives would be similar to the impacts presented in the FEIS. The wetland impacts for the Road North/Bridge South Alternative would decrease from 5.9 acres (2.4 hectares) to 1.9 acres (0.8 hectare) with the additional bridge length. With the Phased Approach alternatives, the wetland impacts for Phase I were 0.6 acre (0.2 hectare) in the FEIS but would increase slightly with the longer bridge to 0.7 acre (0.3 hectare). The reason for this slight increase in Phase I wetland impacts for the Phased Approach alternatives is the frontage roads required on either side of the extended bridge to maintain access to NC 12 and the (former) Oregon Inlet US Coast Guard Station. However, these same frontage roads would be needed after the completion of Phase II to provide access to the (former) Oregon Inlet US Coast Guard Station whether the Oregon Inlet bridge is extended approximately 2,000 feet (610 meters) or not. Thus, this apparent difference reflects more the timing of an impact with the Phased Approach alternatives than a difference in total area of impact. Protected species impacts would not change from that discussed in Section 4.7.9 of the FEIS. Aside from the benefit of minimizing breach risk with the revised alternatives, the coastal conditions impacts would be similar between the FEIS and revised alternatives (see Section 4.6 of the FEIS).

2.3.3.2 NC 12 Transportation Management Plan Impacts

Phase I of the NC 12 Transportation Management Plan Alternative (Preferred), given its southern terminus location between the Phased Approach alternatives and the Road North/Bridge South Alternative, would have visual and cultural resource impacts similar to those other alternatives. Like all of the other Parallel Bridge Corridor alternatives, recreational facility access would be maintained in the area. For Phase I of the NC 12 Transportation Management Plan Alternative (Preferred), the wetland impact would be 1.0 acre (0.4 hectare). The wetland impact is slightly higher than the Phased Approach alternatives (0.6 acre [0.2 hectare]) and slightly less than the Road North/Bridge South Alternative (1.9 acres [0.8 hectare]). These differences are not significant given that wetlands are widespread in the area. Because of its shorter Oregon Inlet bridge (i.e., extended only approximately 700 feet [213.4 meters] versus approximately 2,000 feet

[610 meters] with the other modified FEIS alignments discussed above), Phase I of the NC 12 Transportation Management Plan Alternative (Preferred) would be more likely to be affected should a deep breach result from sound-side erosion near the terminal groin (one of the five potential breach locations within the project area).

Table 2-3 presents a comparison of the updated human impact environments for Phase I of the detailed study alternatives as a result of design changes at Oregon Inlet. The historic resources effects findings presented in this table were determined in association with representatives of the HPO and the ACHP.

Table 2-4 presents a comparison of key natural environment impact issues for Phase I of the FEIS and revised alternatives. Key natural environment impact issues in this area are effects related to coastal conditions and natural resource impacts.

2.3.3.3 Jurisdictional Uses

Table 2-5 shows the impact on jurisdictional resources for Phase I of the Parallel Bridge Corridor alternatives under Section 404 of the Clean Water Act by wetland biotic community type. Coastal Area Management Act (CAMA) coastal wetlands and impacts are identified. Table 2-6 shows the impacts for all phases of the Parallel Bridge Corridor alternatives. Table 2-6 of this EA replaces Table 4-25 of the FEIS. Both tables reflect the updates to the Parallel Bridge Corridor alternatives described in Sections 2.1 and 2.3.2.1. This information is being provided for the purpose of supplying the detailed information needed by USACE as part of its responsibilities under Section 404. The changes in total wetland impacts by fill or piles for the Parallel Bridge Corridor alternatives between those depicted in Table 4-25 in the FEIS and those depicted in Table 2-6 range from a decrease of 0.21 acre (0.08 hectare) to an increase of 3.05 acres (1.23 hectares). The changes in impacts from shading range from an increase of 0.38 acre (0.15 hectare) to an increase of 1.86 acres (0.75 hectare). The changes in total wetlands and waters affected by fill or piles for the Parallel Bridge Corridor alternatives between those depicted in Table 4-25 in the FEIS and those depicted in Table 2-6 range from a decrease of 0.30 acre (0.12 hectare) to an increase of 1.43 acres (0.58 hectare). The changes in impacts from shading range from an increase of 1.53 acres (0.62 hectare) to an increase of 4.59 acres (1.86 hectares). Given that wetlands and other waters dominate the project area as illustrated in Figure E-2 of the FEIS, these changes are small and not significant.

2.3.3.4 Threatened and Endangered Species

FHWA and NCDOT contacted USFWS and NOAA Fisheries to determine whether re-initiation of Section 7 consultation would be necessary if the Preferred Alternative changed from the Phased Approach/Rodanthe Bridge Alternative to the Road North/Bridge South Alternative. Both agencies agreed (USFWS in April 2009 and NOAA in May 2009) that it was not necessary to re-initiate consultation if that change were to occur. FHWA and NCDOT contacted USFWS and NOAA Fisheries again to determine whether re-initiation of consultation was necessary for Phase I of the new Preferred Alternative, the NC 12 Transportation Management Plan. USFWS responded in August 2009 that it was not necessary. NOAA Fisheries has not yet responded as of the date of this document and no additional Section 7 consultation with NOAA Fisheries is expected.

2.3.3.5 Essential Fish Habitat

The FEIS contained an analysis of the effects of the then-preferred alternative (Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge) on Essential Fish Habitat (EFH). The analysis found that the overall effect of the project on EFH is not anticipated to be adverse. In commenting on the FEIS in a letter dated October 27, 2008, NOAA Fisheries did not object to

Table 2-3. Comparison of FEIS and EA Alternatives Human Environment Impacts for Phase I (Oregon Inlet Bridge)

	Road North/Bridge South		Nourishment and Phased Approach Alternatives		NC 12 Transportation Management Plan (Preferred)
	FEIS	EA	FEIS	EA	EA
Visual Impact	Visual change in the Phase I (Oregon Inlet) area of the Refuge with higher bridge.	Sizable visual intrusion into the Phase I (Oregon Inlet) area similar to the Phased Approach and All Bridge alternatives. Bridge is 2,000 feet (610 meters) longer, but is 50 feet (15.2 meters) lower in height as it crosses Hatteras Island.	Sizable visual intrusion into the Phase I (Oregon Inlet) area. Both the Nourishment and Phased Approach bridges are 2,000 feet (610 meters) longer, and the Nourishment bridge is 50 feet (15.2 meters) lower in height (consistent with the Phased Approach).		Sizable visual intrusion into the Phase I (Oregon Inlet) area. Bridge is approximately 1,300 feet (396 meters) shorter than other Parallel Bridge Corridor alternatives and the same height as it enters the Refuge.
Cultural Resource Impacts					
Pea Island National Wildlife Refuge	Adverse Effect to the Refuge as a historic resource.		Adverse Effect to the Refuge as a historic resource.		
(Former) Oregon Inlet US Coast Guard Station	Adverse Effect.		Adverse Effect		
Parks and Recreation Impacts					
Refuge Access					
• General	Access maintained to Refuge facilities and the (former) Oregon Inlet US Coast Guard Station in vicinity of Oregon Inlet.		Access maintained to Refuge facilities and the (former) Oregon Inlet US Coast Guard Station in vicinity of Oregon Inlet.		
• Fishing Access	No fishing catwalks; alternative access possible.		No fishing catwalks; alternate access possible.		
NC 12 Easement in Refuge					
• New, acres (hectares)	6.4 acres (2.6 hectares)	6.4 acres (2.6 hectares)	None.	None.	3.5 acres (1.4 hectares) ¹
• Existing returned, acres (hectares)	4.8 acres (1.9 hectares)	4.8 acres (1.9 hectares)	None.	None.	2.7 (1.1 hectares) ¹
Seashore Impact	The alignment is the same within the Seashore on Bodie Island; no existing NPS facilities displaced.		The three alignments are the same in the Seashore on Bodie Island; no existing NPS facilities displaced.		
NC 12 Easement in Seashore					
• New, acres (hectares)	6.3 acres (2.6 hectares)		6.3 acres (2.6 hectares)		
• Existing returned, acres (hectares)	6.3 acres (2.6 hectares)		6.3 acres (2.6 hectares)		

Note: The southern terminus of the All Bridge Alternative was not modified so no FEIS versus EA impact comparison is needed.

¹ Area impacts are slightly different from those listed in the Revised Final Section 4(f) Evaluation (October 2009) as a result of minor changes made in the preliminary design of the alternative.

Table 2-4. Comparison of FEIS and EA Alternatives Natural Environment Impacts for Phase I (Oregon Inlet Bridge)

	Road North/Bridge South		Nourishment and Phased Approach Alternatives		NC 12 Transportation Management Plan (Preferred)
	FEIS	EA	FEIS	EA	EA
Coastal Conditions Impacts					
Need for Terminal Groin Retention	Retain.		Retain.		
Sound-Side Erosion on North End of Hatteras Island that Could Cause a Breach	A deep breach near the terminal groin could be difficult to fill with sand.	Potential deep breach area associated with sound-side erosion near terminal groin would be bridged in Phase I.	A deep breach near the terminal groin could be difficult to fill with sand.	Potential deep breach area associated with sound-side erosion near terminal groin would be bridged in Phase I.	A deep breach near the terminal groin could be difficult to fill with sand.
Natural Resources Impacts					
Biotic Communities Fill and Pile Impacts, acres (hectares)					
• Submerged Aquatic Vegetation (SAV)	0.3 (0.1)	0.3 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)
• Wetlands	5.9 (2.4)	1.9 (0.8)	0.6 (0.2)	0.8 (0.3)	1.0 (0.4)
• Uplands – Natural and Man Dominated	1.5 (0.6)	2.8 (1.1)	1.5 (0.6)	4.1 (1.7)	3.8 (1.5)
• Impoundments	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
• Aquatic Bottom	2.5 (1.0)	2.4 (1.0)	2.1 (0.8)	2.1 (0.8)	2.2 (0.9)
Total	10.2 (4.1)	7.5 (3.0)	4.4 (1.8)	7.2 (2.9)	7.3 (2.9)
Wetlands and SAV shaded, acres (hectares)					
• Wetlands	2.0 (0.8)	3.3 (1.3)	1.4 (0.6)	1.4 (0.6)	2.2 (0.9)
• SAV	0.9 (0.4)	0.9 (0.4)	0.9 (0.4)	0.9 (0.4)	0.9 (0.4)
Protected Species Impacts	Likely disturbance to piping plover and sea turtles nesting on beach, but not likely to adversely affect in ocean. Not likely to adversely affect seabeach amaranth.		Likely disturbance to piping plover and sea turtles nesting on beach, but not likely to adversely affect in ocean. Not likely to adversely affect seabeach amaranth.		

Note: The southern terminus of the All Bridge Alternative was not modified so no FEIS versus EA impact comparison is needed.

Table 2-5. Phase I Shading, Fill, and Pile Placement Impacts to Wetlands and Waters for the Parallel Bridge Corridor Alternatives

Biotic Community	Nourishment Alternative in Acres (hectares)		Road North/Bridge South Alternative in Acres (hectares)		All Bridge Alternative in Acres (hectares)		Phased Approach/Rodanthe Bridge Alternative in Acres (hectares)		Phased Approach/Rodanthe Nourishment Alternative in Acres (hectares)		NC 12 Transportation Management Plan Alternative in Acres (hectares)	
	Shading	Fill and Pile	Shading	Fill and Pile	Shading	Fill and Pile	Shading	Fill and Pile	Shading	Fill and Pile	Shading	Fill and Pile
Open Water												
• Aquatic bottom (sound/other waters)	8.86 (3.59)	2.13 (0.86)	8.19 (3.31)	2.44 (0.99)	8.31 (3.36)	2.53 (1.02)	8.87 (3.59)	2.13 (0.86)	8.87 (3.59)	2.13 (0.86)	7.86 (3.18)	2.23 (0.90)
• SAV ¹	0.91 (0.37)	0.22 (0.09)	0.91 (0.37)	0.27 (0.11)	0.91 (0.37)	0.27 (0.11)	0.91 (0.37)	0.22 (0.09)	0.91 (0.37)	0.22 (0.09)	0.91 (0.37)	0.22 (0.09)
• Impoundments	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
TOTAL OPEN WATER/SAV IMPACT	9.77 (3.95)	2.35 (0.95)	9.10 (3.68)	2.71 (1.10)	9.22 (3.73)	2.80 (1.13)	9.78 (3.96)	2.35 (0.95)	9.78 (3.96)	2.35 (0.95)	8.77 (3.54)	2.45 (0.99)
Wetland												
• Wetland man-dominated	0.00 (0.00)	0.15 (0.06)	0.02 (0.01)	0.15 (0.06)	0.00 (0.00)	0.15 (0.06)	0.00 (0.00)	0.15 (0.06)	0.00 (0.00)	0.15 (0.06)	0.12 (0.05)	0.20 (0.08)
• Salt shrub/grasslands	0.00 (0.00)	0.07 (0.03)	0.00 (0.00)	0.28 (0.11)	0.58 (0.23)	0.48 (0.19)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Wetland maritime grassland	0.00 (0.00)	0.33 (0.13)	0.13 (0.05)	0.46 (0.19)	0.00 (0.00)	0.38 (0.15)	0.00 (0.00)	0.09 (0.04)	0.00 (0.00)	0.09 (0.04)	0.00 (0.00)	0.09 (0.04)
• Wetland overwash	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Wetland maritime shrub thicket	0.38 (0.15)	0.25 (0.10)	1.10 (0.45)	0.32 (0.13)	0.37 (0.15)	0.13 (0.05)	0.39 (0.16)	0.25 (0.10)	0.39 (0.16)	0.25 (0.10)	0.45 (0.18)	0.27 (0.11)
• Reed stand	0.00 (0.00)	0.01 (0.00)	0.21 (0.08)	0.03 (0.01)	0.10 (0.04)	0.03 (0.01)	0.00 (0.00)	0.01 (0.00)	0.00 (0.00)	0.01 (0.00)	0.32 (0.13)	0.05 (0.02)
• Salt flat ²	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Brackish marsh ²	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Smooth cordgrass ²	0.53 (0.21)	0.16 (0.06)	0.54 (0.22)	0.20 (0.08)	0.54 (0.22)	0.20 (0.08)	0.53 (0.22)	0.16 (0.06)	0.53 (0.22)	0.16 (0.06)	0.59 (0.24)	0.18 (0.07)
• Black needlerush ²	0.47 (0.19)	0.11 (0.04)	1.28 (0.52)	0.46 (0.19)	1.67 (0.68)	0.68 (0.28)	0.47 (0.19)	0.11 (0.04)	0.47 (0.19)	0.11 (0.04)	0.75 (0.30)	0.23 (0.09)
TOTAL WETLAND IMPACT	1.38 (0.56)	1.08 (0.44)	3.28 (1.33)	1.91 (0.77)	3.26 (1.32)	2.05 (0.83)	1.39 (0.56)	0.77 (0.31)	1.39 (0.56)	0.77 (0.31)	2.23 (0.90)	1.02 (0.41)
Intertidal Beach	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL IMPACT (not including intertidal beach)	11.15 (4.51)	3.43 (1.39)	12.38 (5.01)	4.62 (1.87)	12.48 (5.05)	4.85 (1.96)	11.17 (4.52)	3.12 (1.26)	11.17 (4.52)	3.12 (1.26)	11.00 (4.45)	3.47 (1.40)

¹Indicates area of SAV based on unpublished NOAA/DMF mapping and limited ground truthing of imagery taken during 1985-1990. A survey conducted in September 2007 indicated that the current area of SAV coverage is similar to that reported when previous mapping was conducted (NCDOT, 2007).

²CAMA coastal wetlands.

Calculated areas are based on conditions as verified with USACE through June 2005.

Hectares were calculated from acres, thus minor rounding error exists when adding the individual hectare numbers.

Table 2-6. Total (All Phases) Shading, Fill, and Pile Placement Impacts to Wetlands and Waters for the Parallel Bridge Corridor Alternatives

Biotic Community	Nourishment Alternative in Acres (hectares)		Road North/Bridge South Alternative in Acres (hectares)		All Bridge Alternative in Acres (hectares)		Phased Approach/Rodanthe Bridge Alternative in Acres (hectares)		Phased Approach/Rodanthe Nourishment Alternative in Acres (hectares)	
	NC 12 Transportation Management Plan Alternative (Preferred) ¹									
	Shading	Fill and Pile	Shading	Fill and Pile	Shading	Fill and Pile	Shading ²	Fill and Pile ²	Shading ²	Fill and Pile ²
Open Water										
• Aquatic bottom (sound/other waters)	8.87 (3.59)	2.29 (0.93)	11.98 (4.85)	4.07 (1.65)	12.42 (5.03)	3.58 (1.45)	9.18 (3.72)	2.14 (0.87)	9.18 (3.72)	2.15 (0.87)
• SAV ³	0.91 (0.37)	0.22 (0.09)	6.22 (2.52)	0.33 (0.13)	6.22 (2.52)	0.33 (0.13)	0.91 (0.37)	0.22 (0.09)	0.91 (0.37)	0.22 (0.09)
• Impoundments	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	23.03 (9.32)	11.80 (4.78)	0.12 (0.05)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
TOTAL OPEN WATER/SAV IMPACT	9.78 (3.96)	2.51 (1.02)	18.20 (7.37)	27.43 (11.10)	30.44 (12.32)	4.03 (1.63)	10.09 (4.08)	2.36 (0.96)	10.09 (4.08)	2.37 (0.96)
Wetland										
• Wetland man-dominated	0.00 (0.00)	0.15 (0.06)	0.02 (0.01)	1.00 (0.40)	0.00 (0.00)	1.00 (0.40)	0.00 (0.00)	0.15 (0.06)	0.00 (0.00)	0.15 (0.06)
• Salt shrub/grasslands	0.05 (0.02)	0.00 (0.00)	0.03 (0.01)	31.27 (12.65)	9.63 (3.90)	3.74 (1.51)	0.46 (0.19)	0.00 (0.00)	0.46 (0.19)	0.01 (0.00)
• Wetland maritime grassland	0.33 (0.13)	0.08 (0.03)	0.04 (0.02)	0.85 (0.34)	0.00 (0.00)	1.00 (0.40)	2.52 (1.02)	0.08 (0.03)	2.52 (1.02)	0.06 (0.02)
• Wetland overwash	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.61 (0.65)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Wetland maritime shrub thicket	0.48 (0.19)	0.96 (0.39)	1.69 (0.68)	4.77 (1.93)	2.07 (0.84)	1.31 (0.53)	0.77 (0.31)	0.15 (0.06)	0.74 (0.30)	0.15 (0.06)
• Reed stand	0.00 (0.00)	0.01 (0.00)	0.21 (0.08)	0.76 (0.31)	0.19 (0.08)	0.32 (0.13)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Salt flat ⁴	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Brackish marsh ⁴	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
• Smooth cordgrass ⁴	0.53 (0.21)	0.16 (0.06)	0.71 (0.29)	0.20 (0.08)	0.71 (0.29)	0.20 (0.08)	0.54 (0.22)	0.15 (0.06)	0.54 (0.22)	0.16 (0.06)
• Black needlerush ⁴	0.47 (0.19)	0.11 (0.04)	2.34 (0.95)	10.32 (4.18)	5.08 (2.06)	2.16 (0.87)	0.47 (0.19)	0.11 (0.04)	0.47 (0.19)	0.11 (0.04)
TOTAL WETLAND IMPACT	1.87 (0.76)	1.47 (0.59)	5.03 (2.04)	50.79 (20.55)	17.67 (7.15)	9.73 (3.94)	4.73 (1.91)	0.65 (0.26)	4.72 (1.91)	0.63 (0.25)
Intertidal Beach	NA	76.51 (30.96)	NA	NA	NA	NA	NA	NA	NA	13.80 (5.58)
TOTAL IMPACT (not including intertidal beach)	11.65 (4.72)	3.98 (1.61)	23.23 (9.41)	78.22 (31.65)	48.11 (19.47)	13.76 (5.57)	14.82 (5.99)	3.01 (1.22)	14.81 (5.99)	3.00 (1.21)

¹The impacts shown for the five other Parallel Bridge Corridor alternatives reflect the range of reasonably foreseeable impacts associated with the Preferred Alternative.

² Wetland impacts for the Phased Approach are lower when considering all phases because part of the frontage road for NC 12 traffic and recreational access associated with Phase I could be shortened in Phase II and wetlands affected restored.

³Indicates area of SAV based on unpublished NOAA/DMF mapping and limited ground truthing of imagery taken during 1985-1990. A survey conducted in September 2007 indicated that the current area of SAV coverage is similar to that reported when previous mapping was conducted (NCDOT, 2007).

⁴CAMA coastal wetlands.

Calculated areas are based on conditions as verified with USACE through June 2005.

Hectares were calculated from acres, thus minor rounding error exists when adding the individual hectare numbers.

this finding. NOAA Fisheries did, however, provide the following conservation recommendation: “If NCDOT moves forward with the currently selected plan, we recommend early initiation of a long-term study to characterize changes in habitats along Hatteras and Bodie Islands so that adequate information is available for examining applications to USACE for project authorization, including mitigation for unavoidable impacts to EFH.”

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) is a variation on the Parallel Bridge Corridor alternatives assessed in the FEIS. Because this alternative calls for the details of later phases to be determined during future phase development, the EFH analysis also focuses on Phase I separately from the later phases.

In comparing Phase I of the FEIS Preferred Alternative with Phase I of the new Preferred Alternative, Phase I of the NC 12 Transportation Management Plan Alternative would be over the water in a manner similar to the FEIS Preferred Phase I alignment. Therefore, the impacts to EFH from Phase I would not change from those identified in the FEIS. Since there would be no change in impacts with the new Preferred Alternative, Phase I of the Preferred Alternative is not anticipated to affect adversely EFH.

The new Preferred Alternative does not stipulate (at this time) the recommended solution(s) for the remainder of the project beyond Phase I. Possible solutions for later phases of the project include bridging, road relocation, and/or beach nourishment. All of these solutions, which are available for implementation as part of the Preferred Alternative, were identified and assessed as part of the FEIS and would be reassessed at the time decisions on future phases are being made. Should any new solutions be identified in the future, such solutions would be assessed to determine if they include new significant impacts and/or impacts that would adversely affect EFH.

2.3.4 Basis for Selection of the Preferred Alternative

On August 27, 2007, senior representatives of NCDOT, FHWA, USACE, and NCDENR, meeting as the Merger 01 Dispute Resolution Board for the NEPA/Section 404 Merger Process, identified the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the LEDPA for this project (see Section 2.15 of the FEIS). Specifically, the agencies concurred that:

- The Pamlico Sound Bridge Corridor is not practicable based on cost estimates and thus is not the LEDPA;
- Phase I of the project should be to construct the replacement bridge within the Parallel Bridge Corridor as soon as possible, every effort should be made to place the new bridge terminus within the existing easement, and Phase I should be advanced through the Merger Process;
- Building Phase I alone would not meet the purpose and need of the project;
- Future phases present substantial challenges to obtaining permit approvals; and
- At the time of permit application for future phases, reasonable, practicable, and feasible alternatives will be considered and evaluated in pursuit of the LEDPA/Selected Alternative.

Although agency representatives chose the Phased Approach/Rodanthe Bridge Alternative as the LEDPA, they recognized that the project area is complex and the shoreline is constantly changing. They noted that the ability to predict the effect of future storms on the project area is

extremely difficult, and they agreed that the various alternatives may need to be reassessed in the future as the shoreline and other landscape features continue to change.

On May 21, 2009, representatives of the project's NEPA/Section 404 Merger Team met and agreed that the concept of the NC 12 Transportation Management Plan Alternative (Preferred) also fit within the terms of the August 27, 2007, Concurrence Point 3 Agreement (LEDPA) in that:

- It would involve replacement of the Oregon Inlet bridge as Phase I; and
- Completion of Phase I alone would not meet the purpose and need of the project and represented a commitment by all parties to develop and implement the entire action from Rodanthe to Bodie Island.

The following observations were made at the May 21, 2009, meeting that led to the determination of this alternative as the Preferred Alternative:

- The August 27, 2007, LEDPA agreement found that the Pamlico Sound Bridge Corridor is not practicable and that the Parallel Bridge Corridor includes several different alternatives that could be considered in the future when future conditions are better known.
- The August 27, 2007, LEDPA agreement, while identifying the Phased Approach/Rodanthe Bridge Alternative as the LEDPA, left open the opportunity to reconsider the features of phases beyond Phase I (new Oregon Inlet bridge) because it was felt that future coastal conditions were uncertain in the Refuge.
- The environmental impact of multiple Parallel Bridge Corridor alternatives has been evaluated and documented based on thorough research related to potential future coastal conditions in the project area.
- Despite thorough coastal studies prepared during the environmental impact assessment, it is not appropriate to determine the specifics of future phases of a Parallel Bridge Corridor Alternative at this time given there is a great deal of uncertainty in even the best models of future shoreline conditions.
- Phase I should be built now, and the specific features of the rest of the project should be examined in more detail at the time they are to be built, when future conditions are more known.
- An adaptive management plan should be developed to assist with cooperative decision-making for future decisions related to the project.
- State and federal environmental resource and regulatory agencies should be involved in future phase development.
- The regulatory challenges associated with finalizing future phases would likely remain when developing future phases.

All agencies in attendance at the May 21, 2009, Merger Team meeting agreed that NCDOT and FHWA could move forward with the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative as the Preferred Alternative based on the August 27, 2007,

Concurrence Point 3 Agreement (LEDPA). Based on discussions at the Merger Team meetings on May 21, 2009, and September 17, 2009, an amendment to the 2007 LEDPA agreement was prepared and signed by the Dispute Resolution Board on January 7, 2010 (see Appendix A). The LEDPA agreement amendment does not change the intent of the original LEDPA agreement “beyond the understanding that the Phased Approach/Rodanthe Bridge Alternative is no longer considered and identified in the Record of Decision (ROD) as the LEDPA.” The LEDPA agreement amendment also stipulates that the Merger Team will be consulted about decisions on future phases of the project. The USFWS has since raised objections to this alternative but has continued coordination with NCDOT and FHWA, as documented in Section 3.5.

The amendment agreement affirms that the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) is consistent with the original August 27, 2007 agreement. The amendment agreement states:

At this time, there is no formally prescribed alternative for the remaining phases of the project south of Oregon Inlet. One or more of a combination of options, drawing from the alternatives previously studied, as well as any other alternatives determined at the time to be reasonable, practicable and feasible, will be evaluated, designed, and finalized prior to the implementation of actions beyond Phase I. Any option will be evaluated and selected with multi-agency input and concurrence as part of the Merger Process. The agencies do agree that permits will not be granted for the remaining phases of work until their applicable laws and regulations have been satisfied.

In addition to the coordination under the Merger Process, as part of this alternative NCDOT and FHWA pursued an additional formalized agreement with the NPS and the USFWS (the land management agencies within the corridor) in order to develop additional long-term protocols and strategies to follow prior to the implementation of future phases of the project. However, both the NPS and the USFWS, in letters dated March 11 and March 22, 2010, respectively, stated that they would not be able to sign an agreement because they desire a decision now for the later phases of action. NCDOT and FHWA do not agree that decisions should be made for the entire corridor because of the extensive uncertainty inherent in the predictions of future coastal conditions. As is stated in the *Shoreline Change and Stabilization Analysis*¹, “the prediction of future shoreline positions, the impacts of individual severe storms and the behavior of beach nourishment projects are complex problems that by necessity include a relatively high level of uncertainty.” In an attempt to determine the potential likelihood and location of future inlets within the project area, the expert panel documented in the *Potential Inlet Formation Technical Report*² noted that “the potential inlet site closest to Rodanthe has a risk of opening within the next 50 years. No specific level of risk was assigned to this site and no specific dimensions (width or depth) were developed.” During the Climate Change Peer Exchange meeting hosted by FHWA in May 2008,

¹ FDH Engineering, Inc. (Margery F. Overton, PhD and John S. Fisher, PhD, PE). June 2005. *Bonner Bridge Replacement Parallel Bridge Corridor with NC12 Maintenance Shoreline Change and Stabilization Analysis*. Prepared for URS Corporation North Carolina and the North Carolina Department of Transportation.

² FDH Engineering, Inc. September 2005. *NC 12 Replacement of the Herbert C. Bonner Bridge Potential Inlet Formation Technical Report*. Prepared for Parsons Brinckerhoff Quade & Douglas, Inc. and the North Carolina Department of Transportation.

it was noted that “current global sea level rise analytical models are not fully developed to predict local effects. The wide range of future sea level rise information considered illustrates the uncertainty associated with estimating future sea levels and shoreline locations.” FHWA and NCDOT feel that it is important to select an alternative that allows for further new analysis prior to the implementation of future phases.

The LEDPA amendment agreement recognizes this uncertainty by stating:

The best available science has been used to forecast shoreline erosion and potential inlet formation locations. However, it is difficult to predict reasonably and accurately future storm events and their magnitude, intensity, and duration. Extensive coastal engineering studies have been completed to date. Because of uncertainty regarding future storm events, additional coastal and natural resource data will be collected and analyzed to evaluate the available range of alternatives for future phases.

Both the NPS and the USFWS are members of the Merger Team and will continue to be included as part of the Merger Process, and FHWA and NCDOT would reopen discussion about a formalized agreement with the NPS and USFWS if requested by the NPS and USFWS.

2.3.5 Does the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) result in “Segmentation” under NEPA?

With the acknowledgement that the new Preferred Alternative, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, does not immediately prescribe transportation solutions for the project beyond Phase I, FHWA reviewed Title 23 *Code of Federal Regulations* Section 771.111(f) to determine if the new Preferred Alternative is in compliance with the regulations in regards to logical termini. In addition, a FHWA Memorandum titled “*The Development of Logical Project Termini*” (November 5, 1993) was reviewed. The memo states “...A problem of ‘segmentation’ may also occur where a transportation need extends throughout an entire corridor but environmental issues and transportation need are inappropriately discussed for only a segment of the corridor..”. The FHWA Memorandum further states that choosing a corridor of sufficient length to look at all impacts need not preclude staged or phased construction. Therefore, related improvements within a transportation facility should be evaluated as one project, rather than selecting termini based on what is programmed as short range improvements. Construction may then be “staged,” or programmed for shorter sections or discrete construction elements as conditions warrant or funding permits. The FEIS discussed the rationale to assess the portion of NC 12 from north of Oregon Inlet to Rodanthe. The project limits connect logical termini of sufficient length to address environmental matters on a broad scope. Environmental issues throughout the Parallel Bridge Corridor were thoroughly evaluated and discussed in the FEIS. The evaluation of later phases beyond Phase I (Oregon Inlet) would not be any different if FHWA selected a Preferred Alternative for the entire length of the project. In the event new transportation solutions for later phases are developed that were not previously identified in the FEIS, additional NEPA analyses and compliance with Section 4(f) and other environmental laws for these new transportation solutions would be performed. Furthermore, NEPA regulations (Title 23 *Code of Federal Regulations* Section 771.129) require FHWA to re-evaluate its decision if a later phase occurs after more than three years have elapsed without any activity on the project. In addition, after final approval of the EIS, NCDOT must consult with

FHWA prior to requesting any major approvals or grants to advance the project in order to establish whether the approved EIS remains valid.

The NC 12 Transportation Management Plan Alternative has independent utility with the implementation of Phase I immediately, since the bridge is structurally deficient with a sufficiency rating of 4, and is vulnerable to damage from vessels because of short navigational spans. Even if no other transportation improvements are made along NC 12, the replacement of the bridge is a critical expenditure to ensure public safety. The implementation of subsequent phases also is necessary to provide continued safe, reliable transportation along the Parallel Bridge Corridor from Oregon Inlet to Rodanthe. Implementing the NC Transportation Management Plan Alternative does not alter the need to replace the Oregon Inlet bridge (Phase I). Therefore, the project has independent utility. Furthermore, the proposed project also does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements within the project study area, as no further improvements other than the NC 12 Transportation Management Plan Alternative are foreseen within the project study area, mainly because of the island's narrow configuration and the absence of any major cross streets along the corridor. In addition, the proposed project does not restrict consideration of alternatives for foreseeable transportation improvements proposed at two hot spots on Hatteras Island near Buxton and Hatteras Village, well south of the southern limit (Rodanthe) of this project.

The NEPA/Section 404 Merger Team discussed the segmentation issue at the May 21, 2009, meeting. The Merger Team agreed to move forward with Phase I being built, and that the rest of the project should be examined in more detail when future conditions are more known. USEPA noted that the segmentation issue would not be a problem on this project because the administrative record includes thorough documentation of the extensive research for the entire corridor that has taken place related to the unpredictable future conditions in the project area. Also, multiple alternatives for the full length project were evaluated. USEPA also stated that this approach would keep FHWA from committing a huge amount of money to a project with a substantial amount of future uncertainty.

In summary, although the new Preferred Alternative does not immediately prescribe preferred activities beyond Phase I, FHWA and NCDOT have evaluated and assessed environmental issues to maintain transportation along the Parallel Bridge Corridor for the entire project corridor. The impacts presented for the other Parallel Bridge Corridor alternatives reflect the reasonably foreseeable range of impacts for the NC 12 Transportation Management Plan Alternative (Preferred). In addition, based on the projected shoreline conditions on this section of Hatteras Island, this project has logical termini, which encompass the bridge replacement over Oregon Inlet and the NC 12 roadway sections projected to be threatened in the future on northern Hatteras Island. As stated above, the proposed project also does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements, as improvements are proposed south of the southern limits of this project. After reviewing the limits of the study area, the limits of the Preferred Alternative, and the projected shoreline conditions, and after assessing whether the proposed project restricts future foreseeable projects, FHWA has determined that the Preferred Alternative is not segmented in its scope or in its environmental impact assessment, consistent with the 23 CFR 771.111(f) regulations.

2.3.6 Minimizing Impacts of NC 12 Maintenance with the Preferred Alternative

Future phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) would be built based on the evolution of new data and analysis of the

Hatteras Island shoreline, potential future beach erosion forecasts, and potential breach locations. The coastal monitoring program would enable FHWA and NCDOT to determine the timing and extent of each phase. The alternatives for each phase of the project would be determined in conjunction with environmental resource and regulatory agencies through the established NEPA/Section 404 Merger Process.

Section 4.6.8.6 of the FEIS discussed potential short-term maintenance activities that likely would occur prior to the implementation of Phases II, III, and IV of the Phased Approach alternatives. Since the NC 12 Transportation Management Plan is also phased, the section of NC 12 between Oregon Inlet and Rodanthe will also require maintenance prior to the implementation of future phases. The level of NC 12 maintenance, especially as a result of storm events, will continue in the three hot spot areas and is likely to increase in those areas until a second phase is completed. NCDOT will coordinate with USFWS to determine what maintenance measures should be utilized in order to minimize impacts to the Refuge. The completion of a Phase II would substantially decrease the amount of storm-related maintenance on NC 12, though some would remain and would increase prior to the completion of any remaining phases.

Prior to the implementation of future phases of the project, FHWA and NCDOT would comply with 23 CFR 668 for completion of any repair work required following emergency events. NCDOT will continue to work with the USFWS to reduce the impacts of storm-related NC 12 maintenance on the Refuge and will consult with the appropriate environmental regulatory agencies following storm events to ensure that any maintenance activities follow all applicable environmental regulations.

2.3.7 Costs

Table 2-7 and Table 2-8 show the total estimated costs for the Parallel Bridge Corridor alternatives as assessed in the FEIS and this EA. They were updated from those presented in the FEIS to account for the revisions to the detailed study alternatives described in Section 2.1 of this EA. Construction costs, like those shown in the FEIS, are in 2006 dollars. Construction, right-of-way, Bonner Bridge demolition, NC 12 pavement removal, and operation and maintenance costs are shown.

The following observations can be made about the costs in Table 2-7 and Table 2-8:

- When the cost of NC 12 maintenance through the Refuge is added to the cost of a new Oregon Inlet bridge in the Parallel Bridge Corridor, as well as other highway-related costs until 2060, the Road North/Bridge South Alternative would be the least expensive (\$615.0 to \$759.0 million). The Nourishment Alternative is the second least expensive at \$719.7 to \$1.0 billion. The remaining alternatives, which involve longer bridges, would range in cost from \$1.1 to \$1.5 billion.
- Right-of-way in Rodanthe would be most expensive (\$8.5 to \$32.5 million) with the Phased Approach alternatives.
- Operation, inspection, and maintenance costs are greater for bridges than for roads. Inspection costs per square foot are expected to be higher when bridges are either over or closer to the ocean, and lower when bridges are over land.

Table 2-7. Parallel Bridge Corridor Highway Cost to 2060 (Low)

	Nourishment	Road North/ Bridge South	All Bridge	Phased Approach/ Rodanthe Bridge	Phased Approach/ Rodanthe Nourishment
NC 12 Transportation Management Plan Alternative (Preferred) ¹					
Replacement Bridge Construction Cost and Bonner Bridge Demolition Cost (2006 dollars)	\$312,000,000	\$284,000,000	\$285,000,000	\$312,000,000	\$312,000,000
NC 12 Maintenance Construction Cost (2006 dollars)					
• New Road and/or Bridge Cost	\$0	\$178,000,000	\$509,000,000	\$480,000,000	\$451,000,000
• Nourishment to 2060	\$317,550,000	\$0	\$0	\$23,694,000	\$107,416,000
• Dunes to 2060 (2006 dollars)	\$8,267,000	\$1,556,000	\$0	\$533,000	\$3,378,000
Right-of-Way	\$750,000	\$6,075,000	\$6,075,000	\$32,475,000	\$8,500,000
Wetland Mitigation (except SAV) (2006 dollars)	\$468,000	\$14,130,000	\$1,860,000	\$468,000	\$468,000
Road and Bridge Operation and Maintenance Costs to 2060 (2006 dollars)	\$80,710,000	\$131,197,000	\$274,173,000	\$260,289,000	\$245,306,000
TOTAL Highway Cost to 2060	\$719,745,000	\$614,958,000	\$1,076,108,000	\$1,109,459,000	\$1,128,068,000

¹The costs shown for the six Parallel Bridge Corridor alternatives reflect the range of reasonably foreseeable costs associated with the Preferred Alternative. The replacement bridge construction cost and Bonner Bridge demolition cost (2006 dollars) for the Preferred Phase I Alignment of the NC 12 Transportation Management Plan Alternative (Preferred) would be \$265,000,000.

Table 2-8. Parallel Bridge Corridor Highway Cost to 2060 (High)

	Nourishment	Road North/ Bridge South	All Bridge	Phased Approach/ Rodanthe Bridge	Phased Approach/ Rodanthe Nourishment
NC 12 Transportation Management Plan Alternative (Preferred)¹					
Replacement Bridge Construction Cost and Bonner Bridge Demolition Cost (2006 dollars)	\$368,000,000	\$346,000,000	\$347,000,000	\$368,000,000	\$368,000,000
NC 12 Maintenance Construction Cost (2006 dollars)					
• New Road and/or Bridge Cost	\$0	\$260,000,000	\$781,000,000	\$746,000,000	\$689,000,000
• Nourishment to 2060	\$567,065,000	\$0	\$0	\$36,348,000	\$189,668,000
• Dunes to 2060 (2006 dollars)	\$8,267,000	\$1,556,000	\$0	\$533,000	\$3,378,000
Right-of-Way	\$750,000	\$6,075,000	\$6,075,000	\$32,475,000	\$8,500,000
Wetland Mitigation (except SAV) (2006 dollars)	\$468,000	\$14,130,000	\$1,860,000	\$468,000	\$468,000
Road and Bridge Operation and Maintenance Costs to 2060 (2006 dollars)	\$80,710,000	\$131,197,000	\$274,173,000	\$260,289,000	\$245,306,000
TOTAL Highway Cost to 2060	\$1,025,260,000	\$758,958,000	\$1,410,108,000	\$1,444,113,000	\$1,504,320,000

¹The costs shown for the six Parallel Bridge Corridor alternatives reflect the range of reasonably foreseeable costs associated with the Preferred Alternative. The replacement bridge construction cost and Bonner Bridge demolition cost (2006 dollars) for the Preferred Phase I Alignment of the NC 12 Transportation Management Plan Alternative (Preferred) would be \$315,000,000.

The nourishment costs shown in Table 2-7 and Table 2-8 for the Nourishment Alternative include a forecast low and forecast high rate of erosion of the material placed on the beach and the associated need to replace periodically newly eroded material. The cost through 2060, assuming the most likely erosion rate considered, would be \$429.4 million, in contrast with the low of \$317.5 million and the high of \$567.1 million shown in Table 2-7 and Table 2-8, respectively. In the case of nourishment associated with the Phased Approach alternatives, a cost between the low and high cost also is considered the likely cost.

There is also the risk of a storm-created breach of Hatteras Island within the Refuge between now and 2060. Such a breach would separate almost all of Hatteras Island and its associated communities, tourism businesses, and the Seashore from Bodie Island and the mainland. The cost of closing such a breach is discussed in Section 4.6.6 of the FEIS, but is not included in the tables above because, although the potential for a breach exists, its occurrence is not a certainty (unlike shoreline erosion that can be predicted through modeling) (see Section 3.6.3.4 of the FEIS). In addition, there would be the associated economic loss, challenges for maintaining community services, and disruptions to daily living until the breach is closed. These economic costs are discussed in Section 4.1.5.4 of the FEIS. The other public costs of the proposed project (i.e., non-highway costs) discussed in Section 2.12.3 of the FEIS and shown in FEIS Tables 2-11 and 2-12 were not revised.

2.3.8 Conclusion

The description and scope of the Preferred Alternative presented in this section is not anticipated to create any new, significant impacts not previously identified in the FEIS.

3.0 Comments and Coordination

An Environmental Impact Statement (EIS) that addresses the full range of alternatives and issues important to the selection of a Preferred Alternative can be accomplished only in consultation with those who have a stake in the decision. This chapter summarizes comments on the Final Environmental Impact Statement (FEIS) pertinent to the material included in this Environmental Assessment (EA). Appendix D provides responses to comments made on the FEIS. The original FEIS comment letters are presented in Appendix E. One outcome of the FEIS comments was a decision to release a Revised Final Section 4(f) Evaluation in October 2009; the Evaluation is included in Appendix B. Appendix F provides responses to comments made on the Revised Final Section 4(f) Evaluation. The original Revised Final Section 4(f) Evaluation comment letters are presented in Appendix G.

This chapter also summarizes agency coordination that has occurred since the completion of the September 17, 2008, FEIS, including four National Environmental Policy Act/Section 404 of the Clean Water Act (NEPA/Section 404) Merger Team meetings, Section 106 coordination meetings, and coordination meetings with the US Fish and Wildlife Service (USFWS). Earlier coordination activities are discussed in Chapter 8 of the FEIS.

3.1 Comments on the September 2008 FEIS

The September 17, 2008, FEIS was provided to 18 Federal agencies, 11 State agencies, 14 local agencies or governments, and 23 interest groups and nongovernmental organizations (NGOs). Several agencies expressed concerns in their written comments about the Least Environmentally Damaging Practicable Alternative (LEDPA)/Preferred Alternative identified in the FEIS (i.e., the Phased Approach/Rodanthe Bridge Alternative), as well as the conclusions contained in the Final Section 4(f) Evaluation. Appendix D of this EA provides responses to agency and NGO written comments on the FEIS, as well as a summary of the public comments received. The original FEIS comment letters are included in Appendix E.

In part in response to comments related to the Final Section 4(f) Evaluation presented as Chapter 5 of the FEIS, the Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) prepared a Revised Final Section 4(f) Evaluation. This document is included as Appendix B of this EA. Comments that led to the decision to release a Revised Final Section 4(f) Evaluation came from the US Department of the Interior (USDOI), the North Carolina Department of Cultural Resources (NCDRCR), and the Southern Environmental Law Center (SELC).

USDOI commented that “Though all alternatives have some form of 4(f) impact, the Preferred Alternative [LEDPA Alternative] has far greater impacts in quantity and quality on lands protected by section 4(f).” In USDOI’s view, the FEIS LEDPA/Preferred Alternative would constructively use the Pea Island National Wildlife Refuge (Refuge) because the elevated road structure in the Refuge would cause noise, visual intrusion, shading of beach habitat, interference with the flyway of shorebirds, and loss of access to Refuge visitor facilities. USDOI noted that the impacts would be lessened with an at-grade road. USDOI further advised that the LEDPA/Preferred Alternative would likely not avoid the need for a compatibility determination because

construction and/or maintenance work would still likely occur outside of the existing NC 12 easement through the Refuge.

NCDCR also took issue with FHWA's finding that the FEIS LEDPA/Preferred Alternative would not constructively use historic properties. A specific concern was that "the construction of a ten-mile long bridge, elevated thirty feet above ground level and topped with a nearly five-foot railing (and perhaps an additional six-foot high chain-link fence as suggested by the Refuge during the Section 106 consultation) will introduce a substantial visual intrusion that is antithetical to the historic landscape" of the Refuge. In the Rodanthe Historic District, NCDCR was similarly concerned that introduction of a 30-foot (9.1-meter) bridge with flanking one-way frontage roads in the district would substantially impair the characteristics which make the district and Chicamacomico Life Saving Station eligible for the National Register. Another concern was the reduction in access to the Rodanthe Historic District and Chicamacomico Life Saving Station with the FEIS LEDPA/Preferred Alternative.

SELC commented that the FEIS Section 4(f) analysis is inadequate and erroneously concluded that the Phased Approach alternatives will not "use" Refuge lands because it operates within the existing NC 12 easement. Specifically, the SELC commented that the analysis failed to explain adequately how it is feasible to avoid further encroachments into the Refuge while constructing and maintaining a bridge and service road within the existing NC 12 easement and also maintaining existing NC 12. The SELC also commented that the analysis failed to address adequately the expected dune building and maintenance activities through 2030 that would be needed with the Phased Approach alternatives. Further, the SELC commented that the constructive use analysis in the FEIS Section 4(f) evaluation was deficient because the analysis did not adequately assess ecological impacts and access restrictions as a result of the Phased Approach alternatives in the Refuge. The SELC also commented that the documentation failed to acknowledge or assess the use of the Refuge that will result from retaining the terminal groin, which does not lie within the existing NC 12 easement.

3.2 Comments on the October 2009 Revised Final Section 4(f) Evaluation

In October 2009, FHWA and NCDOT released a Revised Final Section 4(f) Evaluation (signed on October 9, 2009). The revised document was prepared based on: comments received on the Final Section 4(f) Evaluation presented as Chapter 5 of the FEIS, as noted in the previous section; new information on the history of Refuge-related land transfers; and revisions made to the detailed study alternatives in the community of Rodanthe based on FEIS comments. Because USFWS, NCDCR, and SELC provided comments on the FEIS Final Section 4(f) Evaluation, the Revised Final Section 4(f) Evaluation was provided to these three entities so that they could have an opportunity to review the changes to the Section 4(f) evaluation as a result of their prior comments, as well as provide additional comments, if desired. The Evaluation was also provided to the National Park Service (NPS), USDOJ, and the Advisory Council on Historic Preservation (ACHP). The Evaluation was made available for public review via the project website (www.ncdot.org/projects/bonnerbridgerepairs) and the Outer Banks Task Force website (www.obtf.org). Comments on the Revised Final Section 4(f) Evaluation were received from USDOJ, NCDCR, and SELC. The comments and responses to those comments are presented in Appendix F. The original comment letters are contained in Appendix G.

3.3 Merger Team Meetings Since Release of the FEIS

Four Merger Team meetings were held between November 2008 and September 2009. These meetings included representatives from FHWA, NCDOT, USFWS, US Army Corps of Engineers (USACE), US Environmental Protection Agency (USEPA), National Oceanic and Atmospheric Administration (NOAA) Fisheries, NPS, NCDOT, and North Carolina Department of Environment and Natural Resources (NCDENR), including the Division of Coastal Management (DCM), Division of Marine Fisheries (DMF), Division of Water Quality (DWQ), and Wildlife Resources Commission (WRC).

3.3.1 November 13, 2008, Merger Team Meeting

A Merger Team meeting was held on November 13, 2008, for the purpose of reviewing the proposed Bridging Decisions and Alignment (Concurrence Point 2A) and the proposed Avoidance and Minimization efforts (Concurrence Point 4A) for Phase I (Oregon Inlet bridge) of the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative (the LEDPA at that time). Materials presented at the meeting included information on proposed bridging decisions and alignment for the Preferred Alternative, as well as proposed avoidance and minimization measures for Phase I construction and Bonner Bridge demolition.

The project stipulations presented in the meeting materials related to proposed bridging decisions and alignment for the Preferred Alternative included:

- The alignment of the bridge on Bodie Island was selected to avoid impacts to the Oregon Inlet Marina and Fishing Center parking lot, as well as to minimize disturbance to the entrances of both the Marina and the Oregon Inlet Campground.
- The alignment was also selected to minimize impacts to wetlands and submerged aquatic vegetation (SAV) on the western side of the island.
- The bridge alignment on Bodie Island and within much of Oregon Inlet could be altered by the design-build contractor, if the contractor can establish that its proposed alignment further minimizes impacts.
- The alignment of the bridge on Hatteras Island is restricted to the current 100-foot (30.5-meter) easement that NCDOT has for maintaining NC 12. All bridge construction and traffic maintenance must remain within this easement. Therefore, any shifts made during the final design of the bridge will still remain within the easement.
- During the Constructability Workshop in 2006, the expert panel on Geotechnical, Hydraulics, and Coastal Engineering identified a potential threat from sound-side erosion along Davis Slough. NCDOT has since monitored the area of potential vulnerability and deems it prudent to extend the south terminus of Phase I an additional approximately 2,000 feet (610 meters), contingent on the availability of funds. As with the rest of the LEDPA, the bridge would remain within the existing 100-foot (30.5-meter) NC 12 easement.

The project stipulations related to proposed avoidance and minimization measures for Phase I construction and Bonner Bridge demolition also were presented and discussed. Avoidance was taken into account during the development of the entire LEDPA, including the alignment of

Phase I; however, wetlands are so pervasive in the project area that it is impossible to avoid completely some impact. Minimization is reflected in the project commitments found in the FEIS and this EA and would be incorporated into the project's design-build contract. The specific stipulations presented at the meeting related to Phase I dredging, dredge spoil disposal, use of work bridges and haul roads, protected species commitments, retention of fishing access at the north end of Hatteras Island, and Bonner Bridge demolition.

At the meeting, the Merger Team concurred with the bridging decisions and alignment recommendations, as well as the avoidance and minimization measures, for Phase I of the LEDPA as included in the FEIS and stipulated at the meeting, with the following additions:

- Merger Team members will be provided, prior to Concurrence Point 4B, with any major changes in wetland/SAV impacts based on updated designs.
- The design-build contractor should minimize damage to wetlands/SAV/Oregon Inlet from jetting spoils.
- Table 2 of the meeting packet showed temporary impacts from haul roads in SAV areas on Bodie Island. NCDOT will not allow haul roads in SAV.
- The Merger Team also concurred that combined Concurrence Point 2A/4A Merger Team meetings should be held prior to the completion of the final design for each subsequent phase of the Preferred Alternative.
- The signed concurrence form for the November 13, 2008, Concurrence Point 2A/4A Merger Team meeting is included in Appendix A. The signed form included abstentions from USFWS, USFWS (Refuge), NOAA Fisheries, and NCDENR-WRC.

3.3.2 March 26, 2009, Merger Team Meeting

The March 26, 2009, Merger Team meeting was an informational meeting held to discuss the possibility of revisiting the project's LEDPA decision. The team discussed FHWA's decision to re-evaluate the applicability of the project's Section 4(f) evaluation because their recent research of property deeds, legal documents, and history revealed an evolutionary relationship between NC 12 and the Refuge. FHWA noted that NC 12 has been relocated within the Refuge four times with no documented significant impacts. The team discussed the concerns of NCDOT, USDOJ, and SELC with respect to the FEIS/Final Section 4(f) Evaluation discussion of constructive use of the Rodanthe Historic District and the Refuge, as well as USDOJ's concern over loss of public access to the Refuge. The team also reviewed changes to the Parallel Bridge Corridor alternatives made as a result of the Section 106 process, as well as other Section 106 concerns.

3.3.3 May 21, 2009, Merger Team Meeting

The purpose of the May 21, 2009, Merger Team meeting was to seek concurrence on a revised Concurrence Point 3 (selection of the LEDPA). The team discussed the reasons why NCDOT and FHWA were now proposing the Parallel Bridge Corridor with Road North/Bridge South Alternative as the LEDPA. The majority of the agencies did not feel that they could concur with the Road North/Bridge South Alternative because of the high amount of wetland and habitat impacts associated with that alternative. Based on a suggestion from the USEPA representative, the team discussed moving forward with the construction of Phase I (Oregon Inlet bridge) and

determining the plan for future phases at a later time. It was also discussed that project area shoreline erosion and other coastal conditions would continue to be monitored, allowing for future decisions to be based on actual data rather than predicted shorelines.

The Merger Team agreed that this concept (referred to as the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative [Preferred] in this EA) fit within the terms of the August 27, 2007, Concurrence Point 3 Agreement (LEDPA) because it would involve replacement of the Oregon Inlet bridge as Phase I. However, it was also discussed that completion of Phase I alone would not meet the purpose and need of the project, so a commitment was needed by all parties to develop and implement the entire action from Rodanthe to Bodie Island. A draft Partnership Agreement was subsequently developed to formalize this commitment.

The NC 12 Transportation Management Plan Alternative (Preferred) developed subsequent to this meeting recognizes that the project area is complex and the shoreline is constantly changing. It also recognizes that the ability to predict the effect of future storms on the project area is extremely difficult, and that the various alternatives may need to be reassessed in the future as the shoreline and other landscape features continue to change.

Since the NC 12 Transportation Management Plan Alternative (Preferred) also fits the terms of the August 27, 2007, Concurrence Point 3 Agreement (LEDPA), no new Merger Team agreement was needed. However, based on discussions at the Merger Team meetings on May 21, 2009, and September 17, 2009 (see below), an amendment to the Concurrence Point 3 Agreement (LEDPA) was prepared and signed by the Dispute Resolution Board on January 7, 2010 (see Appendix A). The LEDPA agreement amendment does not change the intent of the original LEDPA agreement “beyond the understanding that the Phased Approach/Rodanthe Bridge Alternative is no longer considered and identified in the Record of Decision (ROD) as the LEDPA.” The LEDPA agreement amendment also stipulates that the Merger Team will be consulted about decisions on future phases of the project.

3.3.4 September 17, 2009, Merger Team Meeting

The purpose of the September 17, 2009, Merger Team meeting was to discuss the wetland mitigation for Phase I and a draft Preferred Alternative Partnership Agreement, which was prepared as a result of the May 21, 2009, meeting. During the meeting, it was decided that:

- The NCDOT Natural Environment Unit would review the area called man-dominated in the wetland impact numbers and assess the type and quality of all wetlands according to the North Carolina Wetland Assessment Method (NCWAM).
- The NCDOT Natural Environment Unit would coordinate with NPS to develop an appropriate, practicable phragmites control proposal for review by NCDOT and agencies as mitigation for wetland impacts.
- The NCDOT Natural Environment Unit would provide an estimate of the total SAV habitat area, impacts resulting from shading, and impacts resulting from fill.
- The NCDOT Natural Environment Unit would provide an estimate of the potential SAV habitat area under the existing bridge.

The team recommended that the draft Partnership Agreement should be revised into an amendment to the August 27, 2007, Concurrence Point 3 Agreement (LEDPA), and that the amended concurrence form should include the following:

- Recognition that the NEPA/Section 404 Merger 01 Dispute Resolution Board agreed that Phase I should proceed as soon as possible;
- Review of the amount of studies of the project area that have been completed to date;
- Recognition of the available solutions for later phases that were studied;
- Explanation why the team agreed during the May 21 meeting that decisions on the later phases of the project could be postponed; and
- Recognition that an additional formalized agreement should be pursued with USFWS and NPS that provides additional information on how decisions about later phases will be made.

It was decided that NCDOT and FHWA would draft an amended concurrence form with the above stipulations for the Merger Team's review.

However, as stated previously, both the NPS and the USFWS, in letters dated March 11 and March 22, 2010 respectively, have stated that they would not be able to sign the draft partnership agreement. Both the NPS and the USFWS are members of the Merger Team and will continue to be included as part of the Merger Process, and FHWA and NCDOT would reopen discussion about the Partnership (or other similar) Agreement if requested by the NPS and USFWS.

3.4 Section 106 Meetings Since Release of the FEIS

Since the publication of the FEIS in September 2008, FHWA, NCDOT, ACHP, and the State Historic Preservation Office (HPO), as well as other consulting agencies, have participated in approximately nine meetings to discuss the project with respect to Section 106 of the Historic Preservation Act of 1966. These meetings were held to discuss the specifics of a Memorandum of Agreement that detailed the action and appropriate mitigation. The Memorandum of Agreement was revised in the later meetings as a Programmatic Agreement that would resolve adverse effects for Phase I of the Parallel Bridge Corridor and set up a process for compliance with Section 106 prior to the implementation of later phases.

During meetings held in March and April 2009, meeting participants discussed revising the effects calls for several of the project alternatives. On March 24, 2009, FHWA, NCDOT, HPO, and the ACHP concurred that the revised designs for the Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge alternatives (see Section 2.1) would have No Adverse Effect on the Rodanthe Historic District and Chicamacomico Life Saving Station. The effects of the preferred alignment for Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative were discussed during a meeting on June 10, 2009; it was agreed that, as with the other Parallel Bridge Corridor alternatives, this alternative would have an Adverse Effect on the (former) Oregon Inlet US Coast Guard Station and the Refuge.

The final Programmatic Agreement will be included in the Record of Decision (ROD).

3.5 Coordination with USFWS Related to the Refuge Since Release of the FEIS

3.5.1 March 19, 2009, Meeting

A meeting was held on March 19, 2009, between FHWA, NCDOT, and USFWS. The purpose of the meeting was to provide USFWS with foreknowledge regarding FHWA's possible direction with respect to responding to comments on the FEIS and ultimately issuing a ROD. Meeting participants discussed proposed changes being considered in response to comments received on the FEIS, particularly with regard to the Section 4(f) Evaluation. Issues discussed at the meeting included:

- Whether or not the Section 4(f) Evaluation's "Constructive Use Analysis" for the Phased Approach/Rodanthe Bridge Alternative had properly considered effects on the Refuge as a site eligible for the NRHP, and the level of impairment based on FHWA regulations.
- The prudence of considering the Pamlico Sound Bridge Corridor alternatives based on cost and visitor access.
- If the effects of retaining or removing the terminal groin under the Phased Approach/Rodanthe Bridge Alternative had been properly addressed in the FEIS.
- Design changes for the Phased Approach/Rodanthe Bridge Alternative that are being considered and their potential to maintain the current Section 106 effects determination as No Adverse Effect.
- The potential for determining in a Final Section 4(f) Evaluation that Section 4(f) does not apply to the Cape Hatteras National Seashore (Seashore) and the Refuge on the basis that historically the State of North Carolina, USDOJ, and its predecessors have been working to develop, maintain, and operate a transportation corridor through both resources.

3.5.2 May 28, 2009, Teleconference Meeting

A teleconference meeting was held on May 28, 2009, between FHWA and USFWS. The purpose of the meeting was to discuss the proposed project's compatibility with the National Wildlife Refuge System Improvement Act of 1997. Issues discussed included:

- The FHWA submittal of examples of how the state has worked with the Refuge on roads and maintenance thereof in the past, therefore setting precedence for road relocations being considered compatible with the purpose of the Refuge.
- USFWS's authority to implement the Merger Team's proposed solution (from the May 21, 2009, meeting) of cooperating agencies negotiating a Memorandum of Understanding (MOU) or Partnership Agreement. This Partnership Agreement would allow a Phase I bridge replacement option to move forward with a cooperating plan in place for adaptive management of the Refuge prior to implementation of future phases.

The outcomes of this meeting included: USFWS's position that since the decision to proceed with Phase I had been previously agreed upon by the Merger Dispute Resolution Board, there was

no need to go through the process again; FHWA assurance that all applicable permits and authorizations would be obtained prior to any USDOT authorization; agreement by NCDOT to provide future conceptual designs within two to three weeks of future meetings; agreement to hold a field meeting; and NCDOT preparation of a monetary appraisal of right-of-way to be acquired based on NCDOT's conceptual designs.

3.5.3 July 15, 2009, Site Visit

On July 15, 2009, FHWA and NCDOT met with USFWS staff in the Refuge to discuss options for the Phase I southern terminus. NCDOT had previously provided USFWS with conceptual designs for the Parallel Bridge Corridor alternatives as discussed in Section 2.3.2.1. During the meeting, USFWS stated that the Phase I alignments outside of the existing NC 12 easement likely would not be found compatible with the Refuge. However, USFWS did provide an area at the north end of Hatteras Island outside the easement that would be considered a minor modification of the existing NC 12 easement and within which construction activities could occur. If NCDOT decides to utilize this new area, the existing easement would be amended through a permit from USFWS. Maintaining access to the NPS parking lot and the (former) Oregon Inlet US Coast Guard Station also were discussed.

3.5.4 September 2, 2009, Meeting

Following the July 15, 2009, site visit, NCDOT developed a conceptual design that stayed within the limits provided by the Refuge discussed above. NCDOT also developed a second conceptual design in which the alignment traversed just west of the limits provided by the Refuge and tied into NC 12 south of these limits. The latter conceptual design was developed to provide a safer distance between existing NC 12 and the new Oregon Inlet bridge during construction, as well as improved access to the NPS parking lot on the east side of NC 12. On September 2, 2009 FHWA and NCDOT met with USFWS and NPS at USFWS's Alligator River National Wildlife Refuge Office in Manteo, North Carolina, to follow-up on the discussion from the July 15, 2009 site visit and present the two conceptual designs to Refuge representatives. FHWA and NCDOT recommended that the conceptual design located just west of the limits provided by the Refuge be approved because of their concerns related to traffic control during construction and access to the parking lot located at Oregon Inlet. Following the meeting, in correspondence to NCDOT representatives dated September 24, 2009, the Refuge indicated that the conceptual design that was beyond the original limits provided to FHWA and NCDOT in July was acceptable and likely represented the limits of what could be considered a minor modification of the existing easement. This conceptual design was adopted as a part of Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) as evaluated in the Revised Final Section 4(f) Evaluation, which was approved on October 9, 2009 (see Appendix B). NCDOT also agreed at the meeting to provide further impact information on the revised southern terminus of the new Oregon Inlet bridge (Phase I) to USFWS.

3.5.5 Meetings on the Terminal Groin

FHWA and NCDOT began working with USFWS in August 2008 on the requirements for renewing the existing permit for the terminal groin. USFWS has stated that a new permit will be required. FHWA and NCDOT will continue to coordinate with USFWS to meet all necessary requirements.

3.5.6 November 2009 Rodanthe Storm Repair

Since the publication of the FEIS, NCDOT has conducted a series of repairs on a section of NC 12 north of Rodanthe; these repairs were required to maintain traffic following storm events. Following the nor'easter storm in November 2006, NCDOT installed a 900-foot (274.3-meter) section of sandbags adjacent to NC 12 to protect the roadway. USFWS issued a permit for this work that required NCDOT to place approximately 200,000 cubic yards (152,911 cubic meters) of sand on the beach face east of the installed sandbags in order to restore beach habitat in the area. NCDOT completed this effort in March 2010.

Remnants of Tropical Storm Ida caused additional damage to both NC 12 and the protective dunes in November 2009. NCDOT relocated approximately 1,860 feet (566.9 meters) of the roadway 23 feet (7.0 meters) west, remaining within the existing NC 12 easement in the Refuge. In addition to the road relocation, the original 900 feet (274.3 meters) of sandbags, which were damaged during the storm, were removed and replaced, and an additional 350-foot (106.7-meter) section of sandbags was installed on the south end. The road relocation was completed in December 2009, while the sandbag installation was completed in February 2010.

NCDOT coordinated with USFWS and other environmental regulatory agencies, including USACE, NCDENR-DWQ, NCDENR-DCM, and NCDENR-WRC, as needed on all repair efforts. The work was conducted under the direction of USFWS staff and outside of any moratorium time periods as prescribed by USFWS and NCDENR-DCM.

3.6 Endangered Species Act Consultation Since Release of the FEIS

3.6.1 November 2008 Endangered Species Act Update

USFWS's conference opinion for the proposed critical habitat of the piping plover was included in the July 10, 2008, biological opinion. Since that time, there have been no substantial changes in the action as planned or in the information used during the conference. Therefore, effective November 20, 2008, USFWS officially adopted the conference opinion as the biological opinion for critical habitat affected by the proposed project. USFWS sent a letter to FHWA on November 5, 2008, confirming the conference opinion as the biological opinion for the project. The response provided is in accordance with Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

3.6.2 April 2009 Consultation with USFWS

A meeting was held on April 1, 2009, between NCDOT, FHWA, and USFWS to identify any further ESA consultation requirements should a different Preferred Alternative be chosen by FHWA. It was confirmed that USFWS would treat any future changes to the biological opinion as an "amendment" to the biological opinion. It was agreed that USFWS, FHWA, and NCDOT would work together to draft an amendment, if needed, prior to FHWA selecting a different Preferred Alternative. It was agreed that re-initiation of ESA Section 7 consultation was not warranted should the Parallel Bridge Corridor with Road North/Bridge South Alternative be selected as the Preferred Alternative.

3.6.3 May 2009 ESA Consultation with NOAA Fisheries

NOAA Fisheries agreed that re-initiation of ESA Section 7 consultation is not warranted should NCDOT select the Road North/Bridge South Alternative as the Preferred Alternative. They indicated in a May 14, 2009, e-mail that if NCDOT follows the protective procedures outlined in the original consultation (i.e., sea turtle protection guidelines), the effects of the change to this alternative would not be different from that of the original consultation.

3.6.4 August 2009 ESA Consultation with USFWS

Following the development of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred), FHWA and NCDOT again requested assistance from USFWS in determining whether re-initiation of consultation would be necessary with the change of the Preferred Alternative to the NC 12 Transportation Management Plan Alternative. USFWS agreed with FHWA that re-initiation of consultation is unnecessary for the new Preferred Alternative.

3.7 December 2009 Coordination Meeting with Council on Environmental Quality

A meeting was held to discuss the Bonner Bridge Replacement Project on December 11, 2009, at the Council on Environmental Quality (CEQ) office in Washington, D. C. The meeting was held at the request of CEQ since they were contacted by USFWS after USFWS' review of the Revised Final Section 4(f) Evaluation that was approved and circulated by FHWA and NCDOT in October 2009. Along with representatives from CEQ and USFWS, other agencies represented were USDOL, NCDOT, and FHWA. Issues discussed during the meeting included FHWA's Revised Final Section 4(f) Evaluation and FHWA's decision to develop an EA to identify and assess changes to the project since the September 2008 FEIS was approved and subsequently to determine whether the changes result in significant impacts not previously disclosed in the FEIS. While no issues were resolved during the meeting, CEQ stated that FHWA and NCDOT should work with USFWS to develop a Partnership Agreement and include it in the ROD.

3.8 Public Involvement

The agencies and interest groups listed below will be sent a copy of this EA with a request for comments. These same agencies and interest groups were sent a copy of the FEIS. The availability of the EA will be announced via a newsletter sent to those on the project's mailing list and in advertisements within local media outlets. The EA will also be available on the project website (www.ncdot.org/projects/bonnerbridgerepairs) and the Outer Banks Task Force website (www.obtf.org). Public meetings will be held to gather additional comments on the EA. Comments on the EA will be addressed in subsequent documentation.

Federal Agencies

Advisory Council on Historic Preservation	Federal Energy Regulatory Commission
Federal Emergency Management Agency	US Army Corps of Engineers

US Coast Guard—5th District	US Department of Housing and Urban Development
US Department of Agriculture—Natural Resources Conservation Service	US Department of the Interior—US Fish and Wildlife Service (Pea Island National Wildlife Refuge and Raleigh Field Office); Keeper of the National Register; National Park Service; US Geological Survey
US Department of Commerce—National Oceanic and Atmospheric Administration-National Marine Fisheries Service	
US Department of Health and Human Services	US Environmental Protection Agency, Region IV (Environmental Review Branch)

State Agencies

North Carolina Department of Administration—State Clearinghouse	North Carolina Department of Environment and Natural Resources—Division of Air Quality; Division of Coastal Management; Division of Land Resources; Division of Marine Fisheries; Division of Parks and Recreation; Division of Water Quality
North Carolina Department of Cultural Resources—Division of Archives and History	
	North Carolina Wildlife Resources Commission

Local Governments and Agencies

Albemarle Regional Planning and Development Commission (Albemarle Rural Planning Organization)	Mayor of Kill Devil Hills Mayor of Kitty Hawk
Area Development Coordination Agency (ADCA)	Mayor of Manteo Mayor of Nags Head
County of Dare—Chair, Dare County Commissioners; Dare County Manager; Emergency Management Agency	Mayor of Southern Shores
Mayor of Duck	Oregon Inlet and Waterways Commission

Local Interest Groups

Audubon North Carolina	Defenders of Wildlife
Carolina Electric Cooperatives	Eastern Surfing Association, Outer Banks District
Center for Biological Diversity	Environmental Defense Fund
Coastal Wildlife Refuge Society	Friends of Hatteras Island
Conservation Council of North Carolina	Hatteras Civic Association
Dare County Tourist Bureau	

Hatteras Island Business Association

Pamlico – Tar River Foundation

National Parks Conservation Association

Sierra Club, North Carolina Chapter

North Carolina Coastal Federation

Southern Albemarle Association

North Carolina Fisheries Association

Southern Appalachian Biodiversity Project

Outer Banks Chamber of Commerce

Southern Environmental Law Center

Public Review Locations

Dare County Libraries in Hatteras Village,
Kill Devil Hills, and Manteo, North Carolina

Fessenden Recreation Center in Buxton,
North Carolina

Dare County Planning and Inspections
Satellite Office in Buxton, North Carolina

NCDOT Resident Engineer's Office in
Manteo, North Carolina

4.0 Conclusion

This Environmental Assessment (EA) documents changes associated with the project as well as changes to the project environment.

- From the analysis contained in Section 2.3, the Federal Highway Administration (FHWA) believes that the identification of a new alternative (Parallel Bridge Corridor with NC 12 Transportation Management Plan [Preferred]) does not result in new, significant impacts to the human and natural environments not previously identified in the Final Environmental Impact Statement (FEIS) since this alternative is a mixing and matching of the other Parallel Bridge Corridor alternatives already assessed in the FEIS with minor revisions in Rodanthe and at Oregon Inlet on Hatteras Island.
- From the analysis contained in Sections 2.1 and 2.3, FHWA believes that the modification of alternatives lessens several of the adverse impacts identified in the FEIS while not creating new, significant impacts not previously identified. The principal increases in impacts that would occur are associated with revisions to the alternatives in Rodanthe that eliminate adverse effects to the Rodanthe Historic District. While reducing impacts in the historic district, relocations and noise impacts increase in Rodanthe, but the increases are not significant (see Section 2.1).
- From the analysis contained in Section 2.1, FHWA believes that the conclusions in the Revised Final Section 4(f) Evaluation do not suggest any new, significant impacts not previously identified in the FEIS.
- From the analysis contained in Section 2.3.7, although the cost estimates have changed slightly from the FEIS, FHWA does not believe that the changes are of such magnitude that the cost estimates would be a new, significant impact not previously identified in the FEIS.

Based on this analysis and on the extensive coordination with state and federal environmental resource and regulatory agencies, FHWA believes that the FEIS and EA adequately document the range of impacts that could be anticipated with the Preferred Alternative. FHWA also believes the changes identified in this EA would not result in new, significant impacts not previously identified in the FEIS.

FHWA now seeks input on the content and tentative conclusions identified in this EA. Once public and agency input have been received and considered, FHWA will determine whether a Supplemental FEIS needs to be prepared.

Appendix H

Revised Relocation Reports

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

E.I.S. CORRIDOR DESIGN

WBS:	32635	COUNTY	Dare	Alternate - Road North/Bridge of 3 Alternate South and All Bridge
I.D. NO.:	B-2500	F.A. PROJECT	BRS-2358 (15)	
DESCRIPTION OF PROJECT:		Replacement of the Herbert C. Bonner Bridge (No. 11) over Oregon Inlet		

ESTIMATED DISPLACED					INCOME LEVEL							
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP			
Residential	2	0	2	0	0	0	0	1	1			
Businesses	1	4	5	0	VALUE OF DWELLING			DSS DWELLING AVAILABLE				
Farms	0	0	0	0	Owners		Tenants		For Sale For Rent			
Non-Profit	0	0	0	0	0-20M	0	\$ 0-150	0	0-20M	0	\$ 0-150	0
ANSWER ALL QUESTIONS					20-40M	0	150-250	0	20-40M	0	150-250	0
Yes	No	<i>Explain all "YES" answers.</i>										

	X		1. Will special relocation services be necessary?
	X		2. Will schools or churches be affected by displacement? *
	X		3. Will business services still be available after project?
X			4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X		5. Will relocation cause a housing shortage?
			6. Source for available housing (list).
	X		7. Will additional housing programs be needed?
X			8. Should Last Resort Housing be considered?
	X		9. Are there large, disabled, elderly, etc. families?
	X		10. Will public housing be needed for project?
	X		11. Is public housing available?
X			12. Is it felt there will be adequate DSS housing available during relocation period?
	X		13. Will there be a problem of housing within financial means?
X			14. Are suitable business sites available (list source).
			15. Number months estimated to complete RELOCATION? 0 months

70-100M	0	400-600	0	70-100M	0	400-600	0
100 UP	2	600 UP	0	100 UP	45+	600 UP	2
TOTAL	2		0		45+		2

REMARKS (Respond by number)

4 – A strip building that has 4 businesses:
 Hot Tuna Restaurant – approximately 8 employees
 Grub and Pub Bar - approximately 6 employees
 Auto Service and Parts - approximately 2 employees
 Austin's South Island Seafood and Produce - approximately 4-6 employees

- Money's Worth Rentals - approximately ? employees
 Appears to be a seasonal business

6, 12, 14 – Multiple Listing Services, Newspaper, Local Realtor

8 – As mandated by law.

13 – Multiple houses are available for sale or rent, however Last Resort Housing may be needed in this section

*Note – Family Cemetery very close to proposed RW Line

 Michelle A. Pittman Right of Way Agent	02-19-10		 Relocation Coordinator	2/19/10
Date			Date	

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

E.I.S. CORRIDOR DESIGN

WBS:	32635	COUNTY	Dare	Alternate -	Rodanthe	of	3	Alternate
I.D. NO.:	B-2500	F.A. PROJECT	BRS-2358 (15)					
DESCRIPTION OF PROJECT:	Replacement of the Herbert C. Bonner Bridge (No. 11) over Oregon Inlet							

ESTIMATED DISPLACEDS					INCOME LEVEL					
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP	
Residential	5	1	6	0	0	0	0	1	1	
Businesses	3	4	7	0	VALUE OF DWELLING					
Farms	0	0	0	0	DSS DWELLING AVAILABLE					
Non-Profit	0	0	0	0	Owners		Tenants		For Sale	
					0-20M	0	\$ 0-150	0	0-20M	0
					20-40M	0	150-250	0	20-40M	0
					40-70M	0	250-400	0	40-70M	0
					70-100M	0	400-600	0	70-100M	0
					100 UP	5	600 UP	1	100 UP	45+
					TOTAL	5		1		45+
										2

ANSWER ALL QUESTIONS		
Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
	X	3. Will business services still be available after project?
X		4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
X		8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
	X	11. Is public housing available?
X		12. Is it felt there will be adequate DSS housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
X		14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 0 months

REMARKS (Respond by number)

4 – A strip building that has 4 businesses:
 Hot Tuna Restaurant – approximately 8 employees
 Grub and Pub Bar - approximately 6 employees
 Auto Service and Parts - approximately 2 employees
 Austin's South Island Seafood and Produce - approximately 4-6 employees
 - Money's Worth Rentals - approximately ? employees
 Appears to be a seasonal business
 -Island Convenience Store - approximately 8 employees
 - Midgette Realty - approximately 4-6 employees

6, 12, 14 – Multiple Listing Services, Newspaper, Local Realtor

8 – As mandated by law.

13 – Multiple houses are available for sale or rent, however Last Resort Housing may be needed in this section

Note – 2 houses are vacant and for sale, 1 appears to be a summer home

Michelle A. Pittman Right of Way Agent	02-19-10		Relocation Coordinator	2/19/10
Date			Date	

EIS RELOCATION REPORT

North Carolina Department of Transportation
RELOCATION ASSISTANCE PROGRAM

E.I.S. CORRIDOR DESIGN

WBS:	32635	COUNTY	Dare	Alternate - Rodanthe of 3 Alternate Phased Approach Nourishment
I.D. NO.:	B-2500	F.A. PROJECT	BRS-2358 (15)	
DESCRIPTION OF PROJECT:		Replacement of the Herbert C. Bonner Bridge (No. 11) over Oregon Inlet		

ESTIMATED DISPLACEES					INCOME LEVEL							
Type of Displacees	Owners	Tenants	Total	Minorities	0-15M	15-25M	25-35M	35-50M	50 UP			
Residential	0	0	0	0	0	0	0	0	0			
Businesses	0	0	0	0	VALUE OF DWELLING							
Farms	0	0	0	0	DSS DWELLING AVAILABLE							
Non-Profit	0	0	0	0	Owners	Tenants	For Sale	For Rent				
					0-20M	0	\$ 0-150	0	0-20M	0	\$ 0-150	0
					20-40M	0	150-250	0	20-40M	0	150-250	0
					40-70M	0	250-400	0	40-70M	0	250-400	0
					70-100M	0	400-600	0	70-100M	0	400-600	0
					100 UP	0	600 UP	0	100 UP	45+	600 UP	2
					TOTAL	0		0		45+		2

ANSWER ALL QUESTIONS		
Yes	No	Explain all "YES" answers.
	X	1. Will special relocation services be necessary?
	X	2. Will schools or churches be affected by displacement?
	X	3. Will business services still be available after project?
	X	4. Will any business be displaced? If so, indicate size, type, estimated number of employees, minorities, etc.
	X	5. Will relocation cause a housing shortage?
		6. Source for available housing (list).
	X	7. Will additional housing programs be needed?
	X	8. Should Last Resort Housing be considered?
	X	9. Are there large, disabled, elderly, etc. families?
	X	10. Will public housing be needed for project?
	X	11. Is public housing available?
	X	12. Is it felt there will be adequate DSS housing available during relocation period?
	X	13. Will there be a problem of housing within financial means?
	X	14. Are suitable business sites available (list source).
		15. Number months estimated to complete RELOCATION? 0 months

REMARKS (Respond by number)

Negative Report

<p>Michelle A. Pittman Right of Way Agent</p>	02-19-10		2/19/10	<p>Relocation Coordinator</p>	Date
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Appendix G

**Revised Final Section 4(f)
Evaluation Comment Letters**

G. Revised Final Section 4(f) Evaluation Comment Letters

US DEPARTMENT OF THE INTERIOR G-2
US DEPARTMENT OF THE INTERIOR (SUPPLEMENT) G-7
NORTH CAROLINA DEPARTMENT OF CULTURAL RESOURCES G-10
SOUTHERN ENVIRONMENTAL LAW CENTER G-11



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240



DEC 3 2009

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PEP/IRM

ER 07/206

Mr. John F. Sullivan III
Division Administrator
Federal Highway Administration
10 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601

SUBJECT: Comments on the Revised Final Section 4(f) Evaluation for the NC 12 Replacement of Herbert C. Bonner Bridge (No. 11) over Oregon Inlet, Dare County, North Carolina

Dear Mr. Sullivan:

The Department of the Interior has reviewed the Revised Final Section 4(f) Evaluation for the **NC 12 Replacement of Herbert C. Bonner Bridge (No. 11) over Oregon Inlet, Dare County, North Carolina**, and provides comments by the U.S. Fish and Wildlife Service (Service).

The Service has provided detailed comments on this project throughout the planning process, raising numerous concerns about the effects of Parallel Bridge Corridor alternatives on Pea Island National Wildlife Refuge (Refuge). The current revised evaluation neither resolves these concerns nor does it appropriately address potential impacts to the Refuge. These concerns have been raised numerous times, including comments on the draft and final versions of the project's Environmental Impact Statement (EIS), provided in letters from the Department of the Interior (Department) dated February 13, 2006, and October 28, 2008. The Service also provided comments on the Final Environmental Impact Statement (FEIS) and Final Section 4(f) Evaluation, dated April 30, 2009. Most recently, in a letter to the North Carolina Department of Transportation (NCDOT) dated July 31, 2009 (see attachment), the Service pointed out the numerous statements and conclusions put forth in documents provided by NCDOT and the Federal Highway Administration (FHWA) that we believe were in error. This was done in the hope that such errors would be corrected in subsequent decision documents issued by these agencies. We note that this letter is not referenced in any of the documentation provided with the Revised Final Section 4(f) Evaluation, and we are unsure if those concerns have been addressed or considered in any way. We continue to encourage the NCDOT and FHWA to address these issues.

The Revised Final Section 4(f) Evaluation describes a new preferred alternative (Parallel Bridge with NC 12 Transportation Management Plan, or PB/TMP) and provides an analysis and discussion of the feasibility and prudence of various previously assessed alternatives compared with the PB/TMP. Lacking from the analysis is a discussion of the ability of each alternative (particularly the new preferred alternative) to comply with federal law, namely the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act), and National Environmental Policy Act (NEPA). Compliance with these laws is an important factor regarding the prudence of pursuing such a course of action.

Refuge Improvement Act Concerns

The Service believes that the Revised Final Section 4(f) Evaluation, which identifies the PB/TMP alternative as the preferred course for federal action, in conjunction with NEPA documents prepared to date, are inadequate to support the decisions required of us under Federal law. Specifically, in order for the first phase of this new alternative to be implemented, the Service must determine that the proposed use of Refuge lands for construction of the new bridge can be considered a "minor" change to the existing right-of-way, or must be otherwise compatible with the purposes for which the Refuge was established. This determination must be viewed in the context of the overall direct, indirect, and cumulative effects of the project. The Service has consistently stated for many years that all of the Parallel Bridge Corridor alternatives put forth to date would likely result in substantial adverse impacts to the Refuge outside the existing NC 12 right-of-way. As such these alternatives would not likely be found compatible with the purposes for which the Refuge was established, per the Refuge Improvement Act.

The new PB/TMP alternative compounds these inadequacies by deferring decisions regarding most of the project until undetermined points in the future. The Service never concurred that the previously identified preferred alternative (Parallel Bridge with Phased Approach) should be identified as the preferred alternative due to the above-stated issues of compatibility (see the September 11, 2007 letter from the Acting Assistant Secretary of Interior to Governor Easley for reference). Nonetheless, the Phased Approach at least arguably provided some analysis of what could be considered a plan for a complete project that met the stated purpose and need. To the contrary, the new preferred alternative described in the Revised Final Section 4(f) Evaluation provides no description for most of the project except to say that decisions regarding the later phases, "could consist of, but would not be limited to, one or more components of any of the alternatives already studied as part of the environmental review process" (Revised Final Section 4(f) Evaluation, Page 6). In other words, the project could include anything (studied or unstudied in the environmental review

process) between the southern terminus of the new bridge and Rodanthe. As a result, the effects of these undescribed future phases of the project have not been analyzed in any meaningful way, or even placed within some reasonable bounds regarding impacts to the Refuge.

The Service cannot make decisions regarding impacts to the Refuge, including the decision to grant a minor modification of the existing right-of-way, based on the current document. As such, it is no longer clear to us that we can "separate the replacement of the Bonner Bridge... from the more difficult and less urgent issues of realignment of the road," as discussed in the July 6, 2006, letter from the Secretary of Interior to Senator Burr and Governor Easley, without extensive additional analysis and documentation.

NEPA Concerns

The FHWA and NCDOT chose to describe a new preferred alternative in this Revised Final Section 4(f) Evaluation, and we understand that some form of revised NEPA document is being prepared. With that understanding we are providing the following comments for your use in preparation of that document. Based on statements contained in the Revised Final Section 4(f) Evaluation, FHWA and NCDOT appear to believe the NEPA documents prepared to date sufficiently evaluate the PB/TMP alternative because it would represent some, as yet undetermined, combination of previously evaluated alternatives. However, the statement that the new preferred alternative would "...include but not be limited to one or more of the components already studied..." (Revised Final Section 4(f) Evaluation, pg. 6, emphasis added) implies that these actions may not be confined to the range of alternatives thus far considered. It is clear that construction of Phase I (replacement of the Bridge) would limit options for future actions to those that would adversely affect the Refuge. It is also clearly contemplated in the Revised Final 4(f) Evaluation that future maintenance of NC 12 would occur on an as needed basis and is not intended by NCDOT and FHWA to be restricted to the existing right-of-way. For example, Appendix E, Figure S-1 shows a shaded area within which future phases of the new preferred alternative would be located. This area extends well beyond the existing right-of-way. The PB/TMP also references activities, such as beach nourishment and abandonment of old roads that would likely occur outside of the current right-of-way. These activities could result in the net loss of high quality habitat on the refuge. Additionally, Appendix G (pg. 17) refers to the need to stay within the existing right-of-way as "...an artificial and imprudent constraint." The Service disagrees with this statement and maintains that requiring strict adherence to the existing right-of-way is a valid statutory requirement. By proposing to proceed with Phase I of the project while deferring decision-making for most of the project to unspecified future dates, and without providing any clear sense of what those decisions may be or upon what factors they will be based, NCDOT and

FHWA have not fully analyzed the alternatives in the NEPA document. By going forward, the NCDOT and FHWA are proposing to make an irretrievable commitment of resources (construction of Phase I) while inappropriately segmenting the project.

The PB/TMP alternative attempts to overcome the lack of specificity by referring to a Transportation Management Plan and/or Partnership Agreement, the essence of which is that "later phases of actions to manage NC 12 through 2060 would be decided based on actual conditions existing on Hatteras Island at the point in time that additional action becomes necessary" (Revised Final Section 4(f) Evaluation, pg. 5). A draft Partnership Agreement is included in Appendix H of the document. The Service was not consulted in the preparation of the draft Partnership Agreement and fundamentally disagrees with its content. The agreement as drafted fails to recognize the purpose for which the Refuge was established, fails to acknowledge that allowed uses of Refuge lands must be compatible with the purpose for which the Refuge was established, implies that parties to the agreement concur with the selection of the new preferred alternative, and would place the desire to maintain access to and through the Refuge above the wildlife management mission of the Refuge. The Service is in the process of developing detailed comments regarding the Partnership Agreement, but notes that the draft presented is so flawed that we believe it would be more productive for the prospective partners to meet first in an attempt to establish the basic principles upon which such an agreement could be built.

As noted in the Revised Final Section 4(f) Evaluation, the idea of the new preferred alternative was put forth by the U.S. Environmental Protection Agency (EPA) at the May 21, 2009 meeting of the Merger Team. At the meeting, the EPA representative presented the alternative in the context of Adaptive Management. The Service noted at the time that we support the application of Adaptive Management principles where appropriate. We provided the Merger Team members a copy of the Department's 2007 Adaptive Management Technical Guide in order to further the discussion of the appropriateness of applying Adaptive Management principles to the current issue. We note that there has been no discussion of Adaptive Management related to this project involving Service representatives since that meeting, and the principles of Adaptive Management are not reflected anywhere in the Revised Final Section 4(f) Evaluation or the draft Partnership Agreement.

Regardless of what form a Transportation Management Plan or Partnership Agreement may take, or the extent to which principles of Adaptive Management are incorporated into the plan, these features do not eliminate the NEPA requirements to describe a single and complete project and rigorously assess the effects of said project on the quality of the human environment. The Service does not understand how these issues, and the concerns previously expressed by us, can be addressed without preparing a Supplemental EIS.

General Concerns

The basic premise of the Revised Final Section 4(f) Evaluation revolves around two concepts. The first involves consideration of alternatives that are feasible and prudent and the second invokes "new information" that NCDOT and FHWA present to refine and define the concept of "use" as it applies to 4(f) properties. Then, FHWA selectively uses the information to incorrectly determine that there is no use of the Refuge as a refuge, but there is a use as a historic property.

Regarding feasible and prudent alternatives, it must be noted that the Pamlico Sound Bridge Alternative was considered as a feasible and prudent alternative by all agencies until 2003. The record shows that all participants in the Merger Team, representing 13 state and federal agencies, agreed to sign a concurrence statement for studying this alternative when a North Carolina Board of Transportation member stopped the process. Since that time, both NCDOT and FHWA have expended considerable time and effort to transition to the "Phased Approach" as presented in the FEIS. In fact, as we have repeatedly stated throughout the planning process, all of the alternatives put forth to date within the Parallel Bridge Corridor (including the Phased approach and PB/TMP) will most likely require work outside the existing right-of-way, and as such are not likely to be found compatible with the purposes for which the Refuge was established. In this instance, none of the Parallel Bridge Corridor alternatives could be authorized under Federal law.

The effects of climate change will likely shape the options available to NCDOT and FHWA for NC 12 and further hinder their efforts to confine work within the existing right-of-way. North Carolina's coast is on the front-line when it comes to addressing impacts from accelerating climate change. Normal erosion, sea level rise impacts in the next 20 years alone, and the effects of tropical storms and hurricanes have and will continue to change the coast-line and coastal habitats on this dynamic barrier island system. We believe, based on projections between now and 2030, sections of this highway will be consistently under water from erosion and the effects of sea level rise. These changes to the habitats at the Refuge will accelerate with climate change. Projects like this demand a visionary approach that contemplates the best adaptive science taking into account both ecological effects and the needs of our citizens.

Regarding the use of the Refuge, a fundamental issue is that FHWA considers the Refuge to not be a Section 4(f) property as a refuge (pgs. 12-14), but only as a historic property. The FHWA's Section 4(f) Evaluation contains a number of additional inaccuracies relating to the Refuge, such as the relationship between the Service and the National Park Service (NPS), and the existence of a public thoroughfare across Pea Island prior to the establishment of the Refuge.

The Service asserts that FHWA's Section 4(f) evaluation and their subsequent determination that the Refuge (as a refuge) is not a Section 4(f) property are based on a number of unsupported or inaccurate assumptions. In the Revised Final Section 4(f) Evaluation, FHWA incorrectly bases their argument on the premise that the Refuge and NC 12 were "concurrently and jointly planned and developed" (pg.12). In the section "Constructive Use," the FHWA underplays the Refuge as an example of an early 20th century "wildlife sanctuary" eligible under the historic context of "conservation." By underplaying this aspect, the FHWA argues that this undertaking "would constructively use the Refuge (as a historic property)" and avoid designating the Refuge as a Section 4(f) property. As Furr (2008) noted, "The Refuge was determined eligible for the National Register because it was part of two national movements, the creation of wildlife sanctuaries across the United States, and the employment of thousands in the CCC." We believe, based on historical and legal analyses (refer to the attached July 31, 2009 letter and reference therein), that FHWA and NCDOT conclusions are incorrect and that they continue to confuse the Service and the NPS in their discussions. The Service and the NPS, although both housed in the Department, possess unique histories, different missions, organizational structures, and operate under different legislative mandates.

As the Service explained in detail in our July 31, 2009 letter to NCDOT (attached), the Refuge is not an overlay on the NPS's Cape Hatteras National Seashores managed by the Service pursuant to a Memorandum of Agreement, as stated on page 13. The Refuge is a functioning unit of the National Wildlife Refuge System established in 1938 by Executive Order 7864, owned and administered by the Service. The Service's title chain, not only is robust, but documents that the agency acquired lands from private land owners unencumbered by any third party right-of-way. The State of North Carolina did not acquire a right-of-way across the Refuge until 1954, well after the establishment of the Refuge. As articulated in FHWA regulations (23 CFR Part 774.11), the concept of "joint planning" applies when a property is formally reserved for a future transportation facility before or at the same time a park, recreation area, or wildlife and waterfowl refuge is established. Clearly this did not happen with respect to the establishment of the NC 12 right-of-way through the Refuge.

The FHWA's assertion that a public thoroughfare across Pea Island existed prior to the creation of the Refuge is based upon a 1938 State Highway and Public Works Commission map. Oral history, the Refuge's Annual Narrative, and NPS records do not support this assertion. The Service addressed this assertion in detail in the April 24, 2009, "Section 106 Effects Analysis Regarding Bonner Bridge Replacement Alternatives and Adverse Impacts to Pea Island National Wildlife Refuge" and in the attached July 31, 2009, letter from the Service. The case presented by FHWA ignores the fact that the transportation uses they base their conclusions upon are derived largely from informal use of the beach as a transportation corridor. People drove on the beach unless the tide was high to the point that the beach was impassable. The beach was also used as an ephemeral truck corridor by the Civilian Conservation Corps (CCC). The Service is not aware of any records that indicate that an actual "road" existed in any commonly understood use of the term. When the Refuge was established in 1938, none of the property deeds contained any reservations or easements for a public

transportation facility. Consequently, there is no history of a public transportation infrastructure or joint planning or collaboration predating the Refuge, or on the Refuge, until a right to construct and maintain a road in a specific location with a specified width was conveyed in a permanent easement in the 1950's.

By segmenting the original project into two parts consisting of the replacement of the Bridge and the NC 12 Transportation Management Plan, FHWA attempts to ignore or underplay the project's direct and indirect adverse impacts to the Refuge, both as a functioning unit of the National Wildlife Refuge System and as a National Register-eligible historic landscape. The Refuge will be irrevocably harmed by the preferred alternative and any subsequent actions implemented under the NC Transportation Management Plan, primarily due to the exacerbation of the shoreline erosion or loss caused by NCDOT's continuing interruption of the island's geomorphic processes. Recent history shows average winds and tides during storms do cause significant overwash across sections of NC 12 along several sections of highway. The Service has issued emergency special use permits to allow the state to clear the highway. We are currently evaluating that approach because of its impacts to wildlife, associated coastal and estuarine habitats and the complex ecological dynamics of barrier islands, which will only be amplified by ongoing erosion and the growing effect of sea level rise along the North Carolina coast related to accelerating climate change.

An issue not presented for discussion in the Revised Final Section 4(f) Evaluation is the Oregon Inlet Terminal Groin. We understand that FHWA has informed NCDOT that they will not provide funding for the project until the Service issues a new special use permit for retaining the terminal groin. Some dialogue between the Refuge, FHWA, and NCDOT has occurred on the issues around the terminal groin permit. At this time, the Refuge has submitted a scope of work to FHWA and NCDOT for data analysis by appropriate coastal experts as input to the decision-making process to help with the analysis associated with a permit decision. If FHWA intends to link these project features, we suggest both should be addressed in this revised document.

Specific Comments on the Revised Final Section 4(f) Evaluation

Pg. 5 states "The new Preferred Alternative would allow all agencies to minimize risks by building what is needed now, and managing the rest of the project area on an as needed basis." The Service fails to see how this allows us to "minimize risks" considering that there is no plan beyond building the bridge. While it may minimize risks for the highway, the "plan" should also minimize risk to natural resources on the Refuge where possible.

Pg. 5 and the cover page to Appendix H reference agreements of the Merger Team regarding the possible need for a new Concurrence Point 3 form, at a September 17, 2009, meeting. Agreement on Concurrence Point 3 indicates agreement regarding the

selection of the preferred alternative. The Service does not concur with the revised Concurrence Point 3 (Least Environmentally Damaging Practicable Alternative). We question why Appendix H is included in this document, since the Merger Team (which included most of the Merger Team agencies minus the Service, who was not present) decided not to move forward with this specific partnership agreement. We recommend that you remove Appendix H.

Pg. 6 states "Under the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, later phases of actions to manage NC 12 through 2060 would be based on actual conditions existing on Hatteras Island at the point in time that additional action becomes necessary." We point out that the NC 12 Transportation Management Plan portion is not actually a formal plan, but rather a deference to make plans at a later time. The problem with this approach is well illustrated by recent events. During the week of November 9, 2009, a storm battered the eastern seaboard. The storm severely damaged the portion of NC 12 at the southern end of the Refuge near Rodanthe. The beach and berm that formerly protected the road from the ocean are largely gone and it would appear that these "actual conditions" indicate that additional action is necessary. Yet, there is no "plan" for dealing with what would be this next "phase" of the project explicitly stated in the PB/TMP alternative. The only response possible under these crisis conditions is to rush in and attempt to repair the damage. Clearly, waiting for emergencies to dictate action is not conducive to sound long-term decision-making. Yet, based on the FEIS, future decisions regarding the fate of NC 12 and the Refuge would be made under the PB/TMP alternative in this manner.

By "mixing and matching" components of the previously presented alternatives, the NC 12 Transportation Management Plan becomes a plan equating to emergency response for erosion and ocean overwash. Also, the FEIS preferred alternative was based upon the premise that bridging and NC 12 maintenance in the Phased Approach were all envisioned to be done within the existing right-of-way. The new preferred alternative clearly envisions work outside the existing right-of-way (note our comments above and references to Appendices E and G). We note again, that work outside the existing right-of-way is not likely to be found compatible with the purposes for which the Refuge was established and as such may not be allowed. We recommend that NCDOT and FHWA decide on a final alternative and work with us to conduct a compatibility determination so that you can maintain your schedule.

Pgs. 9-13 present substantial information regarding historic use and deed reservations. Most of the information is relative to the Cape Hatteras National Seashore, while very little is relevant to the Refuge as there were no restrictions, reservations, or easements within or attached to the deeds at the time the Refuge land was purchased. Consequently, the manner and format for presenting this information is very misleading

and does not reflect an accurate assessment of the language within the deeds of respective lands. We recommend that NCDOT and FHWA revise their decision documents to acknowledge the fact that the Refuge and Cape Hatteras National Seashore are distinct properties, established under distinct authorities, and managed by separate federal agencies under separate authorities. We further recommend that NCDOT and FHWA revise their decision documents to reflect the requirement to ensure that their actions are compatible with the purposes for which the Refuge was established.

Pgs. 22--23 and related content in Appendix E imply there is final agreement as to what constitutes a minor modification to the existing right-of-way for the southern terminus of the Parallel Bridge. It also implies that a shift may occur in the NC 12 right-of-way of about 216.5 feet further west as the Parallel Bridge makes landfall on the north end of the Refuge. The Refuge, NCDOT, and FHWA have had meetings with regard to what would constitute a minor modification to the existing right-of-way. Discussions at these meetings have been in the context of what could possibly be viewed as a minor modification with appropriate mitigation for the use of Refuge land. To date, there have been no agreements on either the right-of-way or mitigation. We are unaware of any finalized NCDOT proposal. Nothing has been presented to the Refuge that finalizes a shift in alignment and no requests have been made for a right-of-way modification. Therefore, the shift of 216.5 feet west should be considered tentative because we are still working on the specific details with NCDOT and FHWA. Appendix E also presents acreage estimates for new easement, but, because there have been no final agreements with the Refuge, acreage numbers are likely to change. We require a final design proposal for a request to modify the existing right-of-way along with adequate NEPA documentation and a compensatory mitigation plan. Only then we can determine if the proposed modification is minor under our regulations (50 CFR 26.41).

Pg. 23 implies that the Service may discontinue recreational fishing as a Refuge use. That statement is incorrect. Recreational fishing is identified in the Refuge Improvement Act as one of the six public uses meeting the wildlife dependency criteria. If this statement in any way implies that the Service will assume responsibility for maintenance of a remnant portion of the Bonner Bridge attached to the Refuge for fishing access then FHWA must clarify this section. The Service has stated in the past, and remains steadfast, that under no circumstances will we assume ownership or responsibility for maintenance of a remnant portion of the Bonner Bridge. We will continue to allow fishing along the shoreline in the vicinity of Oregon Inlet when compatible. We recommend you clarify this section.

Pg. 27 states that the new preferred alternative "... is the alternative that causes the least overall harm." We cannot support such a conclusion, and question how FHWA and NCDOT made this determination since, based on the information contained in the document, they do not know what future phases of the project will look like based on the

uncertainties of future conditions. We recommend clarifying text on how NCDOT and FHWA reached this conclusion.

We have endeavored to work with the NCDOT and FHWA to resolve these and other issues throughout this process, but the current approach of the transportation agencies (as articulated in this Revised Final Section 4(f) Evaluation) continues to inadequately address fundamental concerns raised by the Service, and raises additional concerns that represent a substantial move away from a workable solution. We thank you for the opportunity to review and comment on this document.

If you have questions with regards to these comments, please contact Mike Bryant, Refuge Manager, at (252) 473-1131 x 222, or Pete Benjamin, Field Supervisor, Raleigh Field Office, at (919) 856-4520 x 11.

Sincerely,



Willie R. Taylor
Director, Office of Environmental Policy
and Policy

Attachment: U.S. Fish and Wildlife Service letter dated July 31, 2009

Reference:

Furr, Mary Pope 2008. Finding of Adverse Effect Documentation for Replacement of the Bonner Bridge (Bridge No. 11) on NC12 over Oregon Inlet, Dare County, North Carolina. TIP#B-2500, State Project WCS#32653, Federal Aid#BRS-2358(15). North Carolina Department of Transportation, Human Environmental Unit, Raleigh, North Carolina.



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240



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PEP/NRM

APR 21 2010

ER 07/206

Mr. John F. Sullivan, III
Division Administrator
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601

Dear Mr. Sullivan:

This supplements the Department of the Interior's (Department) comments of December 3, 2009, on the revised Final Section 4(f) Evaluation for the **NC12 Replacement of the Herbert C. Bonner Bridge (No. 11) over Oregon Inlet, Dare County, North Carolina**, dated October 9, 2009, which proposes a new Preferred Alternative described as the "Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative" (PB/TMP). The Department offers the following comments and recommendations, by the National Park Service, for your consideration.

General Comments

The Department finds the Revised Final Section 4(f) Evaluation and the Final Environmental Impact Statement (FEIS) deficient in a variety of categories. We do not believe it adequately addresses alternatives and environmental impacts as required by the National Environmental Policy Act of 1969 (NEPA) and fails to satisfy standards set forth in the Council of Environmental Quality (CEQ) Implementing Regulations (40 CFR 1500-1508). We do not believe the FEIS fully evaluated all reasonable and practical alternatives.

NEPA Comments

The transmittal letter for the document states that the new Preferred Alternative will be the subject of an Environmental Assessment (EA) to identify and assess changes that have occurred since the FEIS and Final Section 4(f) Evaluation was approved. The Revised Final Section 4(f) Evaluation describes the new Preferred Alternative (PB/TMP) as involving Phase 1 bridge replacement, as previously described in the FEIS, but defers decisions about later phases of the project related to the road corridor through the Refuge. As described, the later phases

"could consist of, but not limited to, one or more components of the alternatives already studied" and could involve "mixing and matching" of the previously described five Parallel Bridge Corridor components.

Due to the complex and controversial nature of the project, which has continually shifted and continues to change, it is doubtful that an EA would provide an adequate assessment of potential impacts, including cumulative impacts, of the new Preferred Alternative or comply with NEPA. The Department recommends that the Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) prepare a supplemental EIS to fully evaluate potential impacts of PB/TMP.

The new Preferred Alternative appears to be entirely contingent upon a North Carolina Route 12 (NC12) "Transportation Management Plan" (TMP) that is yet to be developed and upon proposed draft agreements in the appendices, that both National Park Service (NPS) and Fish and Wildlife Service (FWS) have indicated they cannot support or sign as currently written. An alternative that defers critical decisions to a future date and depends upon "mixing and matching" of alternatives is not consistent with the NEPA requirement to describe a single and complete project and conduct a rigorous assessment of predictable and uncertain effects. The NEPA requires that actions covered by an EIS should have independent significance and must be broad enough in scope to avoid subdivision of the project and to ensure meaningful consideration of alternatives. The Revised Final Section 4(f) Evaluation improperly segments a single project into two or more distinctly separate activities, which is not consistent with NEPA requirements.

The revised Final Section 4(f) Evaluation indicates that the impacts of PB/TMP within the boundary of Cape Hatteras National Seashore (Park) on Bodie Island and Oregon Inlet would be identical to those previously identified in the FEIS for the previous Preferred Alternative. The Department previously stated that the potential impacts of the proposed actions were not adequately analyzed or addressed in the FEIS, and that concern applies to the new PB/TMP alternative as well. The Department's concerns include the economic and physical impacts to the Park's largest concessioner, the Oregon Inlet Fishing Center (OIFC), and impacts on visitor access to the OIFC and other recreational sites in the project area (e.g., NPS Oregon Inlet Campground, Ramp 4 accessing the Bodie Island Spit).

Specifically, the FEIS and the revised Section 4(f) Evaluation do not address the environmental and financial consequences of the loss of the channel known as the "crack" that is used by the OIFC charter fishing fleet. The loss of use of the "crack" would result in an increased consumption of an estimated volume of 90,000 gallons of fuel annually, in addition to increasing the travel time for every trip of the charter fleet by one hour roundtrip. Implementation of the new Preferred Alternative would necessitate the relocation of Ramp 4 and mitigation for potential damage of the NPS-owned segment of NC 12 on Bodie Island that may be incurred as a result of

transporting the projected 100 ton loads for construction of the bridge, which would impact visitor access and other recreational sites in the area.

A number of proposed NCDOT actions will likely require NPS permit(s), including the following:

- construction staging;
- construction of a haul road, construction and use of a dredge channel for barging, or construction of a work bridge to facilitate construction of the north approach spans;
- relocation of the septic system and fields near the Oregon Inlet Fishing Center;
- relocation of the Ramp 4 beach access road on Bodie Island;
- dredging and disposition of dredge spoils, including on Green Island; and
- similar actions related subsequent phases relating to other NC12 construction and maintenance components on NPS lands.

While the above listed actions on NPS-owned lands have been identified and generally described in the FEIS, the Department is concerned about the adequacy of the environmental analysis related to impacts on park resources and facilities and anticipates that additional documentation, prepared by NCDOT or its designee, may be necessary prior to the issuance of NPS permits.

The Department is particularly concerned that previous comments related to the proposed dredging of barge channels on NPS submerged lands at Oregon Inlet, the disposal of dredging spoil, and the use of barges for the transportation and installation of bridging structures have not been adequately addressed. These activities have a significant potential to adversely affect Park facilities, concessioner operations, and protected resources within the Park and they will require consultation and permit(s) from NPS, in addition to any consultation or permitting requirements associated with other Federal and state agencies. NPS will not authorize use of any NPS-owned land as a borrow pit nor will it allow any dredged materials to be permanently deposited on NPS-owned land, with the possible exception of Green Island, a small naturally occurring island on the southwest side of the inlet.

NPS requests to be included in the consultation process along with the Army Corps of Engineers, North Carolina Wildlife Resource Commission and FWS, regarding the potential application of dredge spoils to NPS-owned property on Green Island to improve habitat quality as a nesting site for American oystercatchers and colonial waterbirds. The Department requests that NCDOT confirm that the area referred to as the "Oregon Inlet Shoal" in the FEIS is in fact the submerged lands surrounding Green Island and clarify whether the proposed use of construction barges and dredging of the "Oregon Inlet Shoal" would affect Green Island. In general, the Department expects barge operations and dredging in that area to be performed in accordance with the Terms and Conditions stated in the *Biological and Conference Options* (USFWS 2008).

Section 4(f) Evaluation Comments

Section 4(f) of the Department of Transportation Act of 1966 prevents a Federal project from using publicly owned land unless: 1) there is no prudent and feasible alternative to using that land; and 2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use (49 U.S.C. § 303(c)). In the FEIS/Final Section 4(f) Evaluation, FHWA found that all alternatives would constitute a Section 4(f) "use" of the Park because the existing road would be relocated from its current alignment. The Department concurs with that finding.

However, in the revised Final Section 4(f) Evaluation, the FHWA reverses that determination and now finds that there is no Section 4(f) "use" of the protected property within the Park. The change is reportedly based on "newly obtained information" that shows that a "public vehicular thoroughfare" existed prior to the establishment of the Park and the Park and road were "concurrently and jointly planned and developed." The Department fundamentally disagrees with the change in Section 4(f) "use" determination for the Park, while acknowledging that the deeds of conveyance of property for the Park from the State to the U.S. Government did "expressly retain title to and control of all public roads and highways laid out at the time, and the further right to lay out and establish over and upon said lands such other highways and roads as shall be deemed necessary by the State of North Carolina and political subdivisions thereof." The Department believes the FHWA interpretation of "concurrent or joint planning or development of the transportation facility and the Section 4(f) resource" is incorrect.

The reservation is not unconditional and does not imply that the entirety of the Seashore is or could be considered a "future transportation facility." Rather, the reservation is a species of property, commonly referred to as a floating easement, which is not definitely established until its location is fixed on the ground. The State's reserved property right may not be exercised in a unilateral fashion. It is subject to reasonable regulation by NPS pursuant to Congressionally-delegated authority arising from its Organic Act, 16 U.S.C. 1 *et seq.* Congress included a general constraint on development of lands to be set aside for park recreation and preservation purposes in the 1937 enabling legislation (50 Stat. 669) that authorized the creation of the Seashore, which states

"Except for certain portions of the area, deemed to be especially adaptable for recreational uses, particularly swimming, boating, sailing, fishing, and other recreational activities of similar nature, which shall be developed for such uses as needed, the said areas shall be permanently reserved as a primitive wilderness and no development of the project or plan for the convenience of visitors shall be undertaken which would be incompatible with the preservation of the unique flora and fauna or the physiographic conditions now prevailing in this area."

The Statute clearly articulates a need for constraint, selectivity, and prudence in determining which, if any, areas within the Park would allow for facility development. There is undoubtedly tension between the constraints on development articulated in the Statute and the reservation of use articulated in the deeds of conveyance. This tension is reflected throughout the administrative history of the development of the highway within the Park in the 1950's and of Bonner Bridge in the early 1960's, which is well documented in *The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66* (NPS, 2007). In general terms, it is accurate to say that NPS initially opposed, resisted, then compromised and eventually reluctantly accepted the construction of both the highway and subsequently the Bonner Bridge, because highway and bridge construction were viewed as fundamentally in conflict with the original purpose and intent of the Seashore as a park and as a recreation area.

The deeds, as they apply to the Park, are not "new information" and have been common knowledge and generally understood and accepted by NPS and NCDOT for many decades. NPS, NCDOT, and FHWA have previously acknowledged that the State of North Carolina and its subdivisions do not retain title to lands deeded to the U.S. Government within the Park upon which future roads may be planned or constructed. Historically, NPS-issued permits have been required to authorize NCDOT highway construction on Park lands. For example, the construction of Bonner Bridge was not contemplated prior to or concurrent with the establishment of the Park. NPS authorized, by issuance of a Special Use Permit, use of NPS lands upon which the Bridge was constructed.

The fundamental purpose of the land conveyance was to transfer lands to establish the Park and to be protected as described in the enabling legislation, not to formally reserve any particular property for the development of a future transportation facility. The history of past NCDOT and FHWA actions at the Park has been consistent with the finding that the Park is a protected Section 4(f) property. The revised finding of "no Section 4(f) use" is poorly justified and a dangerous precedent that is inconsistent with the purpose of the Park and with past actions.

The attempt to interpret the history of road construction in the Park as falling within the provisions of 23 C.F.R. § 774.11(i) is unavailing. That provision excludes from the definition of "use" of a Section 4(f) property certain road construction activities when: 1) the formal reservation for future transportation facilities was made at the same time the park was established, and 2) there has been joint planning and development of the transportation facility and the park. Neither of these two elements is satisfied with respect to the NC 12 Replacement of Bonner Bridge.

First, it cannot be said that there has been a formal reservation of a future transportation facility. As noted above, the State's reservation of a floating easement does not encumber any specific and designated lands of the Park. In order to locate a

transportation facility such as a road or a bridge, a definite location would have to be established by means of a process of consultation, NPS permitting, and public input, the very process contemplated by Section 4(f). Hence, the floating nature of the State's reserved right prevents it from being treated as a formal reservation.

Second, it cannot reasonably be concluded that there has existed a pattern of joint planning and development of the Park and the transportation facilities located within its boundaries. History shows that on the occasion of bridge or road construction, the State has secured from NPS an authorizing permit as a condition to the exercise of its reserved right. The exercise of regulatory control by NPS over these activities within the Park belies any notion of joint planning and development. Accordingly, the announced basis for excluding this project from the requirements imposed by Section 4(f) cannot be supported.

The revised Final Section 4(f) Evaluation contains a number of inaccuracies, including its characterization of the relationship between FWS and NPS. The Park and Pea Island National Wildlife Refuge are owned and administered by two separate and independent federal agencies within the Department; the NPS and the FWS possess separate and distinct missions. FWS Pea Island National Wildlife Refuge is not an overlay on the NPS Cape Hatteras National Seashore. The land acquisition history for the Park and the Refuge are different: FWS acquired tracts directly from private land owners and NPS acquired land from the State of North Carolina. The State reserved a right to construct a road across the newly established Park. No such right or reservation is present in the FWS acquisitions.

In summary, the Department continues to have concerns about the potential impacts of road construction on Park property and facilities that have not been adequately analyzed and addressed in the FEIS and now are not adequately analyzed or addressed in the Revised Final Section 4(f) Evaluation. It is the Department's opinion that the lands impacted by the proposed relocation of NC12 on Bodie Island and replacement of the Bonner Bridge within Cape Hatteras National Seashore would occur on a Section 4(f) property and would be considered "use" as defined in 23 CFR § 774.17.

Thank you for providing us an opportunity to comment on the revised Final Section 4(f) Evaluation. If you need additional information, please do not hesitate to contact Cape Hatteras National Seashore Superintendent Mike Murray at (252) 473-2111, extension 148.

Sincerely,



Willie R. Taylor
Director, Office of Environmental
Policy and Compliance

bcc:

OEPC Director, OEPC File, REO/ATL
NPS, FWS

My documents:ER-7/0206.es:4/7/10/JCarriero

NPS: Email surnamed from JCarriero sent to PEP:4/7/10
PEP: ESmith:4/8/10



North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Revelly Hayes, Pandas, Governor
Linda A. Gathale, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

November 25, 2009

John F. Sullivan, III, P.E.
Division Administrator
Federal Highway Administration
310 New Bern Ave, Suite 410
Raleigh, NC 27601

RE: Revised Final Section 4(f) Evaluation, NC 12 Replacement of Herbert C. Bonner Bridge,
B-2500, Dare County, ER90-8304

Dear Mr. Sullivan:

Thank you for your letter of October 12, 2009, transmitting the above referenced evaluation for the proposed undertaking. We have reviewed the evaluation and find that it correctly identifies the historic properties within the project's area of potential effects and the effects on historic properties for the several alternatives.

We would note that while the document states that there "are firm commitments to study and mitigate the future environmental conditions prior to making decisions for the later phases," those commitments are not clearly outlined and available for easy reference within the document. These commitments should be specifically stated at a single site within the document so as to be readily available to all parties involved in and/or affected by the undertaking.

The same holds true for the proposed NC 12 Transportation Management Plan, which at this point is more of a concept than an actual plan.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Peter Sandbeck

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Clarence Coleman, FHWA
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Mary Pope Furr, NCDOT
Carol LeGarde, ACHP
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Ken Wenburg, Chicamacomico
Chris Ivers, NC Aquariums

November 13, 2009

VIA ELECTRONIC MAIL AND FIRST CLASS MAIL

Dr. Gregory J. Thorpe, Ph.D.
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John F. Sullivan III, P.E.
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Re: Revised Final Section 4(f) Evaluation
NCDOT TIP Project Number B-2500, Dare County, NC
NC 12 Replacement of Herbert C. Bonner Bridge

Dear Dr. Thorpe and Mr. Sullivan:

The following comments on the above-referenced Revised Final Section 4(f) Evaluation ("Revised 4(f) Evaluation") are submitted on behalf of the Southern Environmental Law Center, National Wildlife Refuge Association, Environmental Defense Fund, Defenders of Wildlife, Audubon North Carolina, and Pamlico-Tar River Foundation. After reviewing the Revised 4(f) Evaluation, we continue to support the Pamlico Sound Bridge alternative and do not agree that the new "preferred alternative" is a viable or legal alternative.

As discussed in more detail below, the Revised 4(f) Evaluation is inadequate and the project cannot go forward as planned for the following reasons:

- I. In its cover letter for the Revised 4(f) Evaluation, NCDOT describes a new preferred alternative and a plan to supplement its NEPA documentation in a way that will violate NEPA by improperly segmenting the project, by engaging in improper reverse engineering, and by issuing an Environmental Assessment when a Supplemental Final Environmental Impact Statement is instead required.

2. The Revised 4(f) Evaluation is inadequate and does not satisfy the requirements of Section 4 of the Department of Transportation Act of 1966. The evaluation erroneously concludes that the new preferred alternative will not "use" Refuge lands (as a refuge) based on a joint planning exception that does not apply. That determination distorts the evaluation of the factors in the "least overall harm" analysis, which itself provides an incomplete assessment of harms. In addition, the revised evaluation improperly discounts viable avoidance alternatives.

Overview:

The heart of the debate over the Bonner Bridge replacement project is its effect on Pea Island National Wildlife Refuge. The Refuge was created to be a "refuge and breeding ground for migratory birds and other wildlife." Exec. Order No. 7864, 3 Fed. Reg. 863 (Apr. 12, 1938). It occupies the northern end of Hatteras Island, a barrier island separated from North Carolina's mainland by Pamlico Sound. The current Bonner Bridge passes from the southern end of Bodie Island, over Oregon Inlet, to the northern end of Hatteras Island, terminating in the Refuge; NC 12 then continues the transportation route through the length of Pea Island Refuge, and exits the southern end of the Refuge at the town of Rodanthe, then continues traveling southward through the remainder of Hatteras Island.

Bodie Island, Hatteras Island, and Oregon Inlet are part of a dynamic barrier island system, and the Pea Island Refuge relies on this dynamic process for ecological viability. Pea Island Refuge is subject to ocean overwash, high shoreline erosion rates, inlet formation, and other impacts associated with large storm events, sea level rise, and general barrier island dynamics. While many of these natural processes are incompatible with transportation corridors, they are beneficial to the abundant wildlife and are instrumental in creating nesting habitat, feeding grounds, and other natural habitats. Many species of migratory birds, shorebirds, and sea turtles, some federally protected, use Pea Island Refuge. It has 1,000 acres of waterfowl impoundments for migratory birds and 13 miles of ocean beach for wildlife nesting. Many members of our organizations regularly recreate in and enjoy the natural resources of Pea Island Refuge.

Efforts to maintain NC 12 through the Refuge has long contributed to the degradation of the Refuge. A long-term solution to the problems that the NC 12 transportation corridor poses to the Refuge's volatile system is necessary to meet the purpose and need of the Bonner Bridge Replacement Project.¹ For nearly a decade, the

¹The Final Environmental Impact Statement ("FEIS") defines the purpose and need as:

- (1) Provide a new means of access from Bodie Island to Hatteras Island for its residents, businesses, services, and tourists prior to the end of the current Bonner Bridge's service life;
- (2) Provide a replacement crossing that takes into account natural channel migration expected through the year 2050 and provides flexibility to let the channel move; and

maintenance of the entire transportation route (from the southern end of Bodie Island, over Oregon Inlet, to the southern end of the Refuge at the town of Rodanthe, mid-way down Hatteras Island) has been treated as a single project to replace the failing bridge and the existing NC 12 corridor through the Refuge.

Any plan that relies on maintaining the transportation corridor through the Refuge instead of around it will continue to cause problems for both the Refuge and people attempting to drive on NC 12, and will be incompatible with the purpose of the Refuge. As the Revised 4(f) Evaluation acknowledges, "shoreline erosion" in the Refuge will be a "significant issue and new inlets are likely to form" and "future major storms are likely to affect NC 12." Rev. 4(f) at 5. Moreover, there are three areas, known as "hot spots," along the length of the Refuge between Oregon Inlet and Rodanthe, that are known to be particularly susceptible to storm-related erosion and are the likeliest spots that NC 12 will fail in the future. (*Id.* at 3-4.) The portion of NC 12 currently traveling through the Refuge has been plagued by erosion at these hot spots and other points, necessitating emergency repairs that encroach on the Refuge. There is no doubt that, if NC 12 is allowed to continue through the Refuge, there will continue to be the need for emergency repairs and construction of NC 12 caused by recurring storm events, erosion, climate change, and sea level rise, in highly predictable locations and manners.² Indeed, we understand that, a week ago and then again yesterday, NC 12 had once more been breached and was impassable at the hot spot closest to Rodanthe, due to storm activity. As of today, NC 12 is reported as being impassable through the length of the Refuge. (Photographs and an emergency alert from websites maintained by Dare County, <http://www.co.dare.nc.us/webcam/mirio.php>, and <http://www.co.dare.nc.us/EmgMyMgm/Alert/index.asp>, are attached hereto as Exhibit B.)

The new preferred alternative identified in the Revised 4(f) Evaluation, however, ignores these certainties. On the basis that shoreline erosion and storm effects are putatively too uncertain to predict, the new preferred alternative defers until "later phases" of the project decisions about the manner in which the NC 12 corridor will be maintained through the Refuge. It leaves open the opportunity for NCDOT to use any of the alternatives identified in the FEIS, even those that the FEIS determined will cause the greatest adverse effects to the Refuge, including beach nourishment, building a string of bridges through the Refuge, attempting to maintain NC 12 in its current corridor, and moving the NC 12 corridor into other portions of the Refuge. It even leaves open the

- (3) Provide a replacement crossing that will not be endangered by shoreline movement through the year 2050.

FEIS at 1-6.

²See Stan Riggs et al., "Eye of a human hurricane: Pea Island, Oregon Inlet, and Bodie Island, northern Outer Banks, North Carolina," in *America's Most Vulnerable Coastal Communities*, 43-72 (Kelley, J.T., et al. eds., Geological Society of America 2009) (reprinted with permission, attached hereto as Exhibit A); Margery Overton, Bonner Bridge Replacement Phased Approach Alternative: Coastal Processes and the Phased Approach Alternative (draft 5/13/09).

possibility of maintaining the NC 12 corridor through the Refuge using methods never identified or evaluated in the FEIS, the Revised 4(f) evaluation, or any prior version of either document. (Rev. 4(f) at 5, 6.)

However, delaying the selection from among these alternatives cannot change the fact that none of them is an acceptable alternative. Each attempt to continue to maintain a fixed transportation corridor on a shifting barrier island at the cost of public safety, reliability, and ecological protection. More specifically, each will: (1) fail to protect NC 12 from shoreline movement during the project life, (2) fail to take into account channel migration and to let the channel move, and (3) fail to preserve the natural barrier island system. Furthermore, none of the alternatives for maintaining the NC 12 corridor through the Refuge is compatible with the purpose of the Refuge, pursuant to the National Wildlife Refuge System Improvement Act, and none is a viable alternative pursuant to Section 4(f) of the Department of Transportation Act of 1966.

NC 12 and its associated maintenance are already steadily degrading the Refuge, and the new preferred alternative will only serve to continue this degradation. It will keep NC 12 under construction in the Refuge for the life of the project. The new preferred alternative amounts to a blank check that cannot pass legal scrutiny.

In contrast, the Pamlico Sound Bridge alternative³ is safer, more reliable, and more protective of the environment. FEIS 2-78 to 2-81. A Pamlico Sound Bridge would not be subject to ocean overwash, inlet formation, or erosion. It would allow the U.S. Fish and Wildlife Service ("FW") to preserve and protect the Refuge and the associated wildlife. Furthermore, the Pamlico Sound Bridge is the only alternative that can be authorized pursuant to applicable federal laws. As discussed in greater detail below and in our comments of October 27, 2008, the Pamlico Sound Bridge is the only alternative that will work and can be authorized pursuant to applicable federal laws.

I. The New Preferred Alternative Will Violate NEPA.

A. The Revised 4(f) Evaluation describes a plan to issue an Environmental Assessment, instead of a Revised Final Environmental Impact Statement, which will violate NEPA.

The cover letter for the Revised 4(f) Evaluation (attached hereto as Exhibit C) describes an improper plan to issue an Environmental Assessment ("EA") that will describe the environmental impacts of the new preferred alternative and presumably finding them to be "not significant," instead of issuing a revised or supplemental Final

³ The two Pamlico Sound Bridge Corridor Alternatives referred to in the Revised 4(f) Evaluation are very similar, differing only in terminus, and for ease of reference in this comment letter simply are referred to as the "Pamlico Sound Bridge alternative" or "Pamlico Sound Bridge."

Environmental Impact Statement ("SFEIS") as required by NEPA. This is improper on several counts.

The decision to issue an EA instead of an SFEIS was apparently driven by an improper purpose – that is, a desire to preclude public review and comment on the new preferred alternative and its compliance with applicable laws. According to NCDOT status reports on the Bonner Bridge Replacement Project, NCDOT intended to issue an SFEIS as late as July 24, 2009, but by July 31, 2009, had changed its mind and was considering alternative forms of "supplemental NEPA documentation." The change of heart is explained in handwritten notes by NCDOT Project Planning Engineer Beth Smyre. On July 21, 2009, she wrote that the "concern is allowing the public to comment on the 'new' alternative." Her notes go on to cite federal regulations that govern supplemental EISs, and indicate apprehension that NCDOT would have to issue a draft SFEIS for comment before issuing the SFEIS and Record of Decision. Her notes also point out that any NEPA document on the new preferred alternative will not be complete without agreement on how the later phases involving maintenance of the NC 12 route through the Refuge to Rodanthe will be accomplished. (Ms. Smyre's notes and the two NCDOT status reports are attached hereto as Exhibit D.)

Significantly, neither Ms. Smyre's notes nor the status reports nor any other public record indicate any basis for the decision to issue an EA instead of an SFEIS that would be permissible under NEPA. Federal regulations implementing NEPA list the circumstances in which an SFEIS will and will not be required, all of which relate to the substance and significance of new impacts or new information related to the proposed action. 23 C.F.R. § 771.130; 40 C.F.R. § 1502.9(b). The regulations do not, however, allow the decision whether to issue an SFEIS to be made on the basis of expediency or a desire to exclude the public from the process – for instance, to avoid the time and effort to issue a draft SFEIS or to prevent members of the public from commenting on a proposed action or alternative.

Indeed, because NCDOT and FHWA concluded that the proposed project warrants an EIS, any significant new information or circumstances affecting the project or the selection of an alternative must also be reviewed in an SFEIS. As the U.S. Supreme Court explained, "It would be incongruous with [NEPA's] approach to environmental protection, and with the Act's manifest concern with preventing uninformed action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action . . ." *Marsh v. Oregon Natural Res. Council*, 490 U.S. 360, 371 (1989) (emphasis added) (discussing requirement for SFEIS).

In the present case, significant new information and circumstances that have arisen since the issuance of the FEIS in September 2008 justify the issuance of an SFEIS for public comment. The new information and circumstances not previously addressed in the FEIS include, but are not limited to, the following:

- the selection of a new preferred alternative that includes “later phases of actions to manage NC 12” that “could consist of, but would not be limited to, one or more components of any of the alternatives already studied” – in other words, selection of a new preferred alternative that includes components not previously identified and studied in the FEIS (Rev. 4(f) at 6) (emphasis added);
- the fact that the new preferred alternative will absolutely require the re-permitting of the terminal groin, which will have significant biological impacts (as confirmed by the FWS and, when one is convened in response to FWS requests, a panel of experts) that have never been evaluated in a NEPA document;
- designation in October 2008 of significant portions of the Refuge, including sections that will be impacted by the later phases of the project, as critical habitat for the federally threatened piping plover (73 Fed. Reg. 62,816 (Oct. 21, 2008));
- the supposed unearthing in the Spring of 2009 of old deeds that putatively give NCDOT the right to move the NC 12 right-of-way in the Refuge and in Cape Hatteras National Seashore;
- continuing progress in the scientific study of the effects of global climate change and sea level rise on coastal landscapes, combined with President Obama’s directive to federal agencies to base decisions on sound science, including decisions related to mitigating the threat of climate change, in 2009;
- identification by various federal agencies of federal laws that will be violated by both the old and the new preferred alternative, in comments to the FEIS and throughout 2009;
- an analysis of options for funding a Pamlico Sound Bridge, performed in the summer of 2009.

There is ample precedent supporting the proposition that an SFEIS is required in light of such significant new developments. See *N.C. Alliance for Transp. Reform, Inc. v. U.S. Dep’t of Transp.*, 151 F. Supp. 2d 661, 699 (M.D.N.C. 2001) (requiring SFEIS for highway project in light of notification of violation of a federal law); *Portland Audubon Soc’y v. Lujan*, 795 F. Supp. 1489, 1500 (D. Or. 1992), *aff’d* 998 F.2d 705 (9th Cir. 1993) (requiring SFEIS for sale of timber in light of new information on effects of sale on owl species); *Stop H-3 Ass’n v. Lewis*, 538 F. Supp. 149, 168 (D. Haw. 1982) (requiring SFEIS for proposed highway project where FEIS did not include information relevant to the highway design). Accordingly, issuance of an EA instead of an SFEIS will violate NEPA.

B. The Revised 4(f) Evaluation describes a new preferred alternative that will result in illegal segmentation under NEPA.

As mentioned above, for nearly a decade, NCDOT and FHWA have treated the Bonner Bridge Replacement Project not only as including the construction of a new bridge from the southern end of Bodie Inland over Oregon Inlet to Hatteras Island, but also as including the maintenance of a transportation corridor all the way to the mid-point of Hatteras Island at the town of Rodanthe. For the first time in years, though, NCDOT has identified a new preferred alternative that would complete only a portion of the project to connect the southern end of Bodie Inland to the northern end of Hatteras Island via a new short bridge built parallel to the existing bridge, and would force the maintenance of the remainder of the transportation corridor to the mid-point of Hatteras Island into “later phases,” to be completed using methods yet to be selected. The new preferred alternative seeks to avoid scrutiny by simply delaying the decision among impermissible alternatives to a later point in time.

It is well settled that breaking such a project “into small component parts” to avoid reviewing them together “is to engage in illegal ‘segmentation.’” *New River Valley Greens v. U.S.D.O.T.*, No. 97-1978, 1998 U.S. App. LEXIS 22127, **8-9 (4th Cir. Sep. 10, 1998) (quoting 40 C.F.R. § 15008.27(b)(7)). A hallmark of segmentation is an initial proposed action involving “such a large and irretrievable commitment of resources that it may virtually force a larger or related project to go forward notwithstanding the environmental consequences.” *Id.* Building a replacement short bridge to the northern end of the Refuge is just such an “irretrievable commitment of resources” that will inevitably force later projects to go forward, even though their environmental consequences would preclude their approval if included as part of the original project.

With the new preferred alternative, these later projects include the re-permitting of the terminal groin to protect any new short bridge, as well as managing and maintaining NC 12 through the length of the Refuge for the life of the new bridge. The existing bridge cannot be replaced with another bridge that connects to the northern end of Hatteras Island, without creating the necessity to maintain the terminal groin and to maintain NC 12 through the Refuge for the life of the new bridge, as storms, erosion, and new inlet formation threaten the transportation route. Otherwise, the new bridge would truly become a “bridge to nowhere.” Accordingly, to treat the project as anything but a single transportation route from the southern end of Bodie Island to Rodanthe will constitute illegal segmentation.

Because maintenance of a transportation route from the northern end of Hatteras Island to Rodanthe is an essential component of any project alternative, and maintenance of the terminal groin and NC 12 through the Refuge is an essential component of any alternative involving a short bridge, NEPA requires the analysis of their impacts now. The CEQ Guidelines are clear: “proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.”

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 8

40 C.F.R. § 1502.4(a). Circumstances in which actions should be considered and evaluated together include:

- the situation in which one action “automatically trigger[s]” another action,
- the situation in which one action “cannot or will not proceed unless” another action is “taken previously or simultaneously,”
- the situation in which two actions “are interdependent parts of a large action,” and
- the situation in which two actions have “cumulatively significant impacts.”

40 C.F.R. § 1508.25(a). An action will have a “cumulatively significant impact” if, although its individual effect is minor, its effect is “collectively significant” when considered together with “*other past, present, and reasonably foreseeable future actions* regardless of what agency or person undertakes such action.” *Western N.C. Alliance v. N.C. D.O.T.*, 312 F. Supp. 2d 765, 771 (E.D.N.C. 2003) (emphasis in original).

Each of the four bullet-pointed criteria above aptly describes the new preferred alternative. If the new preferred alternative is implemented, a replacement bridge will be built to the northern end of Hatteras Island, instead of a longer bridge through the Pamlico Sound all the way to Rodanthe. Such a short bridge will “automatically trigger” the need to re-permit the terminal groin and to maintain NC 12 through the Refuge by, for instance, bridging, beach nourishment, or relocation of sections as necessary in response to storm events and erosion. In addition, the construction of the short bridge “cannot ... proceed” unless the terminal groin re-permitting first takes place. And the construction of the short bridge, along with the maintenance of the terminal groin and NC 12, “are interdependent parts of a large action,” with “cumulatively significant impacts.” The maintenance of the terminal groin and NC 12, no matter how it is accomplished, will impact the Refuge in many ways, including those identified in our October 27, 2008, comments on the FEIS. It will interrupt the natural processes of overwash and migration of the island, reduce the quantity and quality of wildlife habitat available within the Refuge, and in general disrupt the biological integrity, diversity, and environmental health of the Refuge.

NCDOT employee Ms. Smyre’s notes effectively acknowledge the fact of segmentation: they explain that any NEPA document on the new preferred alternative will be incomplete without agreement on how the later phases involving maintenance of the NC 12 route through the Refuge to Rodanthe will be accomplished. Yet we understand that the members of the merger team has not been able to agree on a *plan for how to make decisions* regarding future phases, much less an actual decision on construction of those future phases. Moreover, to date, NCDOT and FHWA have been unable to identify a preferred alternative involving a short bridge that is not plagued with criticism and serious legal flaws related to the NC 12 corridor through the Refuge. They now seek to avoid such criticism by deferring their decision on which of the flawed means

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 9

of maintaining NC 12 they will implement, until such time as a storm event or other crisis forces Refuge management to allow emergency highway repairs, dune building, beach nourishment, or some other measure the Refuge management would not have permitted absent an emergency. Accomplishing in such a backhanded way what cannot be accomplished directly amounts to segmentation, in violation of NEPA.

C. The Revised 4(f) Evaluation indicates an intention to engage in “reverse engineering,” in violation of NEPA.

An EIS must “serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.” 40 C.F.R. § 1502.2(b), see also 40 C.F.R. § 1502.5 (EIS must “be prepared early enough so that it can serve practically as an important contribution to the decisionmaking process and will not be used to rationalize or justify decisions already made”). To reverse the order, and instead first decide on an alternative, then structure the analysis to justify that decision, is to engage in improper reverse engineering. *Stop H-3 Ass’n v. Lewis*, 538 F. Supp. 149, 168 (D. Haw. 1982).

The Revised 4(f) Evaluation includes, for the first time, a financial analysis that NCDOT contends justifies its conclusion that the Pamlico Sound Bridge alternative is not a feasible or practicable avoidance alternative. (Rev. 4(f), Appendix F.) Yet the financial analysis was clearly performed in the last few months,⁴ long after NCDOT and FHWA had made the decision to justify selection of a short parallel bridge alternative by labeling the Pamlico Sound Bridge alternative to be not feasible, practicable, or “financially viable” in the FEIS published over a year ago. (See FEIS xxix, 2-148, 5-45.) Adding to the appearance that the recent analysis was done merely to justify a foregone conclusion is the fact that the analysis was done without the usual aid of an expert consultant. In contrast to the cursory financial analysis of the Pamlico Sound Bridge alternative attached to the Revised 4(f) Evaluation as Appendix G, a nationally recognized transportation consulting firm, Wilbur Smith & Associates, performed a thorough evaluation of funding options for the approximately seven-mile-long Mid-Currituck Bridge, resulting in a 71-page report on toll funding alone (available at http://www.ncturnpike.org/pdf/Mid-Currituck_Preliminary_Traffic_and_Revenue.pdf). Significantly, the Mid-Currituck financial analysis was performed long before the publication of even a draft EIS for that project, in marked contrast to the order of events for the Bommer Bridge replacement.

In other words, the Pamlico Sound Bridge financial analysis was performed after an alternative had been selected, and it was designed to justify that decision, rather than to inform and aid that decision. To the extent that the proposed EA, or an SFEIS, relies on

⁴ Public records received from NCDOT show that, as of March 2009 and May 2009, the financial feasibility analysis had not yet been performed and was still on a list of action items for NCDOT and FHWA.

the same financial analysis, it will be in violation of the NEPA requirements proscribing reverse engineering. More generally, it is clear that the environmental documents – the Revised 4(f) Evaluation and the forthcoming EA – were both drafted *after* the selection of the new preferred alternative, with an eye toward justifying and rationalizing the decision, rather than aiding the decision. Such reverse engineering is not proper under NEPA.

II. The Revised 4(f) Evaluation Is Inadequate.

Section 4(f) of the Department of Transportation Act of 1966 prevents a federal project from using publicly owned land unless “(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.” 49 U.S.C. § 303 (c). When there is no feasible and prudent avoidance alternative, the regulation implementing Section 4(f) states that “the Administration may approve only the alternative that . . . [c]auses the least overall harm,” using a balancing of seven factors. 23 C.F.R. § 774.3 (c)(1); see 49 U.S.C. § 303 (2). At the heart of Section 4(f) lies the policy that “special effort should be made to preserve the natural beauty of the countryside,” including “wildlife and waterfowl refuges” in the development of transportation plans. See 49 U.S.C. § 303 (a), (b).

The previously prepared Section 4(f) analysis (accompanying the FEIS) was premised on the flawed assumption that the preferred alternative at that time, the Parallel Bridge – Phased Approach/Rodanthe Bridge (“Phased Approach”), would not “use” Refuge lands under Section 4(f) because that alternative purportedly would stay within the existing NC 12 easement. See FEIS 5-18. Comments provided pointed out that the preferred Phased Approach and all of its associated construction, maintenance, and management activities would, in fact, cause both physical encroachments and constructive uses of the Refuge within the meaning of Section 4(f). As a practical matter, avoiding “use” of the Refuge appeared entirely infeasible. See SELC Comments on FEIS 12-15 (Oct. 27, 2008) at Rev. 4(f), App. A. The flawed assumption that Refuge lands would not be “used” skewed the least overall harm analysis in favor of the Phased Approach, even though the Pamlico Sound Bridge alternative indisputably was (and is) the sole alternative that bypasses the Refuge. See *id.* 16-17.

In the Revised 4(f) Evaluation, FHWA and NCDOT no longer submit that the alternatives the Parallel Bridge alternatives, which bisect the Refuge, will not “use” Refuge lands; indeed, the revised analysis acknowledges use of the Refuge by all six Parallel Bridge alternatives, including the new preferred alternative, the “Parallel Bridge Corridor with NC 12 Transportation Management Plan.” Rev. 4(f) at 8, Table 2, 15. However, in an effort to bend the law to its will, NCDOT attempts to fit Refuge impacts (except those related to its designation as a historical property) into the joint planning exception under 4(f) – an exception that does not apply. The result is, again, an analysis that plays down impacts to the Refuge in order to justify an alternative that will cause

significant impacts and threatens to put the Refuge in a state of phased, or quite possibly perpetual, construction.

In another apparent effort to justify selection of the new preferred alternative and again without adequate study, the analysis also wrongly deems infeasible the Pamlico Sound Bridge alternative, which causes the fewest environmental impacts. FEIS p. 5-44. Ultimately, the Parallel Bridge alternative selected – which is really an undetermined mix-and-match of existing five Parallel Bridge alternatives, reserving the opportunity to add additional, unidentified management techniques – impermissibly defers selection of an alternative for the NC 12 portion of the project and, likewise, defers full evaluation of the environmental impacts. See Rev. 4(f), App. E. Ironically, this alternative has potential to cause the greatest overall harm, because the potential impacts are broad, undetermined, and unquantified. This approach prevents a full assessment of environmental impacts associated with the new preferred alternative, and hence, cannot possibly permit meaningful comparison among other alternatives to deduce least overall harm. In addition, as discussed above, the approach also results in unlawful segmentation of the project under NEPA. Finally, the Pamlico Sound Bridge alternative, which is the sole avoidance alternative that promises to entirely bypass the Refuge and avoid other 4(f) properties, is discounted as infeasible based upon only a cursory and inadequate economic analysis.

A. The Revised 4(f) Evaluation erroneously concludes that “use” of the Refuge under the new preferred alternative falls within the “Concurrent or Joint Planning or Development” exception.

The Revised analysis concedes that all Parallel Bridge alternatives studied in the FEIS “use” 4(f) property, specifically the Refuge, and that the new preferred alternative also would “use” the Refuge, but only insofar as it is a historic property. Rev. 4(f) at 8, 15. However, the Revised 4(f) Evaluation erroneously concludes that section 4(f) does not apply to uses of the Refuge “as a refuge” under the new preferred alternative because of “concurrent or joint planning of development” of the Refuge and NC 12. Rev. 4(f) at 12-15. This is simply not the case.

The 4(f) Evaluation attempts to support its conclusion that the joint planning exception applies with a meandering narrative describing the development of roadways through the Refuge that eventually became what is now NC 12. It misses the crucial point, however, that the easement for the roadway was not “formally reserved . . . before or at the same time” as the Refuge was created. 23 C.F.R. § 774.11(f). The relevant section of the regulation states as follows:

When a property is formally reserved for a future transportation facility before or at the same time a park, recreation area, or wildlife and waterfowl refuge is established and concurrent or joint planning or development of the transportation facility and the Section 4(f) resource occurs, then any

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 12

resulting impacts of the transportation facility will not be considered a use as defined in § 774.17.

Id. In the case of the Refuge, property for NC 12 (or the predecessor dirt road described in the 4(f) Evaluation) was not "formally reserved" until 1954, some sixteen years after the establishment of the Refuge, not before or at the same time. Moreover, there has not been concurrent or joint planning of the road and the Refuge since then; indeed, the events described by the 4(f) Evaluation show that, instead, each time the road has needed to be moved outside of its existing easement because of some storm event or erosion, the Refuge has required that NCDOT apply for a Special Use Permit. A careful review of the deeds, maps, and other documents that record the history of the establishment of the Refuge and the NC 12 corridor through it supports the conclusion that the joint planning exception does not apply.

The 4(f) Evaluation mistakenly conflates the creation of the NC 12 corridor through the Refuge with the NC 12 corridor through Cape Hatteras National Seashore. The corridors for the two sections of NC 12, however, were formed through two entirely different mechanisms.

Cape Hatteras National Seashore was authorized by Congress in 1937 and established in 1953, but without an appropriation of funds to purchase land. Congress instead authorized the National Park Service to accept donations of land. The North Carolina legislature established the Cape Hatteras Seashore Commission in 1939 for the purpose of acquiring land and transferring it to the federal government for the National Seashore. (Ch. 257, pp. 522-528, Public Laws of N.C. (1939).) The Commission acquired such lands, and then, in the 1950s, the State conveyed those lands to the federal Department of the Interior ("DOI") in several transfers. In both the legislation creating the Commission and several of the subsequent transfers of property from the State to DOI for the Seashore (those in 1952, 1953, 1955, and 1958), the State purported to reserve an easement for existing roads as well as a right to build and maintain additional roads in the future. The lands transferred in those deeds now comprise portions of Cape Hatteras National Seashore. Those deeds, however, have nothing to do with the NC 12 right-of-way through Pea Island National Wildlife Refuge.

In contrast, although Pea Island Refuge technically lies within the boundaries of Cape Hatteras National Seashore, the right-of-way for NC 12 through the Refuge was created in a different manner. The Refuge was created in 1938, by Executive Order 7864, as a refuge for migratory waterfowl. The lands constituting the Refuge were acquired directly by the United States from private landowners (the Simpson, Byers, and Chaffee families) through three condemnation proceedings in 1937 and 1938, long before the 1950s-era deeds upon which NCDOT relies. The State did not own these lands at the time they were acquired for the Refuge and therefore could not convey them to the United States or reserve an easement through them, either in the 1950s era deeds or otherwise; it is axiomatic that an entity cannot reserve a right in a property that it does not own and is not transferring. Later, in 1951, Congress authorized DOI to grant an easement to the

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 13

State for a road through Pea Island Refuge over the lands it had previously acquired. In May 1954, North Carolina quitclaimed to the United States all interest it had in any routes or roads through Pea Island Refuge except for the then-existing NC 12 corridor. In exchange, in July 1954, DOI granted an easement specified by metes and bounds for a 100-foot-wide NC 12 corridor. This series of events, and the State's interest in the NC corridor through Pea Island Refuge, is accurately summarized by NCDOT itself in a 1979 memo:

The right of way on NC 12 from Oregon Inlet to a point north of Rodanthe was constructed under this [NC road construction program] and was completed July 23, 1954. The project plans show 100 feet of right of way and is all inside of Pea Island National Wildlife Refuge. On May 20, 1954, the State of North Carolina granted a Quitclaim deed to the United States of America for all interest that it had on Pea Island National Wildlife Refuge, except an easement of right of way 100 feet in width (copy attached). On July 21, 1954, the United States of America conveyed a Deed of Easement to the State of North Carolina for a strip of land 100 feet wide for highway right of way (copy attached).

(Copies of the three original condemnations and the 1979 memorandum are attached as Exhibit E.) The alignment of NC 12 through Pea Island Refuge was moved in 1963 and 1995 in response to erosion and storm events. These new alignments were again specified in metes and bounds and, importantly, required a special use permit from DOI.

Thus, the State's interest in the right-of-way for NC 12 through Pea Island Refuge is as specified in the 1954 deed from DOI to the State: a specific metes and bounds easement in the then-existing NC 12 corridor, as subsequently modified by two realignments in 1963 and 1995 through special use permits. North Carolina simultaneously quitclaimed any other interest it had, if it had any, in other rights-of-way or easements. Accordingly, NC 12 is fixed within its current corridor and cannot be moved at will by NCDOT. Any alternative that depends upon construction of NC 12 outside of its current corridor will likewise require a new easement and special use permit from DOI, which the FWS has consistently stated it cannot issue because such construction would be incompatible with the purposes of the refuge under the 1996 Refuge Administration Act.

The right-of-way was established in 1954, 16 years after the Refuge was established. It was not, in any way, "formally reserved ... before or at the same time" as the Refuge was created. Thus, on that basis alone, the joint planning exception described in 23 C.F.R. § 774.11(f) does not apply. *Contra Tahoe Tavern Prop. Owners Ass'n v. U.S. Forest Serv.*, 314 Fed. Appx. 919 (9th Cir. 2008) (in the sole case we found interpreting 23 C.F.R. § 774.11(f), court held that the joint planning exception applied, where the agency simultaneously began planning to use land for both recreation and transportation at the time it acquired the land). Moreover, even if the exception did apply, which is denied, it would only exempt from 4(f) analysis the adverse effects caused by construction of NC 12 within the corridor described in the easement, but not construction

outside the easement. This is because the regulation describing the exception speaks of exempting "impacts" by the "transportation facility" on the refuge, but says nothing about expanding the "transportation facility" outside of its original boundaries.

B. The Revised 4(f) Evaluation fails to assess "use" of the Refuge (as a refuge) fully.

As a result of misplaced reliance on the joint planning exception, the Revised 4(f) Evaluation mistakenly omits use of the Refuge (as a refuge) from the calculus in evaluating the degree to which each alternative uses Section 4(f) properties. Although the Revised 4(f) Evaluation recognizes that the Refuge is the "most significant Section 4(f) property affected by this project" (Rev. 4(f) at 24), the evaluation only recognizes use of the Refuge insofar as it is a historic property, confining consideration of the Refuge's significance to its value as a "historical landscape." See Rev. 4(f) at 8, Table 2; Rev. 4(f) at 15-17. The analysis, therefore, categorically excludes the use and adverse impacts that go to the purpose for which the refuge was created, as a "refuge and breeding ground for migratory birds and other wildlife." Exec. Order No. 7862, 3 Fed. Reg. 734 (Apr. 12, 1938).

Because NCDOT's revised analysis is grounded in an exception that does not apply, the "use" determination under 4(f) is incomplete and suffers from the same deficiencies identified in SELC's previous 4(f) comments. See SELC Comments on the FEIS 12-15. Moreover, since the new preferred alternative will permit a "mixing and matching of the five Parallel Bridge Corridor alternatives" (Rev. 4(f) at 6 and App. E), any Refuge uses and impacts presented by those individual alternatives are possibilities which must be fully assessed. Because of the misapplication of the joint planning exception, these uses are not even acknowledged, much less fully evaluated or understood.

"Use" within the meaning of Section 4(f) includes uses that result in the actual incorporation of land into a transportation facility, as well as constructive uses that create proximity impacts causing substantial impairment to a resource. See 23 C.F.R. §§ 774.17, 774.15.⁵ In addition, temporary occupancies that do not satisfy all of conditions set forth in 23 C.F.R. § 774.13 (d) fall within the definition of "use."

Here, the Revised 4(f) Evaluation fails to address project uses stemming from incorporation of additional Refuge lands in the "transportation management plan" phase

⁵ According to 23 C.F.R. § 774.15(a):

A constructive use occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the resource are substantially diminished.

of the project, including for example, physical encroachments associated with the relocation of NC 12, beach nourishment, and dune building and maintenance activities to shield the road from overwash. See, e.g., Rev. 4(f) at 14 (stating that "Section 4(f) is not applicable to the Refuge (as a refuge) . . . [and] impacts resulting from relocating NC 12 from its current alignment through the Refuge would not be considered a use"). So too, for uses short of physical encroachments, the Revised 4(f) fails to assess anticipated proximity impacts, and therefore constructive uses, arising from the mixing-and-matching of the five Parallel Bridge alternatives in the new preferred alternative. The various alternatives will require some combination of elevated bridges, beach nourishment, realignment of NC 12, and dune building, as well as other ongoing construction activities related to road improvement projects, like construction of service roads. See FEIS 2-114 to 2-129 (describing NC 12 Maintenance Alternative Characteristics). The Revised 4(f) Evaluation does not acknowledge or assess proximity impacts resulting in substantial impairment, and therefore constructive use, of the Refuge that would result from each of these alternatives in isolation, much less any heightened impact from their combined implementation. Specific proximity impacts (and therefore potential project uses) that go unaddressed include, for example, "ecological intrusion[s]" and "esthetic" impairments stemming from the above activities. 23 C.F.R. § 774.15 (listing specific situations that rise to the level of a constructive use).

With regard to ecological impacts, the 4(f) analyses essentially fail to address the long-term impacts from altering the landscape within the Refuge under the different alternatives at NCDOT's disposal in its new preferred alternative. While many of these activities should be deemed actual uses by reason of physical incorporation of Refuge lands, even if they were not, the proximity impacts would render them constructive uses.

The Refuge encompasses 5,834 acres of barrier island habitat, including 1,000 acres of waterfowl impoundments and 13 miles of ocean beach, which support over 300 species of migratory birds, federally listed sea turtles and piping plovers, and other wildlife. See, e.g., SELC Comments on FEIS 2-4; DOI Comments on FEIS, at Rev. 4(f), App. A. The westward relocation of NC 12 as a result of storm events, natural processes, or sea level rise will push the transportation corridor further into the Refuge and diminish and impair wildlife and waterfowl habitat in its path.⁶ The introduction of elevated bridges and hardened piles into the Refuge will affect sand and water migration and erosion, and eventually could impact habitat in the ocean hazard zone, as the barrier island continues to migrate beneath elevated portions of the highway, NC 12. The introduction of additional dune systems and ongoing maintenance activities to shield the road will interfere with natural coastal processes, like overwash and inlet formation, and will degrade the quality of habitat in the Refuge. We described concerns about proximity impacts to the Refuge in our October 27, 2008, comments with respect to the then-preferred alternative; we incorporate those comments by reference, as the Revised 4(f)

⁶ See, e.g., Riggs et al., *supra* note 2 (predicting Highway 12 will continue to be "severely impacted" by natural coastal processes and that westward migration of the barrier island will require its relocation).

Evaluation did not remedy the situation, but simply ignores the proximity impacts and the resulting use of the Refuge under a different, but equally misplaced, rationale. *See also* DOI Comments on FEIS (describing proximity impacts related to visual character, noise, access, and ecological impairments).

Finally, the Revised 4(f) Evaluation does not address use of the Refuge, including proximity impacts, from retaining the terminal groin. The Parallel Bridge alternatives assume NCDOT will secure a new permit to retain the terminal groin in its existing location on the Refuge, as discussed in section I(B), *supra*. Neither the original nor revised evaluation analyzes the extent of use and environmental impacts on the Refuge posed by permitting and retaining the terminal groin, which by its design interferes with natural coastal processes.

For these reasons, further analysis under section 4(f) must be conducted since the new preferred alternative will “use” Refuge lands, via physical encroachments or proximity impacts, no matter which combination of alternatives is eventually employed during later phases of the project. The failure to recognize the uses and impacts that will degrade the very purpose for which the Refuge was established (as a refuge and breeding ground for migratory birds and other wildlife) renders the Revised Section 4(f) Evaluation inadequate.

C. The Revised 4(f) Evaluation improperly discounts the viability of a Pamlico Sound Bridge as an avoidance alternative.

In addition to the flawed “use” determination, the Revised Section 4(f) Evaluation dismisses a viable avoidance alternative, and hence, fails to comply with the mandates of Section 4(f). It correctly states that FHWA cannot approve the use of a Section 4(f) property if there is a feasible and prudent avoidance alternative available that will avoid using Section 4(f) properties. *See Rev. 4(f) at 19; 23 C.F.R. § 774.17.* Yet it erroneously rejects a Pamlico Sound Bridge as just such an avoidance alternative.

The Pamlico Sound Bridge alternative satisfies all the criteria for an avoidance alternative. The Revised 4(f) Evaluation recognizes the Pamlico Sound Bridge as the only alternative that entirely avoids Section 4(f) properties. *See Rev. 4(f) at 8, Table 2; Rev. 4(f) at 20.* This determination would be unchanged by a corrected analysis that appropriately accounts for “use” of the Refuge (as a refuge) by all of the Parallel Bridge alternatives. As both the original and revised 4(f) analyses recognize, the Refuge is the “most significant Section 4(f) property affected by this project,” and a Pamlico Sound Bridge would entirely bypass the Refuge and hence avoid *all* use and impacts. *See Rev. 4(f) at 24; FEIS at 5-44.* Notwithstanding that the Pamlico Sound Bridge alternative entirely avoids Section 4(f) properties, the Revised 4(f) Evaluation summarily dismisses it as an avoidance alternative on the unsubstantiated basis that it is too costly, without adequate analysis or explanation and without the usual aid of a transportation consultant to assist with a more thorough analysis. As discussed above, the cursory financial analysis of the Pamlico Sound Bridge, drafted by NCDOT after a decision had already been made,

stands in marked contrast to the thorough financial analysis of the Mid-Currituck Bridge, performed by Wilbur Smith & Associates long before a decision was made.

Appendix G of the Revised 4(f) Evaluation purportedly enumerates the reasons why NCDOT believes that the Pamlico Sound Bridge does not qualify as a Section 4(f) avoidance alternative. According to Appendix G, the Pamlico Sound Bridge would cost between \$942 and \$1,441 billion, and “results in *additional* construction, maintenance, or operational costs of an extraordinary magnitude.” (*Rev. 4(f), App. G at 2-3, citing 23 C.F.R. § 774.17(3)(iv).*) But nowhere in Appendix G does NCDOT specifically define this general “additional” cost that it alleges the Pamlico Sound Bridge would carry. Nor does the Revised 4(f) Evaluation allow for a precise deduction of that additional cost because it never specifies “the total end-to-end cost estimate for [the preferred] alternative compared to the others.” *Rev. 4(f) at 26.* As the Revised 4(f) Evaluation explains, the new preferred alternative “incorporates costs from all the Parallel Bridge Corridor Alternatives since this alternative does not make a decision about the future phases at this time.” *Id.*

The Revised 4(f) Evaluation does estimate various costs associated with the alternatives that NCDOT may decide to adopt in the future, and these range from \$602 million to \$1,524 billion. Comparing the high estimate of the Pamlico Sound Bridge’s cost versus the low estimate for the new preferred alternative, and vice versa, the “additional” cost of the Pamlico Sound Bridge ranges from \$839 million to *scrivings* of \$582 million. *Compare Rev. 4(f) at 26, Table 4, with Rev. 4(f), App. G, at 3, Table 3-1.* This \$1.421 billion range between the low and high estimate of “additional” cost provides a poor basis for making an informed determination of whether the Pamlico Sound Bridge is a “prudent avoidance alternative.”

In addition to this inadequate comparison of overall life-cycle costs, Appendix G also indicates that the Pamlico Sound Bridge poses financing challenges that signify additional costs of an extraordinary magnitude. Much of this discussion focuses on state legislative restrictions. For example, the Revised 4(f) Evaluation argues that the North Carolina equity formula (codified at N.C. Gen. Stat. § 136-17.2A) would complicate efforts to allocate federal funding for the project. It further argues that the prohibitions on tolling existing roadways and on using tolls without an alternate, non-toll route, N.C. Gen. Stat. §§ 136-89.187, 136-89.197, would stand in the way of issuing toll-revenue bonds to finance the project. The Revised 4(f) Evaluation fails to explore creative solutions – for instance, by exempting full-time residents from paying tolls, by charging tolls only from travelers traveling in one direction and not during emergency evacuations, by eliminating fees for ferry travel from the Outer Banks to create a free alternative route, etc. More importantly, under the federal constitution’s Supremacy Clause and principles of conflict preemption, state budgetary directives cannot trump federal law; otherwise the states could simply legislate around the more costly elements of statutes like Section 4(f). U.S. Const. art. VI, ¶2; *Nat’l Audubon Soc’y v. Davis*, 307 F.3d 835, 851-52 (9th Cir. 2002); *Wyoming v. U.S.*, 279 F.3d 1214, 1234 (10th Cir. 2002). In sum, the state statutes cited by

⁷ All cost estimates cited from the Evaluation and Appendix G are presented in 2006 dollars.

NCDOT are not an adequate basis for rejecting a Pamlico Sound Bridge as an avoidance alternative.

Moreover, in North Carolina, the General Assembly's support of similar projects with comparably high upfront costs – such as the \$1 billion Triangle Expressway around Raleigh and the \$700 million Mid-Currituck Bridge – suggests that the Pamlico Sound Bridge alternative could be constructed without the dire consequences predicted in Appendix G.⁸ The Triangle Expressway and Mid-Currituck Bridge have depended on various funding sources, including “gap funding,” which Appendix G does not adequately address. The Appendix does not even mention the possibility of a public-private partnership like the one that is responsible for funding the construction of the Mid-Currituck Bridge. And while it claims that “funding the construction of the Pamlico Sound Bridge Corridor Alternative with GARVEE bonds, state bonds, toll revenue bonds, or financial package with a combination of funding sources was shown not to be reasonable,” the analysis leaves much to be desired. The General Assembly has appropriated \$25 million of “gap funding” to be paid each year, over the next 30 years, for debt service on Triangle Expressway project. Financing that project has also relied on TIFIA loans and toll-revenue bonds, but the “gap funding” has played a critical role, supporting preferred debt that is entitled to the gap-funding appropriations stream even if toll revenues are insufficient to meet other obligations. The “gap funding” necessary to finance the Pamlico Sound alternative would not appear to exceed the average cost associated with the yet-to-be-defined “nourishment” or “transportation management plan” phases of the preferred alternative. Appendix G, however, does not specify what level of annual “gap funding” appropriation might suffice. It simply concludes that the “toll rates are relatively high considering that some form of other tax would be necessary to provide funding or revenue to support bonds to bridge the funding gap.” Rev. 4(D), App. G at 14.

The toll rates cited in the Appendix appear to reflect a crude analysis that incorporates a number of questionable assumptions. For instance, Tables G-12 through G-15, which support the calculation of “the toll rate of an individual trip to support a TIFIA loan,” assume that traffic volumes will remain fixed at the 2025 annual average of 9,600 vehicles per day for the life of the project. Yet various factors indicate this assumption is too low, including the bridge’s capacity for much larger traffic flows (the average summer weekends are expected to approach 20,000 vehicles per day by 2025), and current upward trends in visitation to the Outer Banks. The analysis also assumes that toll rates will not increase, and that toll rates will not vary between winter and summer seasons. In addition, creative possibilities, such as the use of partial public funding to supplement lower tolls, were not examined. Such failures and unrealistic assumptions belie a serious evaluation of whether the Pamlico Sound alternative is a feasible and prudent option for the purposes of Section 4(f).

⁸ These include Division 1 having to “defer all other construction, maintenance, and operational activities for the four- to five-year construction contract” (Rev. 4(f), App. G, at 15), and the unmitigated neglect of “statewide bridge replacement, rehabilitation and preservation.” *Id.* at 12.

D. The “least overall harm” analysis fails to assess and balance Refuge impacts adequately.

If no feasible and prudent avoidance alternative truly exists, “the Administration may approve only the alternative that . . . [c]auses the least overall harm in light of the statute’s preservation purpose.” FHWA determines which alternative causes the “least overall harm” by balancing of seven factors prescribed by regulation.⁹ 23 C.F.R. § 774.3(c)(1).

The least overall harm analysis in the Revised 4(f) Evaluation is based upon the erroneous conclusion that there is no feasible and prudent avoidance alternative. Because the Pamlico Sound Bridge alternative is a feasible avoidance option (*see supra* section II(C)), the evaluation need not move on to the balancing of harms among remaining alternatives, all of which use Section 4(f) properties. However, even if there were no feasible avoidance alternatives (and there are), the revised least overall harm analysis is nonetheless indefinite and incomplete.

Since the revised 4(f) analysis categorically excludes Refuge uses (as a refuge) from the evaluation of alternatives, the analysis also stops short of evaluating adverse impacts of those uses and mitigation of those impacts, as well as the severity of remaining harm to the Refuge (as a refuge).¹⁰ As a consequence, an assessment of the ecological impacts to the Refuge is not part of the calculus of least overall harm in the revised evaluation. By defining the scope of use of Section 4(f) property too narrowly, which

⁹ The least overall harm determination requires a balancing of the following factors:

- (i) The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- (ii) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- (iii) The relative significance of each Section 4(f) property;
- (iv) The views of the official(s) with jurisdiction over each Section 4(f) property;
- (v) The degree to which each alternative meets the purpose and need for the project;
- (vi) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- (vii) Substantial differences in costs among the alternatives.

23 C.F.R. § 774.13(c)(1).

¹⁰ As noted in our previous comments of October 27, 2008, the prior Section 4(f) analysis also failed adequately to assess adverse impacts and severity of the harm caused by the relative alternatives. That deficient analysis was premised, in part, upon the flawed assumption that the selected Phased Approach could stay within the existing easement, and thus, avoid use of the Refuge.

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 20

stems from misplaced application of the joint planning exception, the revised evaluation misses an entire suite of environmental harms. This violates Section 4(f).

In addition, not only is the assessment of relative adverse impacts incomplete, the revised evaluation, in fact, also fails to choose between alternatives at all. See Rev. 4(f), App. E (noting the new alternative “does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I”). The revised evaluation instead defers selecting an alternative under the guise of an ill-defined “transportation management plan,” which permits mixing and matching of the five Parallel Bridge alternatives but does not endeavor to evaluate the extent of adverse impacts likely to result from the potential assortment of combinations.

For those limited adverse impacts under the preferred approach, which are recognized, namely impacts to the Refuge as a historical property, the revised evaluation does not even attempt a complete analysis, explaining: “It is not possible to precisely quantify or qualify the extent of the remaining adverse effects to the Refuge after mitigation, due to the deferred decision-making for later phases of the project with the preferred Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative.” See Rev. 4(f) at 24.

The proffered justification for the deferred Parallel Bridge approach relies on reasoning that is evasive, tortuous, and disconcertingly circular. On the one hand, the Revised 4(f) Evaluation attempts to justify the new preferred alternative, and its choice to defer decision-making regarding later phases, by pointing to the uncertainty of future conditions, including storm events, shoreline erosion and inlet formation. See Rev. 4(f) at 5. On the other hand, the Revised 4(f) Evaluation, in the least overall harm analysis, (which purportedly informed selection of the preferred alternative), claims it cannot quantify remaining adverse impacts to the Refuge for the new preferred alternative because of the deferred decision-making approach, instead promising a “firm commitment to study and mitigate future environmental conditions.” See Rev. 4(f) at 24. Such tortuous justification does not satisfy the balancing requirement for a least overall harm analysis and underscores the problem with the new preferred alternative. The preferred “transportation management plan” approach simply weds the agencies to a short, replacement bridge without a solution in place for the NC 12 transportation corridor to the deal with the realities of a dynamic barrier island system. As the Revised 4(f) Evaluation acknowledges, shoreline erosion will continue to be a significant issue, storm events will continue to break through the manmade dune systems, and inlets are likely to form in identified “hot spots.” See Rev. 4(f) at 3-5; see also Riggs et al., *supra* note 2, at 66-67 (discussing natural processes of barrier islands and effects of human modification on barrier-island dynamics). However, the solution to these known realities (the new preferred alternative) is poorly defined, and the harms flowing from that solution – whatever ever mix of alternatives it ends up utilizing – also have not been evaluated and are not fully assessed or understood.

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 21

In the absence of a complete evaluation of overall harms pursuant to 23 C.F.R. § 774.3 (c)(1), which must include a full assessment of adverse impacts to the Refuge from the deferred mixing-and-matching approach and must account for impacts to the Refuge as a wildlife and waterfowl refuge, a meaningful comparison among alternatives to deduce least overall harm is not possible.

For all of these reasons, the Revised Section 4(f) Evaluation is inadequate and incomplete and cannot justify the new course of action charted by FHWA and NCDOT.

III. The New Preferred Alternative Will Not Comply With DOI Guidelines Governing Adaptive Management.

As explained above, the new preferred alternative identified in the Revised 4(f) Evaluation involves building a short bridge parallel to the current Bommer Bridge now, and then leaving until “later phases” decisions about how to maintain a transportation corridor through Pea Island Refuge to Rodanthe. Public records retrieved from NCDOT refer to the new preferred alternative as constituting “adaptive management” during the later phases for maintaining the transportation corridor through Pea Island Refuge.

According to federal regulations, though, agencies should use adaptive management only when the response of a natural resource to a proposed action is what is uncertain, and adjustments to the proposed action may be necessary for the protection of resources, for instance, if the resource does not respond well. See 43 C.F.R. § 46-145. The key to adaptive management is the uncertainty about impacts of a proposed action on natural resources, and not uncertainty about factors such as the weather or the availability of funding. Yet these are precisely the types of factors that NCDOT and FHWA have identified to justify their delay in deciding about the later phases of the project. Rev. 4(f) at 5.

Indeed, the impacts on natural resources of each of the options for the later phases of the project have been identified and examined in the FEIS. It is precisely the enormity and certainty of those impacts on natural resources that NCDOT and FHWA are attempting to obfuscate by their impermissible delay in decision-making.

The Department of Interior’s Technical Guide to Adaptive Management identifies the conditions that warrant an adaptive management approach. (A copy of the Guide is available at <http://www.doi.gov/initiatives/AdaptiveManagement/documents.html>.) Those conditions are not present here. First and foremost, “there must be a mandate to take action in the face of uncertainty.” Technical Guide at 9. For instance, a Refuge manager may be uncertain about which of several methods would be the best way to eradicate a parasite that is quickly killing a species of tree; yet, there is a need to act quickly to try to stop the spread of the parasite. In that instance, there is a mandate to try one method, monitor the trees, and adapt by trying another method if the first does not work. Here, however, there is no mandate to take action – that is, to build the short bridge and maintain NC 12 through the Refuge – because the adverse effects to natural resources are

Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 22

already known, each method of maintaining NC 12 through the Refuge is known to be incompatible with the Refuge, and there are better, viable options, including the Pamlico Sound Bridge Alternative.

Another condition for adaptive management is that there must be "an opportunity to apply learning," which is also absent here. *Id.* at 10. In the present case, when the natural resources inevitably do not respond well to the maintenance of NC 12 through the Refuge, there will be no opportunity to react by creating a different transportation corridor to Rodanthe. As described in section I(B) above, the decision to build a short bridge will constitute such a significant, irretrievable expenditure of resources, that there will be no way to "apply learning" and do anything but continue to maintain NC 12.


Finally, the Technical Guide to Adaptive Management also prescribes specific steps for implementing a program of adaptive management, involving steps such as identifying clear management objectives (again, with the focus being on natural resource well-being), identifying specific potential management actions along with models and monitoring plans to determine how well the objectives are being met, and planning how to assess whether goals were met and to react if they were not. *Id.* at 21-37. Yet the putative adaptive management plan in the present case (attached at Appendix H to the Revised 4(f) Evaluation), does not include these required components. For instance, it contains no objectives or goals related to natural resource responses and no plans for monitoring and assessing those responses. Rather, the plan is merely an agreement to wait until later to decide how to react to inevitable weather events.

Accordingly, the new preferred alternative violates federal guidelines governing adaptive management. For this and other reasons, it should not be implemented.

Conclusion:

In conclusion, we recognize the pressing need to replace Bommer Bridge, and we support construction of a new bridge that provides the most dependable and safest transportation to and from Hatteras Island, is environmentally sound, is economically reasonable over the long term, and does not violate federal law. We support the Pamlico Sound Bridge alternative and believe that it best satisfies these objectives.

Thank you for your consideration of our comments.


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Dr. Gregory J. Thorpe, Ph.D.
John F. Sullivan III, P.E.
November 13, 2009
Page 23

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Enclosures

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Eye of a human hurricane: Pea Island, Oregon Inlet, and Bodie Island, northern Outer Banks, North Carolina

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ABSTRACT

Pea Island, Oregon Inlet, and Bodie Island, North Carolina, are severely human-modified barrier-island segments that are central to an age-old controversy pitting natural barrier-island dynamics against the economic development of coastal North Carolina. Bodie Island extends for 15 km from the Nags Head–Kitty Hawk urban area to the north shore of Oregon Inlet and is part of Cape Hatteras National Seashore. Pea Island extends 19.3 km from the southern shore of Oregon Inlet to Rodanthe Village and is the Pea Island National Wildlife Refuge. Bodie and Pea Islands evolved as classic inlet- and overwash-dominated (transgressive) simple barrier islands that are now separated by Oregon Inlet. The inlet was opened in 1846 by a hurricane and subsequently migrated 3.95 km past its present location by 1989. With construction of coastal Highway 12 on Bodie and Pea Islands (1952) and the Oregon Inlet bridge (1962–1963), this coastal segment has become a critical link for the Outer Banks economy and eight beach communities that occur from Rodanthe to Ocracoke. The ongoing natural processes have escalated efforts to stabilize these dynamic islands and associated inlet in time and space by utilizing massive rock jetties and revetments, kilometers of sand bags and constructed dune ridges, and extensive beach nourishment projects. As the coastal system responds to ongoing processes of rising sea level and storm dynamics, efforts to engineer fixes are increasing and now constitute a “human hurricane” that pits conventional utilization of the barriers against the natural coastal system dynamics that maintain barrier-island integrity over the long term.

INTRODUCTION

In 1937, the U.S. Congress passed legislation authorizing development of the Cape Hatteras National Seashore on 119 km of Bodie, Hatteras, and Ocracoke Islands of the North Carolina

Outer Banks (Stick, 1958). Cape Hatteras National Seashore is composed of a series of barrier-island segments located between eight villages (Fig. 1A). The U.S. Department of Agriculture purchased land on the south side of Oregon Inlet, and President Roosevelt established Pea Island Migratory Waterfowl Refuge by

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EXHIBIT A

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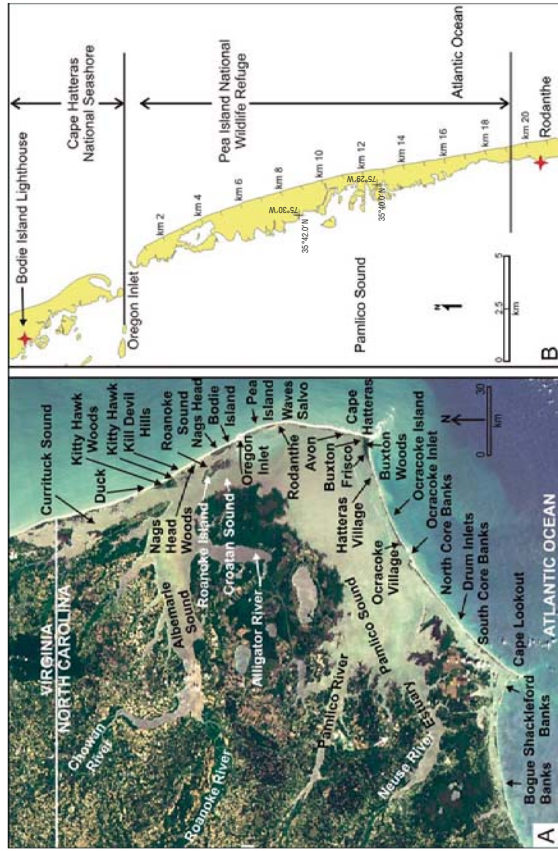


Figure 1. (A) Satellite image of the northeastern North Carolina coastal system shows the location of features referenced in this manuscript. Imagery is from a National Aeronautics and Space Administration (MODIS) sensor provided by the Institute for Marine Remote Sensing, College of Marine Science, University of South Florida. (B) Map of the study area extending from the southern end of Bodie Island, across Oregon Inlet, and south along the 19.3 km of Pea Island to the village of Rodanthe. Distance along Pea Island is indicated in km south of the Oregon Inlet terminal jetty. The red star in Bodie Island is the location of the Bodie Island Lighthouse, and the red star in Rodanthe is the proposed landing point of the back-barrier causeway bridge.

presidential executive order in 1938. Today, this is the Pea Island National Wildlife Refuge, managed by the U.S. Fish and Wildlife Service. Pea Island is a 19.3-km-long barrier segment separated from Bodie Island on the north by Oregon Inlet and bounded on the south by the village of Rodanthe (Fig. 1B). Establishment of Pea Island National Wildlife Refuge did not include a right-of-way for North Carolina Highway 12 to connect the Oregon Inlet ferry with the Outer Banks villages to the south. Rather, a high-way right-of-way through the refuge was obtained by a deed of easement. Highway 12 was built from Nags Head to Cape Hatteras in 1952. In 1962–1963, the Oregon Inlet ferry was replaced by a 3.86 km bridge (Fig. 2) that connected Highway 12 on Bodie Island with Pea Island. Construction of this infrastructure was critical for the economic development of the Outer Banks.

Wildlife refuges have specific functions and become highly managed ecosystems designed to meet those functions. Pea Island National Wildlife Refuge’s function is to preserve and manage Pea Island for migratory birds and other wildlife. Fed-

eral legislation passed in 1997 protects the function of national wildlife refuges by prohibiting construction of roads that interfere with refuge functions. However, the cumulative impact of sea-level rise and numerous storms (hurricanes and nor’easters) through time has promulgated increased efforts to maintain and/or reconstruct the transportation infrastructure, unfortunately at the expense of the natural barrier-island dynamics within Pea Island National Wildlife Refuge.

The Pea Island ocean shoreline is receding westward at rates up to about -4 m/yr (Everts et al., 1983; Stone et al., 1991; USACE, 1993; Benton et al., 1997; Fisher et al., 2004) as the island attempts to migrate upward and landward in response to a rise in sea level in northeastern North Carolina (Riggs and Ames, 2003; Horton et al., 2009; Kemp et al., 2009). Each storm that breaches the constructed dune ridges either destroys the road or covers it with overwash sand, which is then mined and used to reconstruct the dune ridges. This engineering of the ocean front impedes the natural island-building processes of inlets and over-



Figure 2. A September 2001 oblique aerial photograph shows Oregon Inlet on the North Carolina Outer Banks with a dredge working to maintain the inlet throat under the high navigation span of the Oregon Inlet bridge. The bridge connects Bodie Island and Cape Hatteras National Seashore and the Kitty Hawk to Nags Head urban area (on the left) to Pea Island National Wildlife Refuge and the eight Outer Banks villages (on the right). Photograph is from W. Birkmeier, U.S. Army Corps of Engineers, Field Research Facility, Duck, North Carolina.

wash that build island width and elevation. The result is island narrowing and increased vulnerability to future inlets (Everts et al., 1983; Riggs et al., in press).

Oregon Inlet opened in 1846 and migrated southward at average rates that ranged from 23 m/yr to 165 m/yr (Imman and Dolan, 1989; Pilkey et al., 1998; Riggs et al., in press). As the navigational channel shifted southward, the fixed navigational span of the bridge required continuous dredging. Inlet migration has resulted in the exhaustion of bridge pilings, causing bridge segments to subside. Further, as the north end of Pea Island migrated southward, the southern end of the bridge was in danger of being stranded in Oregon Inlet. These problems led to plans to fix the location of the inlet with a pair of 3.2-km-long jetties (Pilkey and Dixon, 1996). These jetties have not been built to date. However, a 938-m-long terminal jetty, along with a rock revetment at the southern bridge abutment, were built in 1989–1991 to stabilize the southern side of Oregon Inlet and prevent the disconnection of the bridge from Pea Island.

The long-term future of Highway 12 on Pea Island and Oregon Inlet bridge, built on a mobile barrier island and inlet system that responds to natural dynamics, has created a serious conflict. The efforts to permanently fix the highway and bridge have now reached a fevered pitch. Numerous stakeholder groups, each with different agendas, form the eye of a different kind of hurricane that pits short-term economic development against the long-term natural dynamics of a changing barrier-island system.

The purpose of this paper is threefold: (1) summarize the basic barrier-island processes operating on the North Carolina Outer Banks that are essential for the short-term maintenance and long-term evolution of a healthy barrier-island-inlet system; (2) outline the growing conflict between the natural dynamics and the rapidly increasing economic development on the Outer Banks; and (3) provide a framework for the multiple user groups

in the public domain to define an acceptable strategy for managing the barrier-island resources while maintaining a viable coastal economy. This manuscript does not include a technical summary of previous barrier island–estuarine studies in other geographic portions of the world.

METHODS

The work conducted here is part of the North Carolina Coastal Geology Cooperative (NCCGC) research program funded by the U.S. Geological Survey (USGS) Coastal and Marine Geology Program, U.S. National Park Service (USNPS), and U.S. Fish and Wildlife Service (USFWS). Since 2000, the NCCGC has carried out a broad range of studies that utilize geophysical surveys in the estuaries and nearshore ocean, deep-core drilling (<75 m) on land areas, shallow vibrocoring (<10 m) on the barrier islands and in the surrounding estuaries and marshes, ground penetrating radar (GPR) surveys on the barrier islands, and surveys of shoreline change through time using georeferenced aerial photographs and topographic surveys. The overall goal of the NCCGC research program is to develop a comprehensive understanding of: (1) the Quaternary stratigraphic framework of the coastal system (Fig. 1A); (2) the climate and sea-level history since the Last Glacial Maximum, when the current coastal system was formed; and (3) the modern process-response dynamics of both the natural and human-modified coastal systems.

For this study, core materials were subjected to sedimentologic, micropaleontologic, and stratigraphic analyses. The resulting data were placed in a three-dimensional framework derived from geophysical (seismic and GPR) data and a temporal framework derived from Pb-210, Cs-137, C-14, and optically stimulated luminescence techniques (Riggs and Ames, 2003, 2007; Culver and Horton, 2005; Culver et al., 2007, 2008; Mallinson et al., 2005, 2008; Horton et al., 2006, 2009; Vance et al., 2006; Corbett et al., 2007; Parham et al., 2007; Horton and Culver, 2008; Smith et al., 2008; Kemp et al., 2009). Geomorphic classification and mapping of the North Carolina barrier islands (Riggs et al., in press) were based on a series of conceptual models of barrier-island evolution developed from process-response studies and modern field surveys of the North Carolina Outer Banks. These studies utilized time-slice analysis of georeferenced aerial photography (1932–2006) and topographic surveys (1849–1917) of sites between Kitty Hawk and Cape Lookout, North Carolina. The modern data were integrated with historical data to develop the evolutionary responses of geomorphic-ecologic systems to sea-level rise, storms, and human modification. Light detection and ranging (LIDAR) data were used to aid in mapping the geomorphic components.

Numerous M.S. thesis and Ph.D. dissertation studies were carried out on specific barrier-island segments and portions of the estuaries to develop the detailed supporting information for understanding the origin and evolution of the northeastern North Carolina coastal system. The following are the most relevant to the present manuscript: Sager (1996), Rudolph (1999), Parham

(2003), Abbene (2004), C.G. Smith (2004), Vance (2004), Ricardo (2005), Grand Pre (2006), Rosenberger (2006), C.W. Smith (2006), Twamley (2006), and Hale (2008).

OUTER BANKS BARRIER-ISLAND SYSTEM

Simple and Complex Barrier Islands

Barrier-island segments within the North Carolina Outer Banks are classified into two types: simple and complex (Fig. 3). This determination is based upon the barrier-island geomorphology, which is a product of the evolutionary history, available sediment supply, and physical dynamics operating upon the islands (Riggs et al., in press).

Barrier-island segments with a relatively limited sediment supply are low, narrow barriers dominated by inlet and overwash processes (Figs. 3A and 3B) (Riggs et al., in press). Since these barriers are sediment-poor, and little additional sand is added to them through time, they tend to be extremely dynamic and are dominated by modern and paleo-inlet flood-tide deltas. The deltas extend into the back-barrier estuary, building island width while overwash fans build island elevation. Examples of simple barrier islands in northern North Carolina include all of Core Banks and most of the northern Outer Banks that are in Cape Hatteras National Seashore and Pea Island National Wildlife Refuge (Fig. 1A). This includes

most of Ocracoke Island, the island segments between the villages of Hatteras to Frisco, Buxton to Avon, Avon to Salvo, Rodanthe to Oregon Inlet, and Oregon Inlet to Nags Head (Fig. 1A).

Complex barrier islands are high and wide islands in response to major inputs of additional sediment onto the barriers at various times in their evolutionary history (Figs. 3C and 3D) (Riggs et al., in press). Complex islands are generally characterized by a young overwash-dominated component that has migrated toward and became welded onto an older barrier-island component on the mid- and back sections of an island that is composed of beach ridges and dune fields. Due to the large volume of sand, normal storm surges have little potential for opening new inlets through complex islands, and oceanic overwash only occurs along the modern, front side of the barrier. Thus, salt spray is minimal, allowing extensive maritime forests to develop on the mid- and back sections of complex barrier islands. Complex barriers form a continuum that ranges from well developed to poorly developed. Kitty Hawk, Nags Head Woods, and Buxton Woods are examples of well-developed complex islands (Fig. 1A). Ocracoke and Hatteras villages are situated on moderately developed complex islands, while the villages of Rodanthe, Waves, Salvo, and Avon are on poorly developed complex islands (Fig. 1A). Most urban development occurs on complex barrier islands.

Extensive studies of changing depositional patterns placed within a chronostratigraphic framework (based upon an exten-

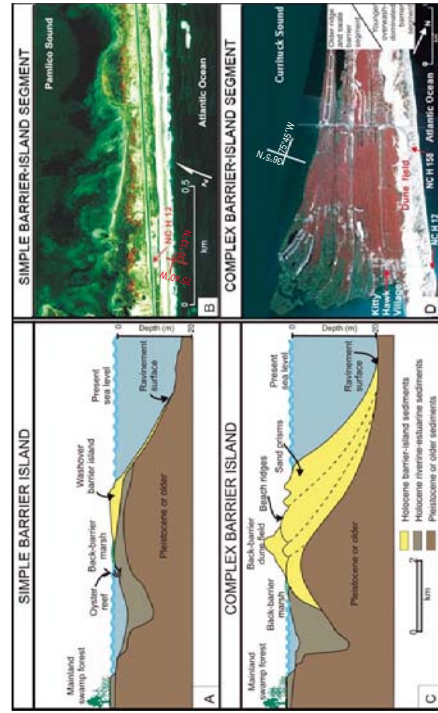


Figure 3. Schematic cross-sectional diagrams show a (A) sediment-poor, inlet- and overwash-dominated simple barrier island, and a (B) sediment-rich, beach ridge-dominated complex barrier island (modified from Riggs et al., in press). (C) 1998 infrared aerial photograph shows a barrier-island segment northeast of Hatteras village, North Carolina, a classic example of a simple barrier island. (D) 1983 infrared aerial photograph shows Kitty Hawk, North Carolina, a classic example of a complex barrier island.

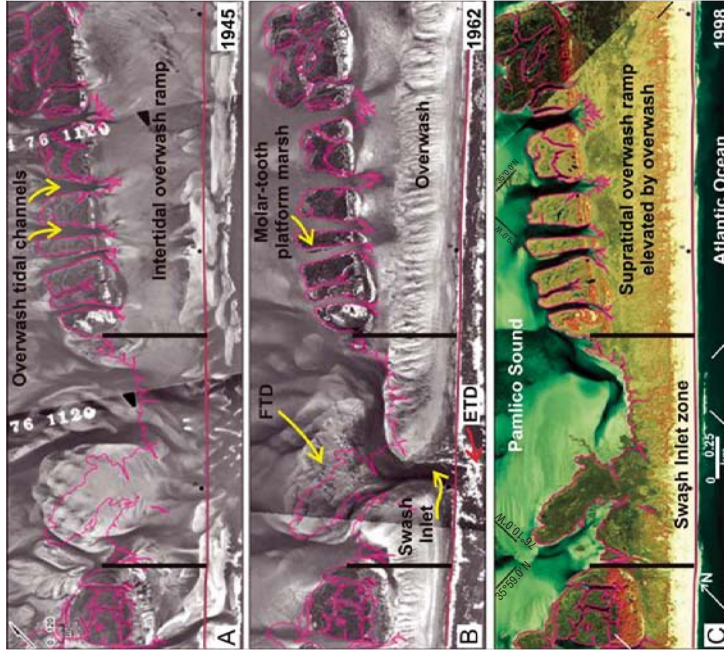


Figure 4. Georeferenced aerial photograph time-slice series; (A) 1945, (B) 1962, and (C) 1998, show the history of the Swash Inlet area on North Core Banks. The Swash Inlet zone shows the evolutionary succession of an inlet that builds island width through deposition of a flood-tide delta along the estuarine side of the barrier island. With time, overwash processes build a berm that ultimately closes the inlet, builds elevation, and becomes vegetated. The platform marsh develops on the intertidal portions of the flood-tide deltas. The right-hand sides of the photographs show an older and much larger inlet flood-tide delta complex with well-developed platform marshes and tidal channels on the estuarine side and an active overwash ramp on the ocean side that becomes vegetated through time. The red lines are the 1998 digitized shorelines superimposed on the older photographs to show the sequence of changes. The ebb-tide delta (ETD) and flood-tide delta (FTD) are labeled in B.

sive database of age dates on sediments within the back-barrier estuaries and barrier islands) have demonstrated that the Outer Banks have a complex history of formation, collapse, and reformation (Culver et al., 2007; Mallinson et al., 2005, 2008). Rising Holocene sea level began to flood up the paleo-Roanoke ca. 12,000 yr B.P., and up the paleo-Tar and paleo-Neuse River valleys, and associated tributary streams by ca. 7000 yr B.P. The flooding formed a series of small embayments dominated initially by estuarine sediments (Sager and Riggs, 1998; Riggs et al., 2000; Parham, 2003; Mallinson et al., 2005, 2008; Culver et al., 2007, 2008). By ca. 5000 yr B.P., further flooding within the drowned river valleys had formed large open embayments dominated by marine sediments. Initial formation of an almost continuous barrier island system in the vicinity of the modern barriers began ca. 3500 yr B.P., producing a system of restricted estuaries dominated by brackish water and deposition of estuarine organic-rich mud (Riggs, 1996; Sager and Riggs, 1998; Riggs et al., 2000). Where abundant sand was available, regressive barrier islands formed and developed the early framework of the complex barrier system (Mallinson et al., 2008). Large, back-barrier dune fields accumulated episodically on top of and in front of many of the beach ridges on the complex barrier islands (Havholm et al., 2004). In the areas that were sediment poor, simple or transgressive barrier islands formed on top of the late Pleistocene Hatteras Flats interstream divide, which now underlies the Outer Banks from Oregon Inlet to Ocracoke Inlet (Riggs et al., in press).

Since ca. 2500 yr B.P., transgressive conditions have dominated the simple-barrier islands, and substantial shoreline recession has moved the ocean shoreline westward. Circa 1000 A.D., a 50 km segment of the southern Outer Banks (Portsmouth, Ocracoke, and Hatteras Islands) collapsed, probably due to a major storm or series of storms (Grand Pre, 2006; Culver et al., 2007). The barrier island was transformed into a vast submarine shoal system. Behind the shoal, the organic-rich estuarine mud in southern Pamlico Sound was replaced by fine sand containing marine foraminifera, including planktonic species derived from the Gulf Stream (Culver et al., 2007). Marine conditions persisted in southern Pamlico Sound until ca. 1500 A.D., by which time the simple subaerial barriers had reformed, resulting in a lower-energy environment and a return to organic-rich mud deposition throughout all deeper portions of Pamlico Sound (Riggs, 1996; Abhene et al., 2006; Grand Pre, 2006; Foley, 2007; Culver et al., 2007). The significance of the 1000 A.D. collapse event is the time for recovery; it took ~500 yr for that portion of the Outer Banks barrier-island system to recover. By ca. 1800 A.D., the Outer Banks had developed to their most continuous extent with the fewest number of inlets open at any one time (Riggs et al., 1995). Because inlet and overwash processes are so frequent and important to the dynamics of simple barrier islands, the shallow stratigraphic units, the basal back-barrier platform marsh peat, and the surficial geomorphic features from Pea Island to Portsmouth Island tend to be less than 500 yr old (C.G. Smith, 2004; Ricardo, 2005; Culver et al., 2006, 2007;

Rosenberger, 2006; C.W. Smith, 2006; Twamley, 2006; Hale, 2008; Mallinson et al., 2008; C.G. Smith et al., 2008; Riggs et al., in press).

Function of Inlets on Simple Barrier Islands

Inlets are high-energy components of coastal systems, and their formation and location are difficult to predict. Since the barrier islands form a sand dam between the ocean and estuaries, inlets are opened and closed by storms that produce storm surges driven from either the ocean or estuarine side of the islands (FitzGerald and Hayes, 1980). Once open, an inlet allows the interchange of freshwater and ocean water. Thus, inlets are also outlets, since they let the water flowing off the land escape into the ocean. Inlets construct extensive flood-tide deltas on the estuarine side of the barrier islands and ebb-tide deltas on the ocean side, where the tidal energy is dissipated into the larger water bodies and sediment is deposited to form the flood-tide and ebb-tide deltas (Hayes and Michel, 2008). Both the ebb-tide delta and flood-tide delta shoals are critical elements of the coastal sediment budget and contribute to the long-term evolution of the barrier islands. Inlet flood-tide delta shoals are essential for building back-barrier island width. Within the context of a rising sea level, barrier islands migrate onto the shallow flood-tide delta shoals by overwash dynamics (Fig. 4). Multiple channels often characterize the flood-tide deltas and flow into the inlet throat that occurs between the adjacent barrier islands (Figs. 4A and 4B).

Inlets act as safety valves by adjusting and shifting in size and location in response to each storm. The dynamism of inlets means that a stable, deep channel is rarely maintained naturally. Constant dredging and/or inlet jetties are utilized in efforts to maintain a fixed navigation channel. However, these practices generally disrupt the self-adjusting, safety-valve function of the inlet, the sediment bypass system between islands, and the exchange of sediment between the flood-tide delta and ebb-tide delta. In addition, removal of ebb-tide delta and/or flood-tide delta sand for beach nourishment changes both the geometry and dynamics of an inlet and modifies the natural sediment budget. If enough sand is removed, it will affect the amount of channel migration and related shoreline erosion on the adjacent barrier islands.

Approximately 70%–85% of the Outer Banks have had one or more inlets at some time during their past 500 yr history (Riggs et al., 1995; Smith, 2006; Riggs et al., in press). Pea Island, from Oregon Inlet south to the village of Rodanthe, is a simple barrier-island system dominated by inlets and overwash dynamics. Based upon historical sedimentological and geophysical data, three historic inlets (Fig. 5) have been documented on Pea Island (Stick, 1958; Fisher, 1962; Everts et al., 1983; Payne, 1985; Smith, 2004; Smith, 2006; Culver et al., 2006; Smith et al., 2008).

- (1) Chickinacommock Inlet was open irregularly between ca. 1650 and ca. 1775;
- (2) Loggerhead Inlet was open frequently between ca. 1650 and ca. 1870; and

- (3) New Inlet was open numerous times between ca. 1650 and 1945.

Function of Overwash on Simple Barrier Islands

Simple barrier islands are dependent upon storm overwash to build island elevation and width, a critical process for the health and evolution of the islands (Godfrey and Godfrey, 1976; Riggs and Ames, 2007; Riggs et al., in press). Small storm surges produce waves that overtop the island berm, resulting in small-scale

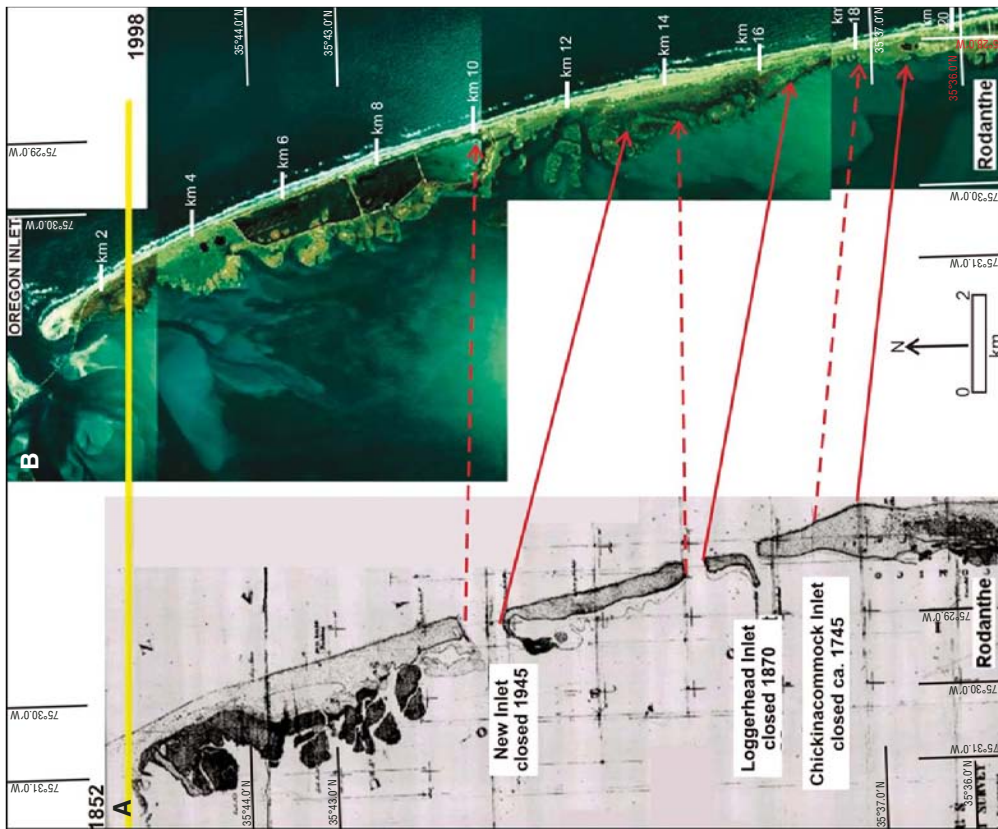


Figure 5. The georeferenced 1852 U.S. Coast Survey topographic map (A) and 1998 infrared aerial photograph mosaic (B) shows the approximate locations for opening of the paleo-historic inlets (dashed red arrows) and the inlet location when final closure took place (solid red arrows). Oregon Inlet opened north of the location on the 1998 aerial photograph mosaic (B). See Figure 6 for the migration of Oregon Inlet.

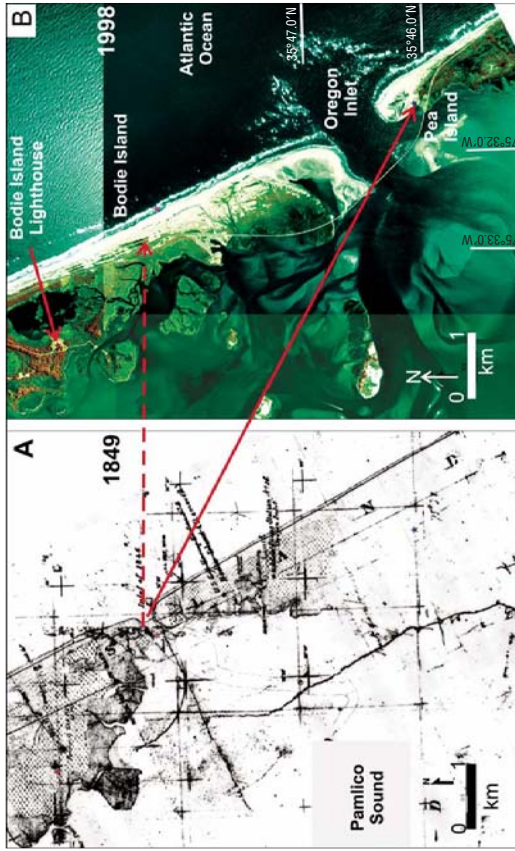


Figure 6. The georeferenced 1849 U.S. Coast Survey topographic map (A) and 1998 infrared aerial photograph (B) shows the southward migration of Oregon Inlet through time. To the north of Oregon Inlet, there is southern Bodie Island (Cape Hatteras National Seashore), and to the south, there is northern Pea Island (Pea Island National Wildlife Refuge). The dashed red arrow indicates the approximate location where Oregon Inlet opened in 1846, and the solid red arrow indicates the southernmost point to which the inlet migrated in 1989. Figure is modified from Riggs et al. (in press).

overwash fans on the ocean side of the barrier. Figure 7 shows a series of small overwash fans that have added up to 2 m of elevation on the ocean front and middle portions of the island. Large storm events produce meters of water overtopping the island berm and result in large, arcuate overwash ramps that bury the back-barrier platform marshes and occasionally build shallow shoals extending well into the estuarine system (Fig. 8) (Godfrey and Godfrey, 1976). Through time, overwash events bury the platform marshes and associated peat deposits that formed on the flood-tide delta shoal system and fill the inlet channels with overwash sand (Smith, 2004; Smith, 2006; Culver et al., 2006; Riggs and Ames, 2007; Smith et al., 2008; Riggs et al., in press).

The 1932 aerial photographs (Fig. 8A) of the Loggerhead Hills barrier-island segment predate major human modification. The extensive overwash fan extends across the entire island into Pamlico Sound. This storm product renews the estuarine shoreline and produces broad shallow flats that subsequently become important habitats for marsh grass and submerged aquatic vegetation. The aerial photographs from 1999 (Fig. 8B) show the same barrier segment that has experienced the building and re-building of constructed dune ridges since the late 1930s and a paved Highway 12 since 1952. These constructed dune ridges

minimize oceanic overwash and allow for the extensive growth and development of vegetation. Today, the estuarine shoreline is characterized by eroding salt marshes and local, thin strand-plain beaches in coves between peat headlands (Fig. 8B).

The 1999 photographs in Figure 8B postdate Hurricane Dennis, which had a minor impact on this coastal segment in fall 1999. The constructed dune ridge was severely damaged by the storm and eroded away in a few areas, allowing for small overwash fans to develop. However, overwash covered the road only locally, and in no place did it extend to the estuarine shoreline, and thus naturally renourish the back-barrier marsh. More frequent, smaller storms with small to intermediate storm surges produce small overwash fans that rarely extend all of the way across a barrier island. Consequently, they generally do not build island width (Riggs and Ames, 2007).

Evolution of Pea Island during Rising Sea Level

The rate of sea-level rise in the Outer Banks region for the past two millennia has been ~10 cm/100 yr (Horton and Culver, 2008; Horton et al., 2006, 2009; Kemp et al., 2009). This rate increased around the beginning of the nineteenth century to

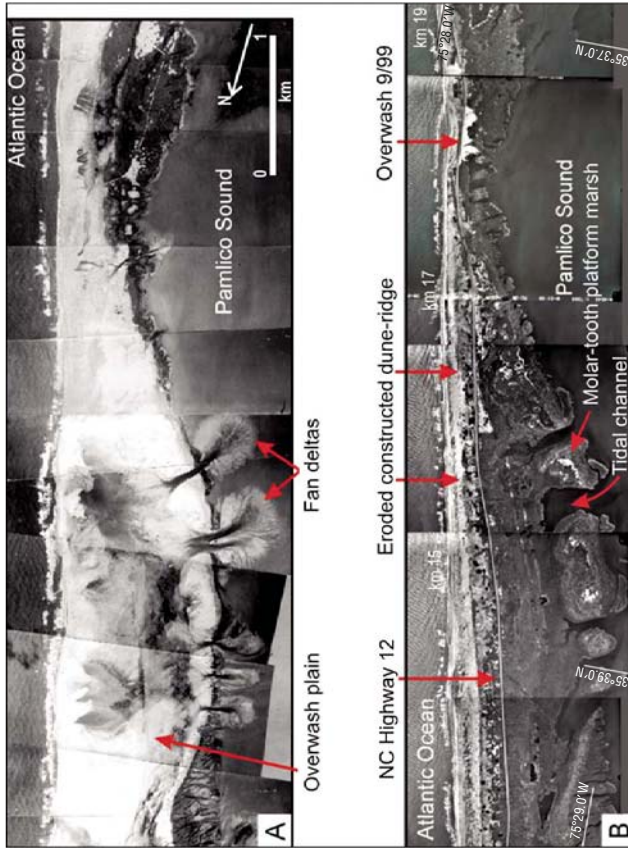


Figure 8. (A) 1932 aerial photograph mosaic of the Loggerhead Hills area (left two thirds) and southern portion of Pea Island National Wildlife Refuge (right one third) were taken shortly after a major storm produced the large arcuate overwash plain and reactivated overwash tidal channels and fan deltas that extend into Pamlico Sound. (B) 1999 aerial photograph mosaic of the same area shows severe human modification in which barrier dune ridges were constructed to prevent overwash and protect Highway 12. The 1932 aerials are from the U.S. Army Corps of Engineers, Field Research Facility, Duck, North Carolina. The 1999 aerial photographs are from the North Carolina Department of Transportation, Raleigh, North Carolina.

Predicting Potential Inlet Locations on Pea Island

The data presented in Figure 13 integrate the time-slice analysis, remotely sensed data, and lithostratigraphic, biostratigraphic, and chronostratigraphic data to produce the interpretations presented in Figure 14. Pea Island consists of four segments; the evolutionary history of each is displayed in Figure 14. Two young segments (stage 1, New Inlet; stage 2, Loggerhead Hills on Fig. 14) have gained substantial island width through development of inlets and overwash plains during the past 150 yr. Two older segments (stages 3 and 4 on Fig. 14) are characterized by substantial island narrowing from both the ocean and estuarine shorelines during the period from 1852 to 1998 (Fig. 13). They consist of molar-tooth platform marshes that are split by tidal channels extending across most of the barrier island. Marsh peat extends seaward beneath Highway 12 and the ocean beach, where it often crops out in the surf zone during storms.

GPR data in Figure 11 documents the Chickinacommock Inlet channel. The flood-tide deltas of these two inlets were subsequently buried by fining-upward sediment sequences of several overwash fans, which gave the island both width and elevation (Smith, 2004; Culver et al., 2006; Smith et al., 2008). The barrier segment between the two inlets in Figure 10 is very narrow with a molar-tooth platform marsh adjacent to Highway 12. The importance and processes of molar-tooth platform marshes in the evolutionary history of simple barrier islands are presented by Riggs et al. (in press) and displayed in Figure 4. Molar-tooth platform marshes are remnants of a former flood-tide delta shroud system that have converted to intertidal marshes upon inlet closure. The platform marshes occur on shoals that are separated into smaller segments by the old flood-tide delta channel system. With time and ongoing recession of the ocean shoreline, the oceanward side of the molar-tooth platform marsh is buried, and the associated tidal channels are filled with overwash sand. Ultimately, as the island segment narrows, the molar-tooth platform marsh extends under the entire island, cropping out during storms on the beach and upper shoreline. As the storm surge flows over the narrowed island, the exposed marsh peat surface resists overflow erosion, while the sand-filled tidal channels readily blow out to produce new sub-sea-level inlet channels and an initial flood-tide delta as the storm recedes. Figure 11 presents GPR data obtained along Highway 12 across the molar-tooth platform marsh. The northern section is characterized by a horizontal reflector off the top of the underlying peat surface of the platform marsh and dipping reflectors representing small tidal channels. This area is vulnerable to inlet formation necessary to build new island width.

Inlet and overwash processes interact through time to produce a stable barrier island that is in equilibrium with both storm dynamics and rising sea level. The georeferenced maps and photographs in Figure 12 demonstrate the evolutionary succession of the Loggerhead Hills segment of Pea Island from narrow inlet-dominated (1852) to wide overwash-dominated (1917 and 1932), to a human-dominated barrier system (1962 and 1998). Two channels of Loggerhead Inlet were open from ca. 1650 to 1680 and again from 1843 to 1870 (Payne, 1985). Sometime prior to 1917, the flood-tide delta and its channels were buried by a massive overwash, possibly during the 1899 hurricane that severely impacted this region. The 1932 aerial photograph shows the broad overwash plain that was reactivated by the 1932 storm just prior to the photographs. The tidal channels, associated fan deltas, and well-developed back-barrier berms along the estuarine shoreline display fresh structures resulting from the hydrologic flow during the recent storm. The 1998 aerial photograph shows the influence of humans, which began in the late 1930s with construction of dune ridges along the ocean beach and within the overwash flats in an effort to stabilize the moving sand and, since 1952, to protect Highway 12. The constructed dune ridges, designed to prevent overwash, dramatically increased island vegetation cover and shifted this barrier segment into an island-narrowing mode (Fig. 9), with shoreline erosion occurring on both sides of the island (Smith et al., 2008).

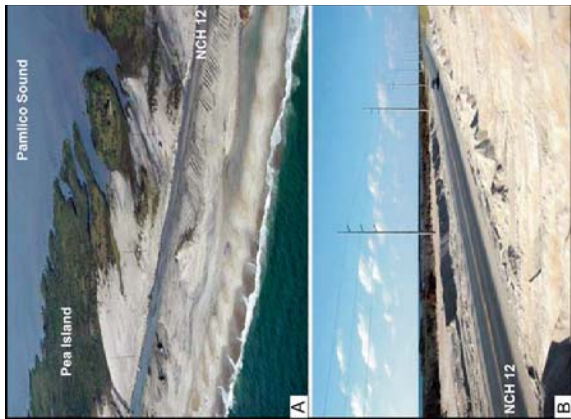


Figure 7. Two oblique aerial photographs illustrate the accretion of new ocean overwash sand on two simple barrier-island segments resulting from small storm surges during Hurricane Isabel (September 2003). (A) Overwash at the southern end of Pea Island, National Wildlife Refuge buried Highway 12 and extended a short distance onto the platform marsh and associated tidal channels. (B) Two-meter thick overwash just north of Buxton buried Highway 12 and extended into the scrub-slab zone. The car is for scale. Photographs are by S.R. Riggs.

~15 cm/100 yr and increased again around the beginning of the twentieth century to its current rate of ~40 cm/100 yr. Within this context, Figures 9 and 10 demonstrate the various changes through time on a segment of Pea Island. The ocean shoreline receded landward between 210 and 510 m from 1852 to 1962. The Loggerhead Hills area (top of Figs. 9 and 10) had widened in the landward direction through deposition of a major overwash plain prior to the 1917 topographic survey (possibly by the 1899 hurricane), and this overwash plain was reactivated by the 1932 storm (Fig. 8A). The lower portions of Figures 9 and 10 have experienced island narrowing, and the narrow central portion is highly vulnerable to the opening of a new inlet in the near future.

The 1992 oblique aerial photograph in Figure 10 includes the wider island segments of Loggerhead Inlet, which last closed in ca. 1870 (upper portion), and Chickinacommock Inlet (lower portion), which last closed in ca. 1745. The southern section of

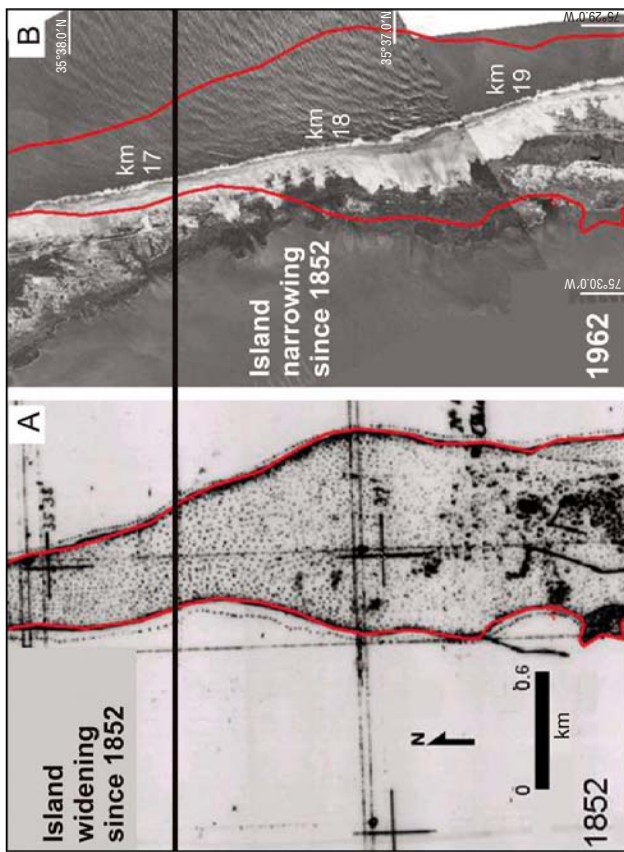


Figure 9. The georeferenced 1852 U.S. Coast Survey topographic map (A) and the 1962 aerial photograph mosaic (B) shows most of the same area as in Figure 8. This figure demonstrates the long-term recession of the ocean shoreline, as well as dramatic changes in island narrowing and island widening. A large overwash plain substantially widened the area north of km 17 sometime after 1852 and before 1917 (see Fig. 12). The area south of km 17 consists of an old inlet flood-tide delta (Chickinacommock Inlet) buried by an overwash plain that predates 1852 and has been undergoing island narrowing since. The red outline on the 1962 photographs is the 1852 digitized shoreline. The 1852 aerial photographs are from the North Carolina Department of Transportation, Raleigh, North Carolina.

supply (Figs. 3A and 3B), the entire length of the island is vulnerable to inlet formation (Fig. 15). However, three locations (sites 1 through 3) have a high likelihood of becoming inlets if one or more major storms or a series of smaller storms (hurricanes or nor'easters) occur during any given year. Site 1 is a very narrow island segment consisting of molar-tooth platform marsh with sand-filled overwash tidal channels that underlie the barrier island. Site 2 is the location of historic New Inlet and associated flood-tide delta, and it has several large sand-filled inlet channels that underlie the barrier island. Site 3 is the location of historic Chickinacommock Inlet, which has a single large sand-filled inlet channel that underlies the barrier island.

Sites 4 and 5 (Fig. 15) have an intermediate likelihood of inlet formation in the sand-filled overwash tidal channels

on each side of a large molar-tooth platform marsh. A large flooding or ebbing storm surge could flank the existing jetty at Oregon Inlet and open small flanking channels. Sites 6 and 7 are the widest portions of Pea Island and have low likelihoods of new inlets in the short term (annual to decadal scale). However, as the ocean and estuarine shorelines erode and the island continues to narrow, these segments will evolve (at the decadal scale) to the point where they will need new inlets to rebuild island width. These sites could also experience major overwash events that would maintain a back-barrier shoal system and build island elevation. Site 8 is the northernmost segment of Pea Island, and it is hardened by a 938-m-long rock jetty at Oregon Inlet and the rock revetment around the base of Oregon Inlet bridge. The likelihood of Oregon Inlet migrating further

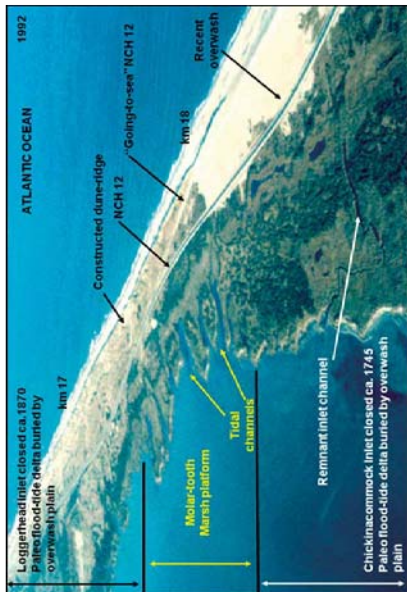


Figure 10. A 1992 oblique aerial photograph shows the same general area of Pea Island as in Figures 8 and 9. Historic Loggert Inlet was located in the upper left and historic Chickinacommock Inlet was located in the lower right portion. Notice the “going-to-the-sun” portion of Highway 12 that was relocated to the west. The new highway was buried by overwash sediment from a nor’easter that breached the constructed dune ridge just prior to the taking of this photograph. The narrow central portion of the island, where the platform marsh and associated tidal channels occur, has a high likelihood for an inlet to form in the near future (see Fig. 15). Photograph is by S.R. Riggs.

south or of an additional inlet breaking through these massive structures is low. However, the site could experience overwash events and associated damage.

Transition Years: 1930s to 1960s

According to the U.S. Census Bureau (USCB, 2007), the population of Dare County in 1930 was 5202 and showed a very low growth (14%) to 5935 by 1960. The 1930s saw the beginning of a series of large-scale projects that would represent both the framework for the coming tourist economy and the long-term changes to the natural dynamics of the North Carolina Outer Banks. Driven largely by the long-term economic potential of Outer Banks, a group of developers, businessmen, politicians, and state agency officials began a three-pronged approach at laying the groundwork (Stick, 1958). Appendix 1 contains a chronology of major impacts affecting the barrier-island dynamics.

Constructed Barrier Dune Ridges

The Works Progress Administration (WPA) of the federal government put people to work in late 1930s building sand fences to form constructed dune ridges that would act as a “fort wall” to protect the islands from storms and overwash (Fig. 16). The constructed dune ridges extended from the Virginia State line south to Ocracoke Inlet. The dune ridge “fort wall” provided a critical, but false, sense of security. Oceanfront land behind the dune ridges was sold at premium prices, houses and businesses were constructed, and roads were built with little concern for storm overwash, ocean shoreline recession, or inlets breaching the islands. However, maintenance and rebuilding of the constructed dune ridges have become an overwhelming and costly task. Further, the short-term gain of protection leads to long-term failure because the natural processes of overwash and inlet flood-tide delta formation, essential for maintaining the barrier island’s health and evolution in response to rising sea level, are curtailed.

ARRIVAL OF THE HUMAN HURRICANE

Pre-1930 Outer Banks

Prior to 1584, the Outer Banks operated as a natural barrier-island system dominated by storms and locally populated by small and nomadic groups of Native Americans involved in subsistence living. Europeans landed on Roanoke Island in 1584 and led to the “dawn of British Colonialism” (Stick, 1983). For the next ~350 yr, small populations of Native Americans and immigrants lived in small villages on the estuarine side of the barrier islands, often within maritime forests that grew on the wider and higher portions of complex barrier islands. The population was primarily involved in fishing, hunting, guiding, boat building, life-sawing, shipping, and ship salvage. They lived off the water and land with a few domestic animals and small gardens. Water transportation was largely by personal boats, supply boats, and toll ferries, with movement on the islands largely by horse and wagon. In the first half of the twentieth century automobiles traveled along the ocean beach or estuarine side of broad overwash ramps.

The impact that these small groups of people had upon the barrier islands included digging channels and ditches, constructing ponds, logging for ship building, and grazing domestic animals. However, the net consequences of these human impacts were overwhelmed by the natural storm dynamics of the coastal system that opened and closed inlets, built beach ridges and back-barrier dune fields, and flooded the islands with large overwash ramps.

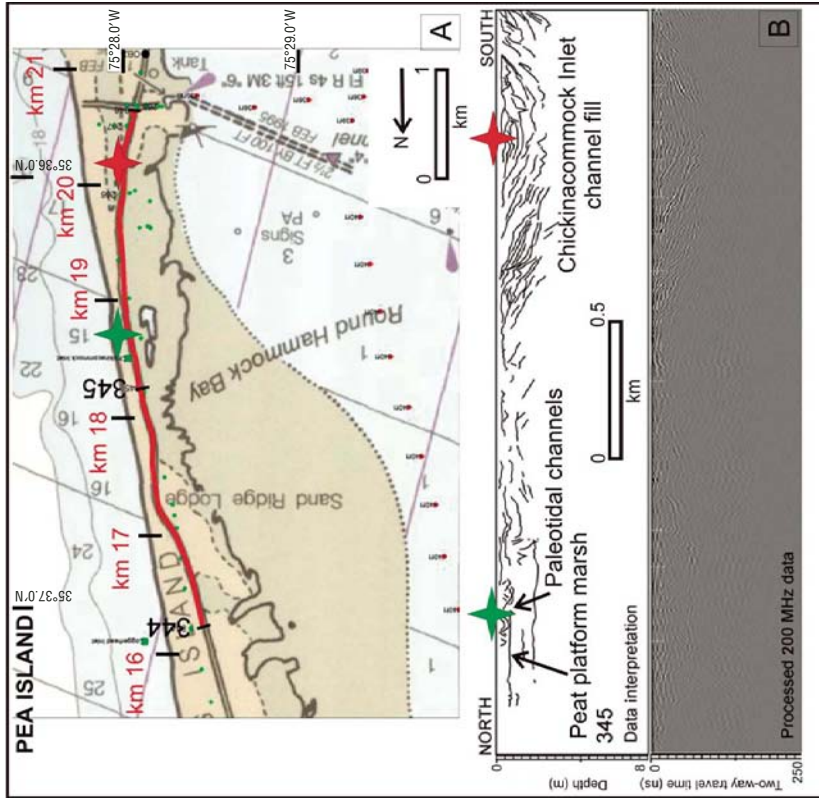


Figure 11. Ground-penetrating radar survey data were obtained along Highway 12 for the southernmost portion of Pea Island. The data show two distinctive patterns. The northern section is characterized by a horizontal reflection off the top of the underlying peat surface of the platform marsh with a few small tidal channels, all extending under the highway and adjacent beach. The southern section displays the Chickinacomack inlet channel. Data are from Smith (2006).

The North Carolina WPA and the USNPS erosion control project along 174 km of the northeastern North Carolina coast convened in 1935-1936 (Toll, 1934; Senter, 1939; Stratton et al., 1939). The purpose of the project was to "eliminate the flow of ocean water over the Banks" by constructing "a barrier sand dune along the crown of the beach" that would form a "windbreak to allow transplanting of vegetation in its lea on the sandy flats" (Stratton, 1943, p. 4). Within 12 mo, the project had succeeded in closing all "shallow, useless inlets...that are not of value to the fishing industry or for drainage purposes and invariably caused transportation difficulties" (Stratton, 1943, p. 6). The accomplishments of the shoreline protection project included 1258 km of constructed dune

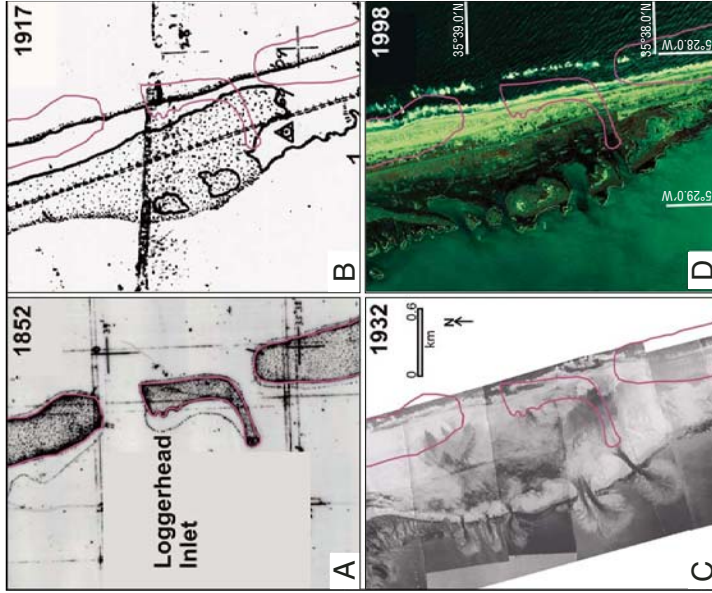


Figure 12. Georeferenced time-slice series. (A) 1852 U.S. Coast Survey map. (B) 1917 U.S. Coast Survey map. (C) 1932 aerial photograph mosaic. (D) 1998 infrared aerial photograph mosaic, shows how inlet and overwash processes interact through time in the historic Loggerhead Inlet segment of Pea Island. The figure shows the evolutionary succession from narrow inlet-dominated barrier (1852) to wide overwash-dominated system (1917 and 1932), to human-dominated system (1998). The purple line is the outline of the 1852 digitized shoreline that has been superimposed on each of the subsequent maps and photographs to show changes through time. The 1932 aerial photographs are from the U.S. Army Corps of Engineers, Field Research Facility, Duck, North Carolina.

ridges, >26.5 km² of grass plantings, >3.4 million tree and shrub plantings, and 120 km of dikes and jetties (Stratton, 1943).

Stratton and Hollowell (1940, p. 30) reported that "instead of a barren sand swept stretch of beach it has been transformed" by constructed barrier dune ridges that protect "the banks from the ocean" (Stratton and Hollowell, 1940, p. 6). According to Stratton (1943, p. 6) "results of the work were evident almost immediately. No longer do the ocean tides flow over the Banks to hinder traveling, wash away the beach, and kill out the vegetation. Transportation is no longer difficult, permitting increased numbers of visitors and tourists to flow into the area."

However, there was controversy over the North Carolina Beach Erosion Control Project as indicated by the memos from other agencies (Senter, 1939). For example, an official from the Branch of Historic Sites reviewed 35 historical maps and con-

cluded that the "historical appearance of the barrier islands remained much the same from 1585 to 1932" (Senter, 1939, p. 1). "If planting continues at the present pace, the historical appearance of the whole area will be changed...as a result of man-made intrusions." The act authorizing establishment of the Cape Hatteras National Seashore makes it clear that the purpose was to "preserve the area in its primitive condition for the benefit and inspiration of the people." An official from the NC Geological Survey (Senter, 1939) stated that efforts to close low swales extending across the islands concerned the local people who stated the following: (1) the swales were "safety valves when the water of the sounds rush toward the sea after being bottled up during storms;" (Senter, 1939, p. 6); (2) "natural forces are completely opposed to the formation of embankments" (Senter, 1939, p. 4) that are readily breached by water; and (3) it seems certain that

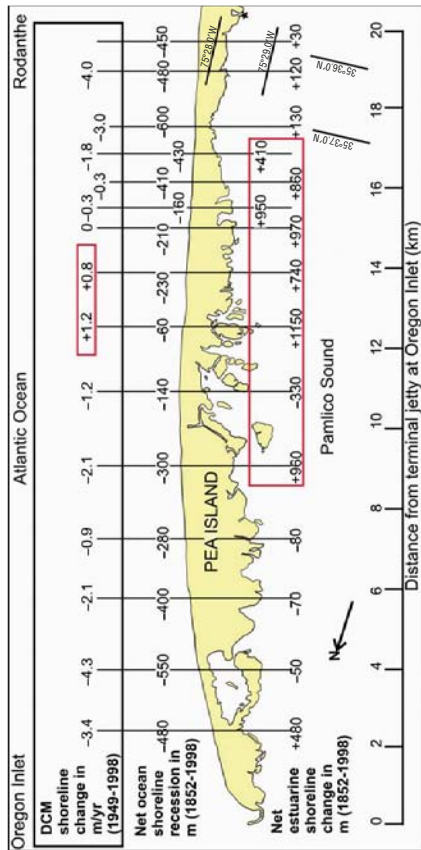


Figure 13. Map summarizes the shoreline change data for Pea Island National Wildlife Refuge. Upper row of numbers is the ocean shoreline annual change rate in m/yr developed by the North Carolina Division of Coastal Management for the period 1949–1998 derived from end-point analysis (Benton et al., 1997). The middle and lower rows are net ocean and estuarine shoreline change, respectively, in m, from 1852 to 1998 derived from evaluation of georeferenced time slices of topographic surveys and aerial photographs. The red boxes indicate portions of the shoreline characterized by accretion in two of the data sets.

the project “will be a never-ending one” (Senter, 1939, p. 4). The Geological Survey concluded with the question, “how far do we wish to go in completely counteracting natural conditions and forces, and how far do we go in preserving natural conditions” (Senter, 1939, p. 4).

Numerous researchers have demonstrated that overwash- and inlet-dominated barrier islands have never been covered by substantial vegetation (Dolan et al., 1973; Godfrey and Godfrey, 1976; Dolan and Lins, 1986; C. Frost, 1999, personal commun.; Riggs and Ames, 2007). Rather, the magnitude of storm dynamics and the frequent salt-water overwash and inlets along large segments of the Outer Banks continually reshape the coastal sand pile. Thus, the temporary halt of these dynamics with constructed dune ridges and vegetation plantings, in concert with subsequent beachfront development, has led to the artificial and temporary stabilization of the barrier islands. Today, the constructed dune ridges continue to be rebuilt during and after each major storm. Great numbers of bulldozers and earth-moving equipment are engaged in a constant effort to “hold the line” against the receding ocean shoreline (Fig. 17).

Acquisition of Large Land Tracts

Large segments of the barrier islands were acquired by various state and federal agencies for incorporation into historic monuments (Fort Raleigh National Historic Site and Wright

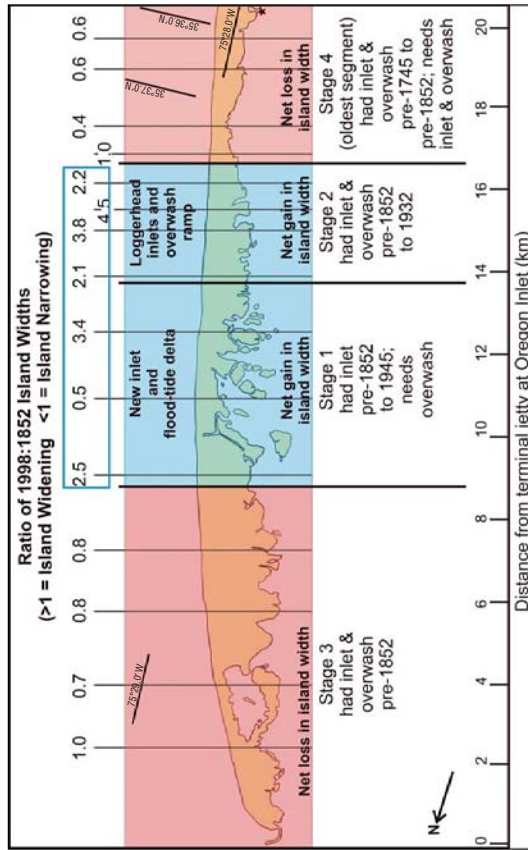


Figure 14. Map summarizes the four stages of evolutionary succession of Pea Island. The upper row of numbers is the ratio of 1998 island width to the 1852 island width based upon the georeferenced time-slice data. The evolutionary stages are based upon the width ratios, ages of inlet closure, and ages of subsequent overwash deposits. Island segments with blue overprints are the youngest (stages 1 and 2, respectively), which formed in the past 150 yr and are dominated by island widening. Island segments with red overprints (stages 3 and 4, respectively) formed prior to 150 yr ago and have since experienced island narrowing.

initially housed within the U.S. Department of Agriculture (Federal Register, 1938). The primary purpose of Pea Island National Wildlife Refuge is to be a refuge and breeding ground for migratory birds and other wildlife. Any other use of the refuge must be compatible with the “wildlife first” mission.

Infrastructure Construction

In the effort to begin developing the Outer Banks, the access problem had to be resolved. The first toll bridges and roads were built privately in the late 1920s and early 1930s (Roanoke Island to Nags Head causeway, the bridge from mainland Currituck to Kitty Hawk, and the road from Nags Head to Kitty Hawk). The state of North Carolina took over these facilities and built three more bridges (Croatan Sound, Alligator River, and Oregon Inlet) and paved the road from Nags Head to Ocracoke Village in the 1950s and early 1960s. The Outer Banks were now open to the outside world. This infrastructure opened the door for a real-estate boom that involved development of the tourist industry and its hotels, restaurants, and support businesses, as well as a building boom of beach cottages, second homes, and retirement homes.

An Act of Congress in 1951 granted North Carolina Department of Transportation (NCDOT) a permanent easement for Highway 12 through Pea Island National Wildlife Refuge with a 30 m right-of-way. However, most of the original Pea Island right-of-way was soon in the ocean due to ocean shoreline recession (D. Stewart, August 2007, personal commun.). In response, much of the original right-of-way has been moved westward into the refuge through time. In 1997, the U.S. Congress passed the National Wildlife Refuge System Improvement Act, which forbids uses incompatible with the mission and purpose of wildlife refuges. Thus, to remain in compliance with Federal law, Highway 12 cannot be moved further westward into the refuge.

In 1991, Stone et al. (1991) identified eight coastal “hot spots” along the Outer Banks where Highway 12 was increasingly damaged and/or destroyed and maintenance of the constructed dune ridges to protect Highway 12 was becoming increasingly more difficult. These eight locations were island segments where the highway either needed to be relocated or the beaches needed to be nourished in conjunction with reconstruction of the dune

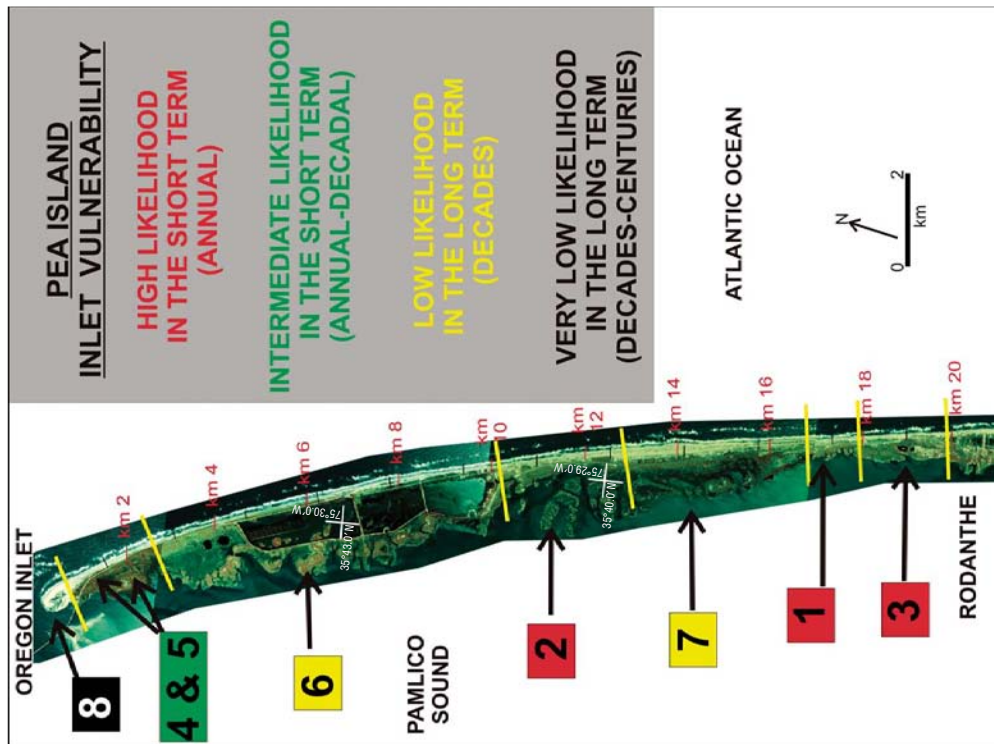


Figure 15. All of Pea Island is vulnerable to the opening of one or more inlets. This 1998 infrared aerial photograph mosaic extends from Oregon Inlet to Rodanthe and shows the relative likelihood of inlet formation (1—highest likelihood, 8—lowest likelihood). Each site is color coded for its inlet vulnerability.

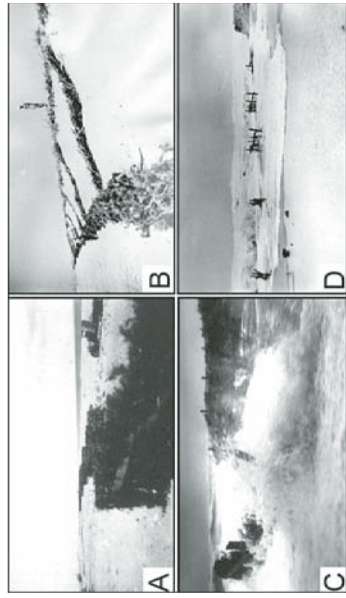


Figure 16. Historic photographs show the construction of barrier dune ridges by the Works Progress Administration (WPA) during the late 1930s on the low and flat overwash-dominated barrier islands using brush fences to trap sand (A–B). These structures are generally not in equilibrium with the storm beach and overwash dynamics and are generally scoured, ultimately breached (C), and overwashed by storm surges (D). Photographs are from Cape Hatteras National Seashore Archives.

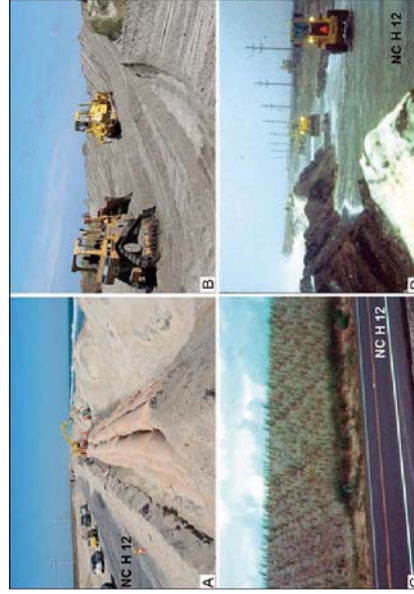


Figure 17. Photographs show the modern rebuilding of constructed barrier dune ridges to protect Highway 12 (A–C). (A) Recently adopted practice of building a sandbag core buried in the dune ridge. Because the constructed dune ridges are out of equilibrium with natural beach dynamics, the beach becomes increasingly steeper and narrower, resulting in more frequent storm surges eroding and overtopping the constructed dune ridge and jeopardizing Highway 12 (D). Photos in A, B, and C are by S.R. Riggs; photo in D is from Pilkey and Thieeler (1992).

ridges. Three of these coastal segments occur on Pea Island and will continue to cause severe problems for the future design and maintenance of Highway 12 (Fig. 18).

Engineering around Limits to Growth: 1960s to the Present

The human population and its effect on barrier-island dynamics began to increase as the economic development of the Outer Banks became a dramatic success story. According to the U.S. Census Bureau (USCB, 2007), between 1960 and 2000, the

Dare County population grew from 5935 to 29,967 (405%). The barrier-island system has become a severely modified and highly engineered system with little chance for the natural dynamics to play their critical role in barrier-island evolution as climate changes and sea-level continues to rise (Riggs and Ames, 2003; Horton et al., 2006, 2009; Kemp et al., 2009).

History of Oregon Inlet and Oregon Inlet Bridge

Oregon inlet opened during a hurricane in 1846 in the vicinity of the current Bodie Island Lighthouse (Fig. 1B) (Slick, 1980). This large and potentially useful inlet for navigation between

end of Pea Island was filled with sand, and the station itself was threatened by the eroding shoreline.

Private ferries carried people across Oregon Inlet until the bridge was completed in 1963. The Oregon Inlet bridge arches gracefully across the tumultuous waters moving between Pamlico Sound and the Atlantic Ocean (Fig. 2). The bridge was designed as a permanent structure on a fixed piece of land with a stable body of water and channel beneath it. Thus, it was poorly designed for a high-energy and dynamic coastal ocean environment including an inlet that was rapidly migrating southward, ocean shorelines that were receding at the highest rates in coastal North Carolina, and inlet channels and sand shoals that were as dynamic as the storms driving the coastal system.

The Ash Wednesday 1962 nor'easter occurred during an early stage of construction. The storm opened the inlet to its maximum width by eroding away the northern inlet spit. After the Ash Wednesday storm, the northern spit reformed but continued to oscillate in response to several smaller storms that caused the various inlet channels to migrate. Channel migration was problematic for the maintenance of a navigation channel within the fixed navigation span of the bridge, requiring increased levels of channel dredging. Migration of southern and northern lateral inlet channels caused the shallow bridge piles to be severely scoured, resulting in subsidence of major portions of the bridge. Re-piling of both the south (1978–1981) and north sides of the bridge (1989–1991) was required "to prevent the bridge's imminent collapse" (NCDOT, 1989, p. 19). In addition, a strong nor'easter blew a hopper dredge into the north end of the bridge in 1990, requiring several bridge spans to be rebuilt.

By 1989, erosion of the north end of Pea Island was about to leave the Oregon Inlet bridge isolated in Oregon Inlet. A rock jetty on the south side of Oregon Inlet and associated rock revetment around the southern inlet shoulder (Fig. 19) were proposed to stop the rapid southward migration of Oregon Inlet and alleviate the threat to the south end of the bridge (NCDOT, 1989). The report stated that the rock jetty would stabilize the northernmost 600 m of Pea Island ocean shoreline, but it would not stabilize the ocean shoreline further south. The environmental assessment report (NCDOT, 1989) concluded that construction of the rock jetty and rock revetment on the north end of Pea Island would have no significant adverse effects to biological resources, endangered and threatened species, recreation, cultural resources, water quality, and aesthetic resources either in the project area or up- or down-coast from the project. Therefore, an environmental impact statement was not prepared.

Construction of the rock jetty on the south side of Oregon Inlet was started in 1989 and completed in 1991. One condition of the permit for jetty construction was that NCDOT should monitor the shoreline position, sediment conditions, and associated beach organisms for the area extending 9.5 km south of the jetty. The shoreline monitoring was done by Fisher et al. (2004) and involved three data sets: (1) digital aerial photography of the monitored area flown every 2 mo from 1989 to 2004, (2) historical aerial photography from the 1940s to late 1980s as analyzed by

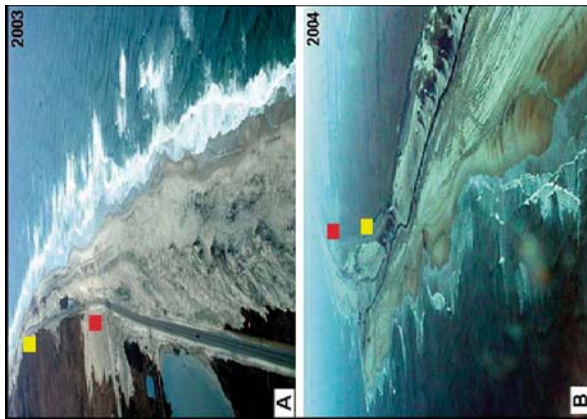


Figure 18. (A) 2003 oblique aerial photograph is looking north along the northern Pea Island "hot spot" (between km 1 and 2) and extends between the yellow (north) and red (south) squares. Highway 12 is immediately adjacent to the ocean beach that has a rapidly eroding shoreline (up to -2.5 m/yr) and substantial overwash. (B) 2004 oblique aerial photograph is looking south at a beach nourishment project using sand dredged from Oregon Inlet and in the same area as A. Photographs are from Pea Island National Wildlife Refuge.

the estuary and ocean has a well-documented history of migration and change since its initial opening. Inman and Dolan (1989) calculated the southward migration of Oregon Inlet between 1849 (date of the first topographic survey) and 1975 at an average rate of 23 m/yr for a distance of 2.9 km. The southward migration demonstrated an increased rate between 1975 and 1988, with an average rate of 54 m/yr for a total migration of 0.7 km. Next, the NCDOT (1989) documented a 0.35 km southward migration of the north end of Pea Island in a nor'easter during the winter of 1988–1989. The northern Pea Island ocean shoreline receded ~ 120 m during the same storm (NCDOT, 1989). This represents a total southward migration of Oregon Inlet between 1849 and 1989 of at least 4 km. By 1989, the south end of the Oregon Inlet bridge was being severed from Pea Island, the U.S. Coast Guard Station harbor on the north



Figure 19. (A) 1986 photograph shows the Oregon Inlet bridge and the rapidly "going-to-the-sea" road on the south shore resulting from the southward migration of Oregon Inlet. (B) 1992 photograph shows the rock revetment built in 1989–1991 around the south end of the bridge to secure it to Pea Island. (C) 1992 oblique aerial photograph shows the north end of Pea Island secured by the rock jetty and rock revetment. (D) Oblique aerial photograph shows the seaward end of the terminal jetty and the sand-filled inlet. The red stars in B–D indicate the location of the old U.S. Coast Guard Station and the approximate Oregon Inlet shoreline prior to construction of the jetty and revetment. Photographs are by S.R. Riggs.

R. Dolan, and (3) the North Carolina Division of Coastal Management (NCDCM) long-term annual erosion rate based upon shoreline change between the 1949 T-sheets and the 1998 digital aerial photography (Overton and Fisher, 2003).

Beach Erosion and Nourishment on Pea Island

The NCDCM produces a set of erosion rates for the entire North Carolina ocean coast based upon comparison of the wet-dry line between 1949 and 1998 end-point analysis (Benton et al., 1997). These shoreline change data for Pea Island are plotted along the length of Pea Island on Figure 20 as the 1949–1998 NCDCM data and show average shoreline change rates that range from $+1.5$ m/yr to -4.8 m/yr. Inman and Dolan (1989) measured the average rate of shoreline change from 1945 to 1986 for the 11 km Bodie Island coastal segment north of Oregon Inlet to be -2.2 m/yr and the 21 km Pea Island coast south of Oregon Inlet to be -2.6 m/yr.

The USACE (1993) has been maintaining the Oregon Inlet ocean bar channel through the ebb-tide delta since 1960 by using various side-cast, hopper, and pipeline dredges (Fisher et al., 2004). From 1980 to 1989, a hopper dredge was used to maintain a 39-m-wide navigation channel under the navigation span of the Oregon Inlet bridge. During this period, $\sim 650,000$ m³ of sand was removed and disposed offshore of the inlet into water depths in excess of 9 m (McCauley, 1993; Dolan et al., 2006). The practice of inlet dredging and offshore disposal resulted in a down-drift deficit for the adjacent beaches of Pea Island National Wildlife Refuge. The consequences of this deficit were (1) an increased rate of migration of the south shore of Oregon Inlet to 188 m/yr (McCauley, 1993) and (2) an increase in the rate of shoreline recession from an aver-

age of ~ 3 m/yr prior to the 1980 dredging to ~ 5.2 m/yr during the 1980–1989 period (Overton et al., 1992).

Offshore disposal of dredged sediment was discontinued in 1989 with construction of the rock jetty. From 1989 on, Oregon Inlet dredged materials were discharged to the northern portion of Pea Island. The material obtained by pipeline dredge was pumped to and placed directly on the subaerial beach between 1 and 4 km south of the jetty (D. Stewart, August 2009, personal communication; Figs. 18 and 20). The material obtained by hopper dredge was deposited offshore between 1.6 and 4.8 km south of the terminal grog in water depths ranging from 4.5 to 6 m. The actual amount of sand dredged from Oregon Inlet and placed on the Pea Island beach from 1989 to 2005 as reported in Dolan et al. (2004), FDH (2005), Dolan and Stewart (2006), and Dolan et al. (2006) is poorly known. Published values for beach discharge range from 0.5 to 3.8 million m³, while the nearshore disposal values range from 1.0 to 1.9 million m³. The most complete data set was supplied by the USACE (G. Williams, November 2007, personal communication), and stated the following: Slightly more than 3.4 million m³ of sand were dredged from Oregon Inlet in 21 operations between 1989 and 2005 and deposited as follows: 3.8 million m³ of sand were dredged and pipelined directly to the subaerial beaches in 10 operations, and 1.6 million m³ were removed by hopper dredge and deposited in the nearshore in 11 operations.

In addition, NCDOT mined sand from the sand fill behind the rock jetty and trucked it to the beaches ~ 8 km south of the jetty (D. Stewart and J. Jennings, October 2007, personal communication). In 1992–1993 more than 0.15 million m³ of sand were trucked to the beach for nourishment. In 1996–1997, ~ 0.38 million m³ of sand were mined for construction of new dune ridges at km 7 and 8 after Highway 12 was relocated to the west.

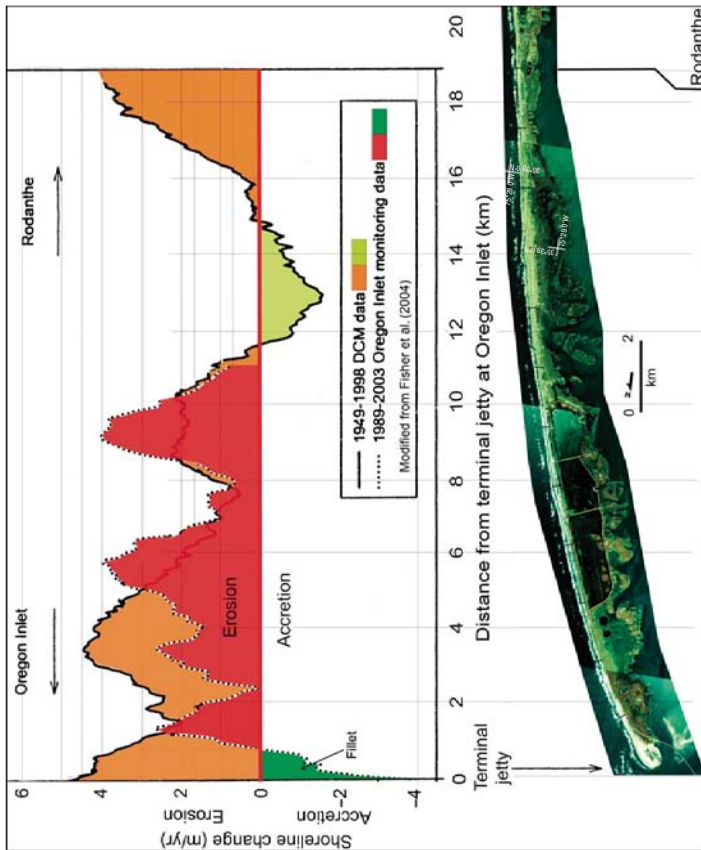


Figure 20. Shoreline erosion data for Pea Island, from Oregon Inlet to Rodanthe, are plotted along and georeferenced to the 1998 infrared aerial photograph of Pea Island. The 1949–1998 North Carolina Division of Coastal Management (NCDCM) shoreline erosion data are from Benton et al. (1997). The 1989–2003 Oregon Inlet shoreline erosion monitor data (northern half from Fisher et al., 2004) and the 1949–1998 DCM data (southern half) are colored red and orange, respectively, for erosion and dark green and light green, respectively, for accretion. Most of the beach nourishment and sand went on the beach between km 1–4, sandbags were utilized along the shoreline in the vicinity of km 7–11, and inlets were historically important in the area of the “short-term accretion anomaly” at km 11–15. Figure is modified from Fisher et al. (2004).

The FDH (2005) study utilized a dredged sand volume of 2.4 million m³ as compared to the USACE volume of 5.4 million m³, a significantly smaller volume of sediment. This is important because the FDH (2005) study utilized the smaller numbers for dredging and beach disposal as the basis for their economic analysis of beach nourishment and dune ridge construction for the new Oregon Inlet bridge and various Highway 12 alternatives across Pea Island through the year 2060 (NCDOT, 2005, 2007a, 2007b).

are the Fisher et al. (2004) shoreline accretion and recession data from 1989 to 2003. The shore segment for ~1 km immediately south of the jetty demonstrates accretion as the filllet was filled with sand and stabilized. However, the next 10 km of shoreline continues to erode at rates that range up to ~4 m/yr, with a general decrease in erosion rates from 1.5 to 5 km and a general increase from 5 to 10 km (Fig. 20). The monitoring studies by Dolan et al. (2004, 2006, p. 60) demonstrated that the “mean sand size of the beach has decreased significantly, the heavy mineral content has increased, and the numbers of the organisms indigenous to the active beach have and continue to decrease.” The NCDCM shoreline erosion rates (Benton et al., 1997) for the coastal segment between 15 and 19 km, at the southern Pea Island National Wildlife Refuge boundary with Rodanthe, have average rates of erosion that increase southward from 0 m/yr to ~4 m/yr at the refuge border (Fig. 20).

South of the monitored beach segment, between 11 and 15 km south of the terminal jetty and opposite historic New Inlet and Loggerhead Inlet, the erosion data of NCDCM (Benton et al., 1997) show a shoreline segment accreting at rates up to +1.5 m/yr (Fig. 20). The data for this coastal segment led Fisher et al. (2004), FDH (2005), and Overton and Fisher (2005) to conclude that the NCDCM erosion data represent a condition of permanent accretion that will be stable for the long-term future, while the adjacent segments continue to erode at rates up to ~4 m/yr. By making this assumption, the studies conclude that ~4 km of Highway 12 would not be threatened through year 2060. Thus, there would be no maintenance costs associated with moving the highway, elevating it onto a causeway or bridge, constructing dune ridges, or nourishing this beach segment (NCDOT, 2005, 2007a, 2007b). However, if the historic New Inlet and Loggerhead Inlet area were to remain as an accreting shoreline for the next 25, 50, or 100 yr, with the adjacent shorelines receding at rates up to ~4 m/yr, a headland or cape structure would form. This is not only highly improbable along one of the highest energy shorelines of the U.S. Atlantic margin, but this scenario is contradicted by the longer-term shoreline recession data of Smith et al. (2008) and the georeferenced time slice analyses of Riggs et al. (2010, in press).

Figure 12 is a georeferenced time-slice analysis that shows the evolution of the historic New Inlet and Loggerhead Inlet coastal segment from the 1852 topographic survey to the 1998 aerial photographs (Riggs et al., in press). The ocean shoreline in the “accretion zone” of Fisher et al. (2004), FDH (2005), and Overton and Fisher (2005) has gone through two stages of erosion (1852–1917 and 1932–1998) and a major stage of accretion between 1917 and 1932. Figure 21 approximately represents the “accretion zone”, and shows a detailed pattern of shoreline change during the generally recessionary period from 1932 to 1996. Notice that the ocean shoreline goes through stages of erosion and accretion that are dependent upon storm abundance and intensities, inlet openings and closings, and human activities associated with inlet dredging, beach nourishment, and dune-ridge con-

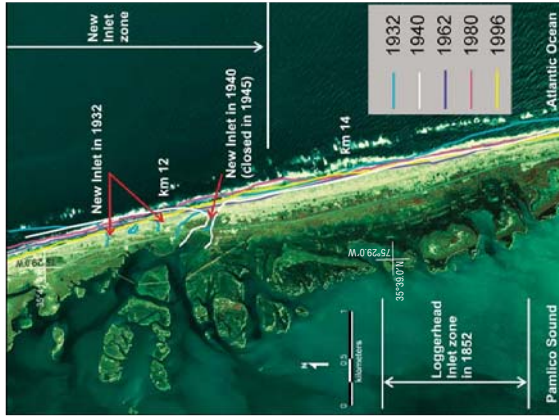


Figure 21. The georeferenced ocean shorelines for 1832, 1940, 1962, 1980, and 1996 are plotted on the 1998 infrared aerial photograph for historic New Inlet and northern historic Loggerhead Hills Inlet. These data show the general changing patterns of short-term erosion (1932–1962), accretion (1962–1980), and erosion (1980–1996). These alternating patterns generally follow the changing pattern of storm frequency for the Outer Banks as described by Riggs and Ames (2007). This entire map area is generally what Fisher et al. (2004), FDH (2005), and Overton and Fisher (2005) considered to be an accretion zone that will not be threatened through 2060 and, therefore, will require no beach nourishment, constructed barrier dune ridges, road relocation, or bridges.

struction. All of these processes interact through time to produce the complex short-term patterns of deposition and erosion. Even though the dates of the historic shorelines do not exactly match the time of the following events, there is a general correlation reflected in the patterns of accretion and erosion. Examples of changing processes that are reflected in the historic shorelines include the following:

- (1) The period from 1932 to 1962 was an intense storm period, while 1962–1971 was an extremely mild period in northern North Carolina (Riggs and Ames, 2007).
- (2) New Inlet was open, according to the 1932–1940 aerial photographs, with deposition along its north flank, erosion along its south flank, and sand in an ebb-tide delta. New Inlet closed in

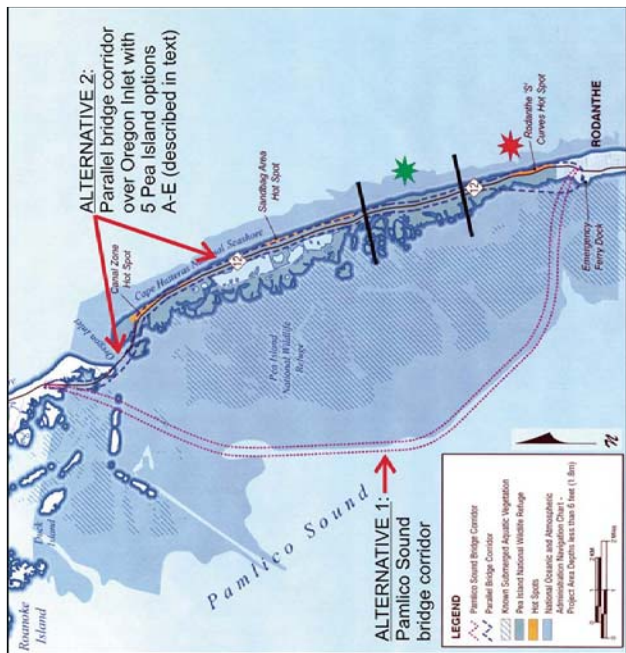


Figure 22. North Carolina Department of Transportation (NCDOT) map shows two major alternatives for the proposed Oregon Inlet bridge and Pea Island road. In alternative 1, Highway 12 would be built on a 27 km long bridge and causeway that crosses the Oregon Inlet, bypasses Pea Island, and crosses the Oregon Inlet flood-tide delta, bypasses Pea Island in the deeper water of Pamlico Sound, and comes onshore in the village of Rodanthe. The cost estimates of building and maintaining the Pamlico Sound bridge and causeway until year 2060 range from \$1.3 billion to \$1.8 billion. Alternative Two: Parallel Bridge. This alternative would cross Oregon Inlet adjacent and parallel to the current Oregon Inlet bridge. Five options (A through E) exist for Highway 12 on Pea Island, and estimated costs until year 2060, together with the bridge, range from \$602 million to \$1.6 billion. Options A through D for Highway 12 use beach nourishment together with constructed dune ridges to maintain a 69 m distance from the pavement edge to the ocean shoreline as "a critical buffer zone" (Overton and Fisher, 2005). These options will be built as needed and are based on the assumption that sand for beach nourishment is available from offshore borrow sites as described by Boss and Hoffman (2000). Unfortunately, these borrow deposits are very poorly defined. Option A will maintain the transportation corridor on Pea Island in its present location, utilizing beach

1945, followed by increased erosion along the north shore and deposition of ebb-tide delta sands on the south shore.

(3) The period from 1980 to 1989 was a time of increased dredging activity in Oregon Inlet with offshore disposal, whereas during subsequent years (1989 to the present) most dredged sediment either was pumped onto the subaerial beach or discharged into the shallow offshore waters of the northern 5 km of Pea Island. From 1989 to the present, ~5.9 million m³ of sand have been placed either on the subaerial beach or in the shallow littoral system.

According to this analysis, the net shoreline change over the period between 1852 and 1996 for the "accretion zone" in the historic New Inlet and Loggerhead Inlet segment is net recession that ranges between ~75 and ~150 m. These data suggest that the long-term planning for Highway 12 based upon the assumption of an accreting beach in the historic New Inlet and Loggerhead Inlet area is inadequate.

The southern 4–4.5 km of Pea Island (Figs. 12 and 20) is commonly referred to as the S-curves due to previous road relocations, and continues today to require extreme efforts to protect the highway. This area contains paleo-inlet deposits (Figs. 5, 10, and 11), is the portion of the island that is most vulnerable for new inlets (Fig. 15), and has among the highest ocean shoreline erosion rates in North Carolina (Figs. 13 and 20). In addition, this island segment is in stage-4 of its evolutionary cycle (Fig. 14) and would benefit from one or more new inlets and abundant overwash in the near future to maintain island integrity.

Oregon Inlet Bridge and North Carolina Highway 12 Alternatives

NCDOT held a public hearing in February 2007 in which they presented two main alternatives for a new Oregon Inlet bridge and Highway 12 across Pea Island (Fig. 22).

Alternative One: Pamlico Sound Bridge and Causeway. This alternative consists of a 27 km bridge and causeway that crosses the Oregon Inlet flood-tide delta, bypasses Pea Island in the deeper water of Pamlico Sound, and comes onshore in the village of Rodanthe. The cost estimates of building and maintaining the Pamlico Sound bridge and causeway until year 2060 range from \$1.3 billion to \$1.8 billion.

Alternative Two: Parallel Bridge. This alternative would cross Oregon Inlet adjacent and parallel to the current Oregon Inlet bridge. Five options (A through E) exist for Highway 12 on Pea Island, and estimated costs until year 2060, together with the bridge, range from \$602 million to \$1.6 billion. Options A through D for Highway 12 use beach nourishment together with constructed dune ridges to maintain a 69 m distance from the pavement edge to the ocean shoreline as "a critical buffer zone" (Overton and Fisher, 2005). These options will be built as needed and are based on the assumption that sand for beach nourishment is available from offshore borrow sites as described by Boss and Hoffman (2000). Unfortunately, these borrow deposits are very poorly defined. Option A will maintain the transportation corridor on Pea Island in its present location, utilizing beach

nourishment and constructed dune ridges. Option B will relocate Highway 12 west of the predicted 2060 shoreline. The northern section will utilize beach nourishment and constructed dune ridges, and the southern section will utilize a bridge built on the island to allow for overwash and inlet dynamics to take place beneath it. Option C is similar to option A, except the southern section will utilize a back-barrier bridge to move Highway 12 off the barrier for the southern 4–4.5 km in Pea Island National Wildlife Refuge to the village of Rodanthe. Option D is similar to option B, except the southern section will utilize a back-barrier bridge similar to option C. Option E acknowledges the high erosion rates of the ocean shoreline, narrowness of the island, and high likelihood for inlet(s) to open within the southern section of Pea Island. This option will maintain Highway 12 in its present location with a bridge and/or raised causeway along the northern section of Pea Island to allow normal overwash and inlet dynamics to take place. The southern section will utilize a back-barrier bridge as in options C and D.

DISCUSSION AND CONCLUSIONS

At present, the North Carolina Outer Banks owe their recovery from summer hurricanes and winter nor'easters to an army of bulldozers that clear the sand off Highway 12. Dredges, trucks, and even more bulldozers stand by to mine the overwash sand, rebuild the barrier dune ridges, and close new inlets that may open along what Pilkey et al. (1998) called the "restless ribbon of sand." However, those concerned about the long-term future of our barrier-island resources, and the lifestyle and tourist economy they support, must understand and accept the critical role of natural coastal dynamics in ensuring that future.

Flying over the Outer Banks after major storms, it is clear that many barrier-island segments are little more than a conveyance for Highway 12, the lone road that shuttles residents and tourists to and from the eight villages nestled between the Cape Hatteras National Seashore and Pea Island National Wildlife Refuge segments. Use of constructed dune ridges to "reduce the frequency and degree of flooding and overwash during extreme storms" as proposed by Overton and Fisher (2005, p. 23) prevents critical natural barrier-island maintenance and evolution in a setting of increasing rates of sea-level rise (Kemp et al., 2009; Horton et al., 2009; Riggs et al., in press). In addition, the constructed dune ridges prevent the natural, overwash- and inlet-driven evolution of habitats that constitute a major component of the "mission and purpose" of both Pea Island National Wildlife Refuge and Cape Hatteras National Seashore. Piping plovers, oyster catchers, black skimmers, and numerous species of terns and turtles are critically dependent upon overwash and inlet habitats. These natural barrier-island processes are crucial for improving estuarine water quality, increasing productivity, and supporting coastal fisheries. Unfortunately, these are not always factors in the thinking of Federal, state, or local agencies that are under pressure to maintain the transportation infrastructure to underpin the concept of ever-increasing economic growth.

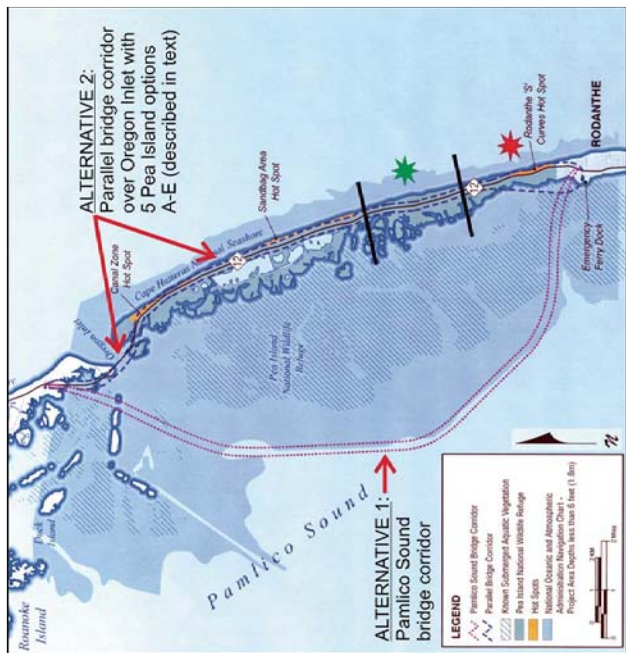


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However, there is no status quo on dynamic barrier islands. They continually evolve in response to storms and ongoing sea-level rise. "Holding the line" with the Highway 12 corridor on these barrier islands is a form of stabilization that prevents the islands from keeping up with sea-level rise. The constructed dune ridges and highway roadbed deprive the back barrier of storm overwash sand. The long-term consequence is island narrowing, which ultimately can lead to the collapse of island segments. Adding fuel to the fire is the fact that the small villages within the Pea Island National Wildlife Refuge and Cape Hatteras National Seashore continue to be developed with larger houses and ex-

panding businesses, which become increasingly dependent upon the unstable Highway 12 corridor.

As soon as storm waves break through the constructed dune ridges and cover Highway 12 with sand, bulldozers begin moving the sand back into the dune ridges. Often, the entire body of overwash sand, which may extend across the full width of the island, is bulldozed back to reconstruct even larger or multiple dune ridges. Ironically, these constructed dune ridges may be partially responsible for increasing the shoreline erosion along the Outer Banks. The constructed dune ridges are out of equilibrium with the natural storm beach and, consequently, act like a seawall until they are

well as the U.S. National Park Service, U.S. Fish and Wildlife Service, Environmental Defense, N.C. Division of Coastal Management, and N.C. Division of State Parks and Recreation.

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APPENDIX 1. DEVELOPMENTAL CHRONOLOGY OF THE PEASLAND-OREGON INLET-BODIE ISLAND BARRIER-ISLAND SYSTEM

The following chronology for the three barrier-island segments is based upon the historical record starting in 1775, as well as specific historical studies including the entries listed in the references cited. Various state and federal agencies have produced many documents over the last four decades concerning Oregon Inlet and Pea Island; this chronology highlights only the most important events and reports.

Ca. 1775: Chidimaconnock Inlet on Pea Island closed naturally.

1846: Oregon Inlet opened during a hurricane on 7 September 1846 in the vicinity of the current Bodie Island lighthouse. It migrated southward about 4 km between 1849 and 1989.

1848: First Bodie Island lighthouse was built on the south side of Oregon Inlet and was subsequently destroyed prior to 1859 as the inlet migrated southward.

1849–1866: First detailed topographic survey of the northern Outer Banks from the Virginia State line to Ocracoke Inlet by the U.S. Coast Survey.

1859: Second Bodie Island lighthouse was built on the south side of Oregon Inlet and was destroyed during the Civil War.

1870: Loggerhead Inlet on Pea Island closed naturally.

1872: Third and current Bodie Island lighthouse was built on the north side of Oregon Inlet.

1899: Major overwash ramp buried the Loggerhead Inlet flood-tide delta, probably during the 1899 hurricane.

1923: New Inlet on Pea Island closed naturally.

1924: North Carolina Fisheries officials attempted to open New Inlet artificially without success.

1928: Manteo Causeway bridge was built across Roanoke Sound as a private toll road from Roanoke Island to Whalebone Junction in Nags Head.

1936: Wright Memorial bridge was built across Currituck Sound as a private toll road.

1936: A hard-surfaced road was built from Manteo to the Manteo Causeway.

1931: A hard-surfaced road was built on the barrier island between Whalebone Junction in Nags Head and Kitty Hawk and connected the Manteo Causeway and Wright Memorial bridges.

1932: New Inlet on Pea Island was reopened by two hurricanes.

1932: First aerial photographs of the Outer Banks were flown from Kitty Hawk to Rodanthe after the 1932 hurricanes.

1934: Federal Emergency Relief Administration began an erosion-control project along several kilometers of Currituck County

changing dynamics of inlets, storm patterns, and human modification activities within each coastal segment.

7. Highway 12 will continue to be severely impacted on a regular basis by individual storm events and, in the longer term, by ongoing sea-level rise. The barrier island will continue to migrate westward, forcing the westward movement of Highway 12 deeper into the heart of Pea Island National Wildlife Refuge. This will further jeopardize the refuge function and prevent the natural barrier-island functions of overwash and inlet openings and closings.

8. Attempts to “hold the line” with a new Oregon Inlet bridge and Highway 12 across Pea Island for the next 50–100 yr could lead to collapse of extensive segments of Pea Island. If this occurs, there will be a very expensive “dead-end” bridge and road system. Eight villages will be isolated, and the coastal economy will be severely damaged.

During the past 500 yr, Pea Island has been dominated by numerous inlets and development of extensive flood-tide deltas, massive overwash depositional fans, and high rates of ocean shoreline recession, all integral elements of island migration. These natural processes are driven by hurricanes and nor easterly winds and are crucial for both the short-term health and long-term evolution of the barrier island. Prior to the 1930s, natural dynamics controlled the evolution of the barrier islands. However, beginning in the mid-1930s, the Outer Banks began to be managed for their economic development. Thus, the barrier islands rapidly became dominated by human modifications designed to “lock the barrier islands in place” and to “minimize the impacts of storms.”

Today, Pea Island has become the “eye of a human hurricane” driven by a vision of unlimited growth and development in support of North Carolina’s coastal economy. This growth is on a collision course with an increasing rate of sea-level rise and escalation of storm impacts. For the long-term health and, indeed, survival of our dynamic coastal system, we must develop new approaches to coastal management that blend the development, utilization, and maintenance of the economic infrastructure with the natural dynamics of climate change, including sea-level rise, increased storm frequency, shoreline recession, and habitat evolution and migration.

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posited in the shallow near shore off the northern 4 km of Pea Island. From 1989 to 2005 approximately 5.6 million m³ of sediment was dredged from Oregon Inlet in 21 operations (1.7 million m³ by hopper dredge and 3.9 million m³ by pipeline dredge and discharged to the shallow near shore and beach segments, respectively, in the northern 1 to 4 km segment of Pea Island). An additional 0.4 million m³ of sediment was mined from the inlet and placed on the beach in the 7 to 8 km area south of the terminal jetty. From 2006 to 2009 approximately 2.3 million m³ of sediment was dredged from Oregon Inlet in 6 operations (0.9 million m³ by hopper dredge and 1.4 million m³ by pipeline dredge and discharged to the shallow near shore and beach segments, respectively, in the northern 1 to 4 km segment of Pea Island) (D. Stewart, September 2009, personal commun.). This represents a total of 10.7 million m³ of sediment (5.0 m³ placed by hopper dredge in the shallow near shore and 5.7 million m³ placed directly on the beach by pipeline dredge) placed on the eroding downdrift beaches of northern Pea Island.

3. Construction of the terminal jetty on the south side of Oregon Inlet stabilized the beach for the first kilometer of Pea Island south of Oregon Inlet. The monitored shoreline from 1 to 11 km south of the Oregon Inlet terminal jetty continues to erode at rates that range up to 4 m/yr. The 1 to 5 km beach segment saw a general decrease in erosion rates from highs of 5 m/yr to highs of 2.5 m/yr due to the extensive and regular discharge of beach nourishment sand primarily to the 1 to 4 km beach segment (conclusion 2). However, the beach erosion rates within the monitored segment from 5 to 10 km have generally increased substantially compared to pre-jetty rates (from 2 to 3 m/yr to 2 to 4 m/yr) in spite of the frequent upstream beach nourishment, installation of sand bags, and construction of barrier-dune ridges.

4. The accretion anomaly within the NC Division of Coastal Management data (coastal segment 11.5 to 15 km south of the terminal jetty) is only a short-term anomaly that is a direct response to inlet dynamics associated with the historical New and Loggerhead Inlets. The long-term changes demonstrate a net landward recession.

5. The construction of the terminal jetty on the south side of Oregon Inlet has not, by itself, trapped any sand on the downdrift beaches of Pea Island beyond the first km. In fact, the terminal jetty has not stopped the processes of shoreline erosion along the Pea Island ocean shoreline from 1 to 5 km. The many additional human modification efforts (e.g., beach nourishment, road bulldozing, barrier dune ridge maintenance and construction, sand bag placements, and highway relocations) locally ameliorated and temporarily stopped the net shoreline recession within this segment. However, within the km 5 to 10 segment, erosion rates have substantially increased and shoreline recession continues in direct response to the dredging of Oregon Inlet and construction of the terminal jetty.

6. In evaluating barrier island shoreline changes through time, it is absolutely essential to take into consideration the

eroded away as the beach returns to an equilibrium profile. Constructed dune ridges cause beaches to steepen and erosion rates to increase, and they prevent storm overwash from delivering sand to the mid- and back-barrier areas. In response, the islands narrow and the scale of reconstruction and/or sound-ward relocation of the highway corridor escalate. With time, the relative proportion of the barrier islands dominated by the Highway 12 corridor increases at the expense of the basic functions of both the Pea Island National Wildlife Refuge and Cape Hatteras National Seashore.

To preserve the villages and barrier islands, as well as the Pea Island National Wildlife Refuge and Cape Hatteras National Seashore, society must learn to live with natural barrier-island dynamics. Buildings will have to be moved back as coastal erosion continues, and if inlets form, alternative modes of transportation should be developed, such as temporary back-barrier bridges or modern ferry and water-taxi systems. As sand covers the highway, it should remain there, and the new road should be reconstructed at higher elevations, perhaps with a clay-gravel surface or the use of airport-runway matting. As existing constructed dune ridges are destroyed by storms, they should not be rebuilt, thus bringing the islands back to a more dynamically stable, natural state.

Most importantly, National Wildlife Refuges and National Seashores must remain under the control of their parent federal agencies to carry out their primary missions for the benefit of all. Managers of the Pea Island National Wildlife Refuge and Cape Hatteras National Seashore must have the authority and support to allow these barrier islands to function naturally and to manage them for their long-term evolution. However, to do this, they need strong public backing to overcome local economic pressures and the attitude that the prime function for these public lands is to provide a transportation corridor for development of private lands. In addition, the size, density, and type of development occurring within the isolated villages must be governed by the “natural limits to growth” (Riggs and Ames, 2003) dictated by the natural dynamics of barrier-island systems. If we hope to maintain a healthy coastal economy based upon a viable barrier-island system as the global climate changes and sea level continues to rise, we must learn to live by the islands’ rules.

The Pea Island ocean shoreline continues to recede at rates that are among the fastest in North Carolina, in spite of the frequent reconstruction of barrier dune ridges since the late 1930s, routine Oregon Inlet dredging since 1960, and the frequent beach nourishment projects since 1990. Based upon the data and discussion presented here, several conclusions are clear concerning the long-term future of the Oregon Inlet bridge and Highway 12 across Pea Island National Wildlife Refuge.

1. The terminal jetty has stopped the southerly migration of Oregon Inlet, and the rock revetment has protected the base of the present Oregon Inlet bridge.

2. From 1960 to 1982 an unknown amount of dredged Oregon Inlet sediment was discharged offshore in deep water. From 1983 to 1988 approximately 2.4 million m³ of sediment was dredged in 8 operations by hopper dredge and de-

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2002: The CEQ of the GAO produced the Report to Congressional Requesters in September 2002: Oregon Inlet Jetty Project. Environmental and Economic Concerns Still Need to Be Resolved (GAO, 2002).

2004: The NCDOT Bridge Inspection Report rated the current condition of 100 The Inlet bridge as "poor", with a sufficiency rating of 2 out of 100. The bridge was classified as structurally deficient with a remaining 2.1 year practical service life.

2005: The North Carolina General Assembly passed legislation (House Bill 747) for expediting and accelerating the efficient, cost-effective completion of the Oregon Inlet bridge replacement. Supplemental Draft Environmental Impact Statement and Draft Section 4(f) Evaluation for NC 12 Replacement of Herbert C. Bonner (Oregon Inlet) Bridge was submitted to NCDOT.

2007: Supplemental Draft Environmental Impact Statement and Draft Section 4(f) Evaluation for NC 12 Replacement of Herbert C. Bonner (Oregon Inlet) Bridge was submitted to NCDOT.

2007: Supplemental Draft Environmental Impact Statement and Draft Section 4(f) Evaluation for NC 12 Replacement of Herbert C. Bonner (Oregon Inlet) Bridge was submitted to NCDOT.

2007: Supplemental Draft Environmental Impact Statement and Draft Section 4(f) Evaluation for NC 12 Replacement of Herbert C. Bonner (Oregon Inlet) Bridge was submitted to NCDOT.

2007: National Environmental Policy Act (NEPA)/Section 404-Meager Meaning Document for NC 12 Replacement of Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet was submitted by NCDOT.

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1981-1983: The Department of Interior requested the U.S. Army Corps of Engineers to study a "dredging-only alternative", along with design changes for the proposed two jetty alternatives. The USACE (1983) report concluded that the dredging-only alternative was "functionally infeasible" and would produce "catastrophic and unacceptable" beach erosion.

1983: The U.S. Army Corps of Engineers published Supplement I to the Phase II GDM for the Oregon Inlet Jetty Project.

1984: The Outer Banks Erosion Task Force Report recommended that hard structures not be allowed as beach nourishment, and that only temporary measures (e.g., beach nourishment, sandbag bulkheads, and beach pushing) be allowed to protect structures until they can be moved landward or until the effect of a short-term erosion event has passed.

1985: The U.S. Army Corps of Engineers published the Final Environmental Impact Study (EIS) for the Oregon Inlet Jetty Project.

1989-1991: Severe channel scour eroded support piles on northern portions of the Oregon Inlet bridge, requiring this portion of the bridge to be replaced.

1989-1991: The North Carolina Coastal Resources Commission (CRC) issued a variance to NCDOT, and the USFWS issued a right-of-way permit to NCDOT for construction of a 637.5 m rock jetty on the north end of Pea Island National Wildlife Refuge. The U.S. Army Corps of Engineers issued permits to NCDOT for construction of the rock jetty, which was completed in 1991. The purpose of the rock jetty was to stop the southward migration of Oregon Inlet and protect the southern end of the Oregon Inlet bridge.

1989-2006: The U.S. Army Corps of Engineers dredged 5.35 million m³ of sediment from Oregon Inlet; 3.75 million m³ of sediment were placed on the Pea Island National Wildlife Refuge subaltern beaches by pipeline dredging, and 1.61 million m³ of life Refuge beaches in 4.5-6 m water depths by hopper dredges.

1989-2006: A physical and ecological monitor program was carried out for the 9.5 km beach zone south of the rock jetty on Pea Island National Wildlife Refuge.

1990: A hopper dredge used to maintain the Oregon Inlet channel was blown into the bridge during a storm, destroying several bridge spans.

1990: The U.S. Army Corps of Engineers published its third economic analysis for the Oregon Inlet Jetty Project.

1991: An NCDOT study (Stone et al., 1991) defined six critical sections or "hot spots" along Highway 12 between Oregon Inlet and southwest Ocracoke Island. Three of the "hot spots" were on Pea Island and included from north to south: northern Pea Island, southern Pea Island, and Rodanthe S curves.

1995: The U.S. Army Corps of Engineers published a Feature Design Memorandum on the Sand Management Plan for the Oregon Inlet Jetty Project.

1997: U.S. Congress passed legislation that prohibited construction of roads within National Wildlife Refuges that interfere with the primary refuge functions.

2001: The U.S. Army Corps of Engineers published the final versions of Supplement II to the Phase II GDM and Supplement III to the EIS for the Oregon Inlet Jetty Project. These documents shortened both jetties to 3000 m in length, eliminated the sand-blocking central barrier within each jetty, and added a 300 m weir section and 24.3 ha depositional basin in the north jetty.

beaches. The constructed barrier dune ridges were destroyed by high tides within a few months (Toil, 1934).

1935: North Carolina enacted legislation to prohibit stock from running wild on the barrier islands of Dare County.

1935-1940: North Carolina Works Progress Administration (WPA), under the supervision of the National Park Service, started an erosion-control project to construct barrier dune ridges along 174 km of the North Carolina coast extending from the Virginia State line through Currituck, Dare, and Hyde Counties.

1937: U.S. Congress passed legislation authorizing development of the Cape Hatteras National Seashore within the U.S. National Park Service; the nation's first national seashore.

1938: Franklin D. Roosevelt established the Pea Island Migratory Waterfowl Refuge at the north end of Hatteras Island by executive order, to further the purposes of the Migratory Bird Treaty Act of 1918.

1945: New Inlet on Pea Island closed naturally after a wooden bridge was constructed across the flood-tide delta.

1950: U.S. Congress authorized the U.S. Army Corps of Engineers through the River and Harbor Act of 1950 (Public Law 81-516), to dredge the Oregon Inlet ocean bar navigation channel to 4.2 m depth as part of the Maneau Shallowing Bay, North Carolina project.

1951: North Carolina Coastal Highway 12 was built from Nags Head to Oregon Inlet.

1952-1955: North Carolina Coastal Highway 12 was built from Oregon Inlet to Ocracoke Village.

1955: U.S. Congress officially established Cape Hatteras National Seashore.

1955: The bridge across Croatan Sound was completed from Mann's Harbor to the north end of Roanoke Island.

1959: Oregon Inlet fishing center was built.

1959: The bridge across Alligator River was completed from Tyrell County to Dare County.

1962-1963: The 3.9-km-long bridge across Oregon Inlet was constructed from Bodie Island to Pea Island, replacing the private ferry operating across the inlet.

1963: U.S. Congress adopted a resolution to initiate a study of the Oregon Inlet jetty project.

1970: U.S. Congress authorized the U.S. Army Corps of Engineers through the River and Harbor Act of 1970 (Public Law 91-611, Section 101), to proceed with the Oregon Inlet jetty project to deepen the ocean bar navigation channel from 4.2 to 6 m, stabilize the inlet with two jetties, provide a means to bypass sand across the inlet, and create a 607 ha harbor at Wanchese.

1977: U.S. Army Corps of Engineers published Phase I of the General Design Memorandum (GDM): Plan Formulation for the Oregon Inlet Jetty Project.

1978: North Carolina awarded the contract for construction of the Wanchese Harbor and the development of a "seafood industrial park."

1978-1981: Severe channel scour eroded support piles on the southern end of the Oregon Inlet bridge, causing bridge subsidence; this portion of the bridge was replaced.

1979-1980: U.S. National Park Service formed a Coastal Advisory Committee (Inman Panel) to study the U.S. Army Corps of Engineers Oregon Inlet Jetty Project. The panel issued its first report, which concluded that the project would adversely affect the adjacent shoreline environments. The panel's second report was titled "Potential Effects of the Proposed Oregon Inlet Jetties on Shore Processes along the Outer Banks of North Carolina."

1980: The U.S. Army Corps of Engineers published Phase II of the GDM: Project Design for the Oregon Inlet Jetty Project.

1980-1989: The Oregon Inlet navigational channel was maintained under the high bridge span by hopper dredge with the sand discharged in offshore water depths >9 m off the inlet.

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Welcome to Dare County ... [land of beginnings](#) | [Home](#) | [Directory](#) | [Contact Us](#) | [Comments](#) | [Links](#)
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Public Information Files | Text Menu | Departments

Emergency Management Bulletins

Coastal Storm

Dare County Bulletins | Storm Position | National Weather Service | Public Information Guide
 Contact Information | Emergency Management (252) 475-5655

BULLETIN NUMBER: 4 **DATE/TIME: 11/13/2009 11:43:21 AM**

COASTAL STORM UPDATE

A State of Emergency has been declared for all of Hatteras Island. The declaration, issued at 11:00am by Commissioner Mike Johnson, the Chairman of the Dare County Control Group, provides access to additional resources.

NC Highway 12 is closed at the Oregon Inlet Bridge with no passage available through the Pea Island National Wildlife Refuge to the Rodanthe area. At this time, it is not known when Highway 12 to Hatteras Island will reopen. North Carolina DOT is on-scene working to clear sand and water from the roadway.

Ferry service between Hatteras Village and Ocracoke has been suspended. For updates on ferry service, call 1-800-BY-FERRY.

Along the Outer Banks, expect water on roads in areas prone to flooding. Drivers should proceed with caution.

In Kill Devil Hills and Kitty Hawk, NC Highway 12, known as the Beach Road, has portions closed.

Old Oregon Inlet Road in South Nags Head is open to residents and property owners.

NC Highway 12 is open from Southern Shores to Corolla.

There are no reports of power outages. If you experience power outages, contact your power company to report the outage. The Northern Beaches and Manteo should contact Dominion North Carolina Power at 1-888-667-3000. Hatteras Island should contact the Cape Hatteras Electric Cooperative at 866-511-9862. Mainland Dare residents should contact Tideland Electric at 252-943-3046.

The Dare County Center will close today at 5:00pm with no after hours activities.

In order to keep 911 phone lines open for emergency communications, please do not call 911 for general inquiries. 911 should be used only for emergencies.

Dare County Emergency Management will continue to closely monitor the situation and issue advisories as needed. Updates are available at www.darenc.com, Cable Channel 20 and NOAA Weather Radio.

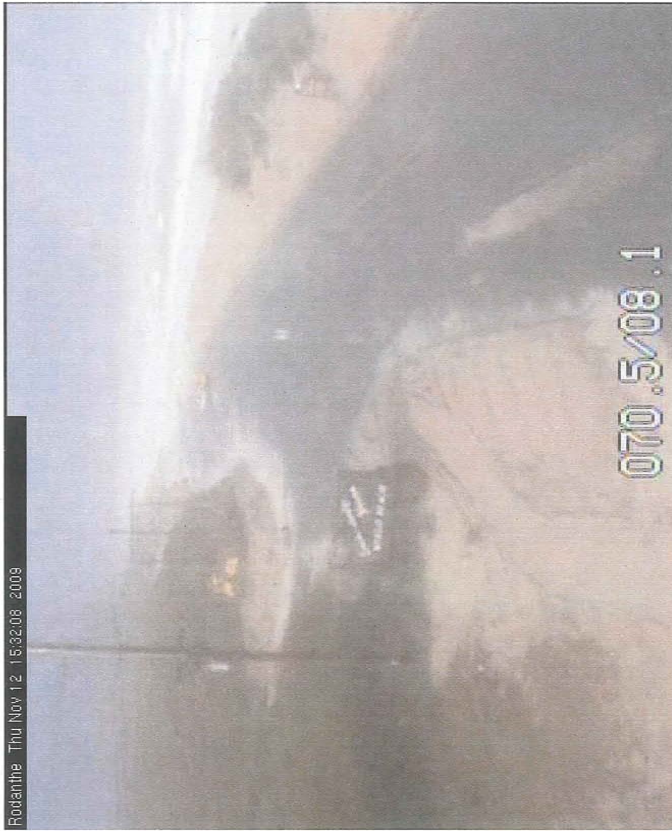
EXHIBIT B

The S-Curves at Rodanthe

Welcome. You are viewing a live feed from The S-Curves in Rodanthe, North Carolina.

This page automatically refreshes itself every 15 seconds.

Rodanthe Thu Nov 12 15:32:08 2009



The S-Curves at Rodanthe

Welcome. You are viewing a live feed from The S-Curves in Rodanthe, North Carolina.

This page automatically refreshes itself every 15 seconds.



U.S. Department
of Transportation
Federal Highway
Administration

North Carolina Division

October 12, 2009

310 New Bern Avenue, Ste. 410
Raleigh, North Carolina 27601
Phone: 919-898-4346
FAX: 919-747-7030
HTTP://www.FHWA.DOT.GOV/NCDDIV

In Reply Refer To:
HDA-NC

Mr. Derb S. Carter, Jr., Director
Southern Environmental Law Center – NC and SC Offices
200 West Franklin Street Suite 330
Chapel Hill, North Carolina 27516-2559

Dear Mr. Carter:

The Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) are currently developing environmental studies for compliance with the National Environmental Policy Act and other environmental laws for the replacement of the Herbert C. Bonner Bridge over Oregon Inlet in Dare County, North Carolina (I. P. No. B-2500). On September 17, 2008, FHWA approved a Final Environmental Impact Statement (FEIS) and Final Section 4(f) Evaluation for this project. The Southern Environmental Law Center provided comments on the FEIS/Final Section 4(f) Evaluation. After consideration of your comments along with comments received from others, FHWA and NCDOT have been working with federal and State regulatory and resource agencies to address comments and concerns regarding the FEIS/Final Section 4(f) Evaluation. A change resulting from additional interagency coordination is the Preferred Alternative. Now, the Preferred Alternative is the Parallel Bridge Corridor with the NC 12 Transportation Management Plan.

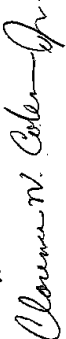
The FHWA and NCDOT have revised our Final Section 4(f) Evaluation based on additional interagency coordination and new information regarding the history of the development of the roadway, Cape Hatteras National Seashore and the Pea Island National Wildlife Refuge. Enclosed, please find for your review the Revised Final Section 4(f) Evaluation. We are requesting that you provide your comments by November 13, 2009 on this Revised Final Section 4(f) Evaluation. All comments received will be reviewed and given full consideration prior to the approval of the use of any Section 4(f) property in the Record of Decision (ROD).

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative will also be the subject of an Environmental Assessment to identify and assess changes that have occurred since the FEIS was approved, and to determine whether the impacts associated with these changes are significant. We expect to make the Environmental Assessment available for review and comment in the next several weeks.



EXHIBIT C

If you have any questions, please contact Mr. Clarence Coleman of this office. He can be reached at (919) 747-7014 or clarence.coleman@dot.gov.

Sincerely,

For John F. Sullivan, III, P.E.
Division Administrator

Enclosure
cc: Mr. Robert H. Hanson, P. E.
Project Development and Environmental Analysis
Unit Head - Eastern Region
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

7-21-09
#1 part 130d - re: Supplemental vs. Technical
can't have a stand-alone
analysis?
must have a draft before you have a final?
App B to TA - meta a project where an FEIS is
supplemental
concern is allowing the public to comment on
the "new" alternative
was alternative vs. new information
completion of the Partnership Agreement by SEIS
or ROD? - FHWA concerned that you don't have
a complete alternative report agreement
the title of the (FE) can mirror the EIS
Amended Draft (FE) and Amended Final (FE)
Lead team - shouldn't you compare entire
alternatives, rather than just the Phase I's?
* don't include a conclusion
- just compare new alternative to the lead team
from the FEIS (Phase I approach) - should go onto
- compare new alternative to the other available

STATUS REPORT

TIP No. B-2500

Replacement of Herbert C. Bonner Bridge over Oregon Inlet,

Dare County

July 24, 2009

STATUS REPORT

PROJECT CONTACTS

- Project Development: Brian Yamamoto, P.E., Eastern Region Project Engineer (919-733-7844 x266, byamamoto@ncdot.gov); Beth Smyre, P.E., Project Planning Engineer (919-733-7844 x333, bemyre@ncdot.gov)
- Roadway Design: Doug Taylor, P.E. / Zak Hamidi, P.E.
- Division 1 Engineer: Jerry Jennings, P.E.
- Board Member: Stan White
- Consultant: PB (John Page, Project Manager)

CURRENT ACTIVITIES

- PB submitted the first review draft of the Supplemental FEIS (not including the Section 4(f) statement)
 - For the completion of the draft, PB and CZR completed updates of wetland/ biotic community impacts for all alternatives
 - First draft sent to NCDOT and FHWA legal staff, but was not distributed for full NCDOT staff review
 - Need to determine how the USFWS-proposed modification to the easement will be treated within the SFEIS and Section 4(f) statement
- PDEA worked with FHWA on the Draft Section 4(f) statement
 - PDEA participated in conference call with FHWA HQ to discuss comments on the current draft
 - PB started revisions of the current draft, incorporating FHWA-HQ comments; a revised draft will be available on Monday
- Participated in meeting with Highway Design, Division staff to discuss possible Phase 1 alignments within the USFWS-proposed easement modification
- Responded to public inquiries about the project

UPCOMING ACTIVITIES

- Work with FHWA on content of Supplemental FEIS and development of Partnership Agreement regarding later phases
 - Need to determine how the USFWS proposal for a minor modification of the existing easement will impact the SFEIS and Section 4(f) statement
- Coordinate with USFWS regarding terminal groin permit process
- Revise draft of Section 106 Programmatic Agreement

CURRENT SCHEDULE

Approval of SDEIS Supplement	February 14, 2007
Corridor Public Hearing	March 28-29, 2007
CP 3 (LEDPA)- Review Board Meeting	August 27, 2007
Final EIS	September 17, 2008
CP 2A/4A (Bridging Decisions/Avoidance & Minimization)	November 13, 2008
Revisit CP3- Merger Team Meeting	March 26/ May 21, 2009
Supplemental FEIS/Draft Section 4(f) Statement	July 2009*
Record of Decision	October 1, 2009
Design Public Hearing	TBA
Design/ Build Let Date (anticipated)	February 2010

*I anticipate a revised completion date of August 2009.

July 24, 2009

Page 1 of 2

July 24, 2009

Page 2 of 2

STATUS REPORT

TIP No. B-2500

Replacement of Herbert C. Bonner Bridge over Oregon Inlet,
Dare County
July 31, 2009

CURRENT ACTIVITIES

- PB completed edits on the most recent draft of the Section 4(f) Statement, incorporating comments from FHWA and formatting the document to match the style of the SFEIS
 - The revised draft was provided to FHWA on July 27
- PDEA provided comments to Program Development on the draft financial plan
- PDEA provided comments to FHWA on draft meeting minutes for the March and April Section 106 meetings
 - FHWA is to finalize these minutes and distribute them to the meeting participants

UPCOMING ACTIVITIES

- Work with FHWA on content of Supplemental NEPA documentation and development of Partnership Agreement regarding later phases
- Need to determine how the USFWS proposal for a minor modification of the existing easement will impact the further documentation
- Coordinate with USFWS regarding terminal groin permit process
- Revise draft of Section 106 Programmatic Agreement
- Currently waiting on comments from SHPO and the ACHP on the most recent draft

CURRENT SCHEDULE

- Approval of SDEIS Supplement February 14, 2007
- Corridor Public Hearing March 28-29, 2007
- CP 3 (LEDPA)- Review Board Meeting August 27, 2007
- Final EIS September 17, 2008
- CP 2A/4A (Bridging Decisions/Avoidance & Minimization) November 13, 2008
- Revisit CP3- Merger Team Meeting March 26/ May 21, 2009
- Supplemental NEPA documentation August 2009
- Record of Decision October 1, 2009
- Design Public Hearing TBA
- Design/ Build Let Date (anticipated) February 2010

PROJECT CONTACTS

- Project Development: Brian Yamamoto, P.E., Eastern Region, Project Engineer (919-733-7844 x265, byamamoto@ncdot.gov);
Beth Smyre, P.E., Project Planning Engineer (919-733-7844 x333, bsmyre@ncdot.gov)
- Roadway Design: Doug Taylor, P.E. / Zak Hamidi, P.E.

July 31, 2009
Page 1 of 2

STATUS REPORT

- Division 1 Engineer: Jerry Jemtings, P.E.
- Board Member: Stan White
- Consultant: PB (John Page, Project Manager)

July 31, 2009
Page 2 of 2

(Judgment- I.M.Meekins To United States of America)

In the District Court of the United States for the Eastern District of North Carolina, Elizabeth City Division; United States of America, Petitioner, vs. I.M. Meekins, et al., Respondents.

Judgment On The Declaration of Taking. This day comes the petitioner in the above entitled cause, the United States of America, by its Attorney General, and moves the court to enter judgment in its favor...

SEVEN: That a petition, in condemnation was filed at the request of the Secretary of Agriculture of the United States, the authorized officer of the United States, to acquire the lands described in said petition, and also under authority under such and in accordance with the provisions of the Act...

North Carolina. All that certain tract of land, a part of the Obiesee-Deeo Bank, situate, lying and being in Kinnekeet township, Dare County, State of North Carolina, described as follows; BEGINNING: at Corner 1, common to land of the Pea Island Club, on the north shore of...

40.00 chains to a point (12-2); S. 17° 58' E. 21.55 chains to Corner 13, common to land of Chester B. Villetti; thence with land of Chester B. Villetti, to the corner of the lot containing 14.40 acres, to the corner of the lot containing 14.40 acres, to the corner of the lot containing 14.40 acres...

Thomas Dixon, Clerk of the United States District Court for the Eastern District of North Carolina, do hereby certify that the above is a true copy of the original as recorded in the office of the Clerk of the United States District Court...

North Carolina Dare County, This being the certificate of Thomas Dixon, Clerk of the United States District Court, Eastern District of North Carolina, attested by his official seal, is adjudged to be correct. Let the instrument, with the certificates, be registered. Witness my hand this 21st day of June, 1937.

Filed for record June 21st, 1937. Recorded June 24th, 1937. C.S. Meekins, C.S.C. Marvin R. Daniels, Registrar.

North Carolina Dare County; This Deed made this 14th day of June, A.D. 1937 by E. Bruce Etheridge and Rosa P. Meekins his wife, of Measeo, Dare County and State of North Carolina of the first part, to Geo. L. Marre, Jr., of Winslow, Bertie County and State of North Carolina of the second part; WHEREAS the first part of the deed is hereby acknowledged, have bargained and sold, and by these presents do grant, bargain, sell and convey to said party the second part his heirs and assigns, a certain tract or parcel of land in Kill Devil Beach, Dare County, State of North Carolina, adjoining the lands of Etheridge and Meekins and bounded as follows, viz:



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH 27611

March 13, 1979

JAMES B. HUNT, JR.
GOVERNOR
THOMAS W. BRACKSHAW, JR.
SECRETARY

DIVISION OF HIGHWAYS

STATE PROJECT: 6.051001
COUNTIES: Dare-Hyde
DESCRIPTION: NC 12 from Whalebone to Ocracoke, including the Villages of Rodanthe, Salvo, Avon, Buxton, Frisco, Hatteras and Ocracoke

MEMORANDUM TO: Mr. W. F. Caddell, Jr.
FROM: A. O. Patterson, Jr.
SUBJECT: Right of Way Verification

This is in reference to your request of February 15, 1979 relative to verification of existing right of way on the above-mentioned description. In this connection, I have examined the records in this office, Division Right of Way Office in Ahoskie, Department of Administration, and the Cape Hatteras National Seashore Headquarters at Manteo. Also, I have made an on-the-ground inspection with Mr. J. O. Sellars, Division Right of Way Agent in Ahoskie and Mr. William Henry Jones, Assistant Maintenance Engineer for Dare and Hyde Counties.

For the clarification of the right of way on NC 12, I am enclosing a county map for Dare and Hyde Counties on which I have attempted to outline the various projects along NC 12.

The following information is submitted with reference to the various sections of Highway NC 12 in question:

Project 1-9-5-204 - From the intersection of US 64-264 and NC 12 at Whalebone to Oregon Inlet. This Betterment Section was completed August 9, 1953. Around 1958 a portion of NC 12 was relocated by the Cape Hatteras National Seashore Park. This relocation was done at the expense of the Park Service and, presently, being maintained by them. This relocation is approximately 4.9 miles long. In 1963 the Department of Transportation changed the numbering of Old NC 12, which runs along the beach, to SR 1000 and the relocated road became NC 12. The project plans show 100 feet of right of way. There is no signed or recorded right of way for this section.

Project 8-21306 - This was bridge and approaches over Oregon Inlet. The project was completed on April 7, 1964 and the project plans show 100 feet of right of way.

DB 21 Pg 86

W. F. Caddell, Jr.
Secretary
Division of Highways
Department of Transportation
Raleigh, N.C. 27611

Thomas Dixon, Clerk
United States District Court
Eastern District of North Carolina
Wilmington, N.C.
A. Hooper, Jr.,
Deputy Clerk.

North Carolina Dare County. The foregoing certificate of Thomas Dixon, Clerk United States District Court, Eastern District of North Carolina, attested by the said seal, is judged to be correct, let the instrument, with the certificate, be recorded. Witness my hand this 21st day of October, 1938.

W. F. Caddell, Jr.
G. S. Meekins, C. S. C.
Melvin R. Duffless, Registrar.

(Good-Isiah T. Davis and wife to W. F. Lemmon)
North Carolina Dare County. This deed made this 7th day of October, 1939, by Isiah T. Davis and wife Luella H. Davis, of Manteo, Dare County, State of North Carolina, parties of the first part, to W. F. Lemmon and Isabelle S. Lemmon of Manteo, Dare County, State of North Carolina, parties of the second part, in consideration of the sum of One Hundred Dollars (\$100.00) and other good and valuable considerations paid to them by the said W. F. Lemmon and Isabelle S. Lemmon and by these presents do bargain, sell and convey unto the said W. F. Lemmon and Isabelle S. Lemmon, their heirs and assigns, a certain lot or parcel of land lying and being in Dare County, State of North Carolina and more particularly described as follows, to-wit: A certain lot or parcel of land lying and being on the West side of Honochoke Island Nege Head Township, Dare County, N. C. and adjoining the lands of Daniel Meekins estate, W. F. Lemmon estate and others and bounded as follows, to-wit: Beginning at an iron pipe situated in the middle of the Landing Road that divides the lands of the said W. F. Lemmon and Daniel Meekins estate, the said line being the Southeast line of the Daniel Meekins estate and the Northwest line of the W. F. Lemmon estate, thence South 54° 30' West from a steam monument situated in the Southwest intersection of the said Landing Road and the other paths leading to the East side of Honochoke Island and constituting a corner of the said Daniel Meekins estate, to a point on the said Landing Road, the said point being mentioned South 54° 30' West 210 feet to the waters of Ocracoke Sound; thence in a southeasterly direction along the waters edge 120 feet to a marked post; thence North 56° 30' East in a southeasterly direction to the Northwest corner of the said W. F. Lemmon and Isabelle S. Lemmon estate, the place of beginning, constituting 85,200 sq. ft. more or less, together with and including all the household and kitchen furniture and fixtures, including the boat and fishing equipment.
Same being the lands conveyed to Isiah T. Davis and wife Luella H. Davis by W. F. Lemmon and wife Garnet S. Lemmon by deed dated June 18th 1937, as recorded in the records of Dare County, N. C. See also quitclaim deed from G. V. Meekins et al. to Isiah T. Davis et al. dated December 1st, 1937 and duly recorded January 12th, 1938 in Book 19, page 287, Dare County registry; the heirs at law of W. F. Lemmon now deceased, whose part and share of the said lands of W. F. Lemmon now deceased.
The said conveyance including a right of way provision set out in the deed referred to above, and the said lands, together with the rights and appurtenances thereto belonging unto the said W. F. Lemmon and Isabelle S. Lemmon their heirs and assigns, to their only use and behoof forever.

NCDDOT 1752A

NCDDOT 1757Z

Special Use Permit No. CAHA-2-62 was issued on January 1, 1962 and would expire December 31, 1982 calls for 100 feet of right of way. However, this permit was cancelled by letter dated February 14, 1966 from Mr. James B. Myers, Superintendent of the Cape Hatteras National Seashore Park to Mr. Ivan Herdesty (copy attached).

The 3rd paragraph of this letter states that the Act which established the Seashore (Cape Hatteras National Seashore) authorizes the State of North Carolina 100 feet only of road right of way on Bodie Island. Special Use Permit CAHA-3-63 issued on August 1, 1963 and would expire on July 31, 1983 (copy attached) makes reference to 100 feet land strip. This permit covered a 35-foot strip adjacent to right of way for aerial electric power line to the north end of Oregon Inlet Bridge. (See attachments No. 1.)

Project 1-9-5-205 - The right of way on NC 12 from Oregon Inlet to a point north of Rodante was constructed under this Betterment Section and was completed July 23, 1954. The project plans show 100 feet of right of way and is all inside of Pea Island National Wildlife Refuge. On May 20, 1954, the State of North Carolina granted a Quitclaim deed to the United States of America for all interest that it had on Pea Island National Refuge, except an easement of right of way 100 feet in width (copy attached). On July 21, 1954, the United States of America conveyed a Deed of Easement to the State of North Carolina for a strip of land 100 feet wide for highway right of way (copy attached). As a result of a severe storm during March 1962, a portion of NC 12 on Pea Island was washed away. The work for the portion of NC 12 destroyed by storm was done under Project 6.0510029 and was completed August 8, 1969. On October 1, 1963 the United States of America conveyed a Deed of Easement to the State of North Carolina for the relocated portion of NC 12 (copy attached). (See attachments No. 2.)

Project 1-9-5-202 - This project runs from a point north of Rodante south to Avon and includes the villages of Rodante, Waves and Salvo. This project was constructed under this Betterment Section and was completed August 27, 1952. The right of way for this project was acquired under R-10 petition-type agreement dated May 10, 1950 - April 28, 1952 (copy attached). These agreements are not recorded. These petitions are all for 100 feet of right of way. The project plans show 100 feet of right of way. (See attachments No. 3.)

Project 1-301 - This project runs from Avon to a point in Hatteras Village and includes the villages of Buxton, Frisco and Hatteras. This project was completed on August 10, 1948. The project plans show a 100-foot right of way, except through the Villages of Buxton, Frisco and Hatteras where there is a 60-foot right of way. There are some right of way agreements in our files which were secured in 1947 - 1950 (copies attached). However, they are not recorded. Generally, within the Villages, we are maintaining a 48-foot to 60-foot section. There are no improvements within the right of way except for some signs, fences and, possibly, one or two retaining walls. As a result of a severe storm during the month of March 1962, a portion of NC 12 from approximate mile post 36 south to mile post 40 was washed away. This work was done under Project 6.0510029 and was completed August 8, 1969. The Cape Hatteras National Seashore Park issued Special Use Permit No. 2:603:9 on March 17, 1967 (copy attached), which calls for 100 feet of right of way. (See attachments No. 4.)

Project 8.21304 - This project runs from a point in the Village of Hatteras to the Hatteras Inlet Ferry Dock. This project was completed November 22, 1957. The plans show 60 feet of right of way and there are copies of unrecorded right of way agreements in our files (copies attached). The Cape Hatteras National Seashore issued Special Use Permit No. CAHA-4-58 on December 1, 1958 which calls for 30 feet right

of way across property formerly used as Weather Bureau Observatory (copy attached). (See attachment No. 5)

Project 2-303 - NC 12 on Ocracoke Island was completed May 2, 1975. This project begins at Secondary Road 1228 (Silver Lake) in the Village of Ocracoke at Station 0+00 and runs southeasterly - northeasterly to Hatteras Inlet. The project plans show 60 feet and 150 feet right of way. In the Village of Ocracoke (Station 0+00 to Station 13+75), we have obtained some right of way agreements which have been recorded and some which haven't been recorded. These agreements call for a 60-foot right of way. Most of the right of way outside the Village of Ocracoke is on Cape Hatteras National Seashore Park property and the right of way is 150 feet wide. The Cape Hatteras National Seashore issued a unnumbered Special Use Permit dated February 1, 1956 to the State Highway Commission for 150 feet of right of way for Project 2-303. On February 2, 1976 the Cape Hatteras National Seashore issued Special Use Permit No. 5:190:31 for 150 feet wide right of way. The Cape Hatteras National Seashore has issued Special Use Permit No. 5:190:40 dated March 1, 1977 and Special Use Permit No. 5:190:46 dated September 1, 1977 which covers Ferry Service on Ocracoke Island, Hatteras Island, and Swanquarter, and access to State Maintenance Area respectively. (See attachment No. 6.)

STATEMENT OF MAINTENANCE FOR ENTIRE SECTION OF NC 12 IN QUESTION - Maintenance of the right of way has been done by the posting of signs where the right of way breaks from 60, 100, and 150 feet respectively. These signs are visible and still in place throughout NC 12 in most cases. There has been virtually no maintenance of the shoulders and right of way since it is covered with sea oats. Any disturbance to this would cause more of a problem from erosion than could be gained through maintenance. There have been some encroachments on the right of way in the Villages area by the placing of some signs, fencing and retaining walls. However, these are the only improvements within the right of way.

NATIONAL PARK SERVICE INFORMATION - RE: NC 12 IN QUESTION - A research of the files in the Cape Hatteras National Seashore Headquarters Office at Manteo revealed the following items as attachment No. 7:

- (1) The State of North Carolina conveyed lands to the United States of America by five deeds dated July 19, 1952, December 22, 1952, December 22, 1952, May 26, 1955 and August 7, 1958 (copies attached). Each of these deeds contains the following language:
 "...upon the further condition that the State of North Carolina and its subdivisions expressly retain title to and control of all public roads and highways now laid out or established over and upon the said lands, and the further right to lay out and establish over and upon said lands such other highways and roads as shall be deemed necessary by the State of North Carolina and political subdivisions thereof; and to such end the said land shall be subject to condemnation proceedings in the same manner and to the same extent as if said lands were privately owned."

(2) On April 24, 1956 the United States of America gave a Certificate of Disclaimer to the State of North Carolina for lands which were outside of the boundary of the Cape Hatteras National Seashore Park (copy attached).

(3) The Declaration of Takings filed by the United States of America contains the following language - "The estate taken for said public use in the full fee

Mr. W. F. Caddell, Jr.

-4-

March 13, 1979

simple title in and to said lands, SUBJECT to existing public roads, highways, and easements for public utilities, if any (copy attached).

(4) On those properties that the United States of America was successful in acquiring through negotiations, the deeds, in some cases, make reference to highway right of way and in others do not. However, there was no reference to a particular width of right of way.

(5) Copies of Special Use Permits from Cape Hatteras National Seashore Park to the Department of Transportation which are mentioned elsewhere in this report except for:

- a. Special Use Permits for Ocracoke - Cedar Island Ferry and Ocracoke - Swan Quarter Ferry located within Whalebone Junction Information. (copy attached)
- b. Special Use Permit for Drop Zone for breaking open shellfish in the vicinity of Kinnakett Coast Guard Station (vacant). (copy attached)
- c. Special Use Permit and correspondence for storm of 1973 which caused a portion of NC 12 to be relocated on Hatteras Island.

Based on the above-mentioned facts, I feel that the Department of Transportation can claim right of way as indicated below:

- (1) Project 1-9-5-204 - Dare County - From the intersection of US 64-264 and NC 12 at Whalebone to Oregon Inlet - right of way 100 feet, except portion built by Park Service in 1958.
- (2) Project 8-21306 - Dare County - Bridge and approaches over Oregon Inlet - right of way 100 feet.
- (3) Project 1-9-5-205 - Dare County - From Oregon Inlet to approximately two (2) miles north of Rodanthe - right of way 100 feet.
- (4) Project 1-9-5-202 - Dare County - From approximately two (2) miles north of Rodanthe south to Avon - right of way 100 feet.
- (5) Project 6-0510029 - Dare County - Part I - Begins approximately 3.5 miles south of Oregon Inlet Bridge and 75-22 feet south of U. S. Department of Interior - National Park Service right of way 100 feet. Part II - Begins approximately 2.5 miles north of Buxton and 1016.6 feet south of U. S. Department of Interior - National Park Service - right of way 100 feet.
- (6) Project 1-301 - Dare County - From Avon to a point in Hatteras Village - right of way 100 feet, except 60 feet in Villages of Buxton, Frisco and Hatteras.
- (7) Project 8-21304 - Approaches to Ferry Slip at Hatteras - right of way 60 feet.
- (8) Project 2-303 - On Ocracoke Island - right of way 150 feet, except for

Mr. W. F. Caddell, Jr.

-5-

March 13, 1979

Village of Ocracoke - 60 feet.

Should this office be of further assistance in regard to this request, please do not hesitate to contact me.

WFC:jlr

Attachments (7)

Appendix F

**Response to Comments on
the Revised Final
Section 4(f) Evaluation**

F. Response to Comments on the Revised Final Section 4(f) Evaluation

The Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) released a Revised Final Section 4(f) Evaluation signed on October 9, 2009 for public and regulatory agency review. The revised document was prepared as a result of comments received on the Final Section 4(f) Evaluation presented as Chapter 5 of the Final Environmental Impact Statement (FEIS), new information on the history of Pea Island National Wildlife Refuge (Refuge)-related land transfers, and revisions made to the detailed study alternatives in the community of Rodanthe based on FEIS comments. Comments were received from the US Department of Interior (USDOl), the NC Department of Cultural Resources (NCDcR), and the Southern Environmental Law Center (SELc).

The comments and responses to those comments are presented in the following sections:

F.1	US Department of Interior.....	F-1
F.2	US Department of Interior (Supplement)	F-26
F.3	North Carolina Department of Cultural Resources	F-26
F.4	Southern Environmental Law Center	F-26

The comments quote the correspondence received. The original correspondence is contained in Appendix G. Comment numbers were added by NCDOT and FHWA in order to facilitate cross referencing rather than repeating responses when the same or similar thoughts are expressed by the commenter in multiple comments.

F.1 US Department of Interior

1. Comment: The Service has provided detailed comments on this project throughout the planning process, raising numerous concerns about the effects of Parallel Bridge Corridor alternatives on Pea Island National Wildlife Refuge (Refuge). The current revised evaluation neither resolves these concerns nor does it appropriately address potential impacts to the Refuge. These concerns have been raised numerous times, including comments on the draft and final versions of the project's Environmental Impact Statement (EIS), provided in letters from the Department of the Interior (Department) dated February 13, 2006, and October 28, 2008. The Service also provided comments on the Final Environmental Impact Statement (FEIS) and Final Section 4(f) Evaluation, dated April 30, 2009. Most recently, in a letter to the North Carolina Department of Transportation (NCDOT) dated July 31, 2009 (see attachment), the Service pointed out the numerous statements and conclusions put forth in documents provided by NCDOT and the Federal Highway Administration (FHWA) that we believe were in error. This was done in the hope that such errors would be corrected in subsequent decision documents issued by these agencies. We note that this letter is not referenced in any of the documentation provided with the Revised Final Section 4(f) Evaluation, and we are unsure if those concerns have been addressed or considered in any way. We continue to encourage the NCDOT and FHWA to address these issues.

Response: *The Revised Final Section 4(f) Evaluation considered comments offered by USDOJ on the FEIS and Final Section 4(f) Evaluation. The Revised Final Section 4(f) Evaluation also took into consideration comments offered by USFWS as part of the NEPA/Section 404 Merger Process in letters dated April 30, 2009 and July 31, 2009 (written USFWS comments made through participation on the Merger Team and NCDOT's responses to these comments are contained in the project files). Comments pertaining to issues related to the new preferred alternative (NC 12 Transportation Management Plan Alternative) and the concurrent development of NC 12, the Refuge, and the Cape Hatteras National Seashore (Seashore) have been addressed in the responses listed below.*

- 2. Comment:** The Revised Final Section 4(f) Evaluation describes a new preferred alternative (Parallel Bridge with NC 12 Transportation Management Plan, or PB/TMP) and provides an analysis and discussion of the feasibility and prudence of various previously assessed alternatives compared with the PB/TMP. Lacking from the analysis is a discussion of the ability of each alternative (particularly the new preferred alternative) to comply with federal law; namely the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act), and National Environmental Policy Act (NEPA). Compliance with these laws is an important factor regarding the prudence of pursuing such a course of action.

Response: *The project is subject to dozens of environmental laws and will not advance to construction until all requirements have been met. The Revised Final Section 4(f) Evaluation was completed to comply with Section 4(f) of the Department of Transportation Act, according to implementing requirements in 23 CFR 774. The ability of the previously assessed alternatives to comply with the National Wildlife Refuge System Improvement Act of 1997 is discussed in Section 4.1.2.4 of the FEIS, where it is noted that all of the Parallel Bridge Corridor alternatives, except for the Phased Approach/Rodanthe Bridge Alternative, may not be compatible with Refuge objectives (as has been conveyed by USFWS representatives during Merger Team meetings). NCDOT will submit separate documentation with a request for a new or amended easement and compatibility determination for Phase I of the NC 12 Transportation Management Plan Alternative (Preferred) prior to construction. In addition, NCDOT and FHWA will coordinate with USFWS during the development of future phases to ensure that each phase complies with the National Wildlife Refuge System Improvement Act of 1997. It is expected that future determinations of compatibility would take into consideration coastal conditions within the Refuge at the time a compatibility determination is requested.*

NCDOT and FHWA have worked with USFWS to design Phase I so that it meets compatibility requirements, as documented in Section 2.3.2.1 of this EA. During coordination with USFWS representatives that occurred during preparation of this EA in July 2009, Refuge representatives presented FHWA and NCDOT a map showing limits of what the Refuge would consider to be a minor revision of the easement for Phase I roadway improvements in the Refuge that would not require a compatibility determination for compliance with the National Wildlife Refuge System Improvement Act of 1997. In September 2009, NCDOT developed a conceptual design in which the alignment traversed just west of the limits provided by the Refuge and tied into NC 12 south of these limits. In correspondence to NCDOT dated September 24, 2009, the Refuge indicated that the conceptual design that was beyond the original limits provided to FHWA and NCDOT in July was acceptable and likely represented the limits of what could be considered a minor modification of the

existing easement. This conceptual design was adopted as Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) as evaluated in the Revised Final Section 4(f) Evaluation.

- 3. Comment:** The Service believes that the Revised Final Section 4(f) Evaluation, which identifies the PB/TMP alternative as the preferred course for federal action, in conjunction with NEPA documents prepared to date, are inadequate to support the decisions required of us under Federal law. Specifically, in order for the first phase of this new alternative to be implemented, the Service must determine that the proposed use of Refuge lands for construction of the new bridge can be considered a “minor” change to the existing right-of-way, or must be otherwise compatible with the purposes for which the Refuge was established. This determination must be viewed in the context of the overall direct, indirect, and cumulative effects of the project. The Service has consistently stated for many years that all of the Parallel Bridge Corridor alternatives put forth to date would likely result in substantial adverse impacts to the Refuge outside the existing NC 12 right-of-way. As such these alternatives would not likely be found compatible with the purposes for which the Refuge was established, per the Refuge Improvement Act.

***Response:** The Revised Final Section 4(f) Evaluation was prepared to document analysis required of FHWA to comply with Section 4(f). It was not intended to satisfy USFWS’ needs with respect to its compatibility determination under the National Wildlife Refuge System Improvement Act of 1997. It is understood that NCDOT needs to submit documentation to USFWS pertaining to compatibility prior to beginning construction. NCDOT will submit a request for a compatibility determination for Phase I. If future phases require additional right-of-way, NCDOT will submit the appropriate documentation at that time.*

Compatibility determinations have been required for relocations of NC 12 since 1966 when the National Wildlife Refuge System Administration Act authorized the Secretary of Interior to “permit the use of, or grant easements in, over, across, upon, through, or under any areas within the System for purposes such as but not necessarily limited to, powerlines, telephone lines, canals, ditches, pipelines, and roads, including the construction, operation, and maintenance thereof, whenever he determines that such uses are compatible with the purposes for which these areas are established.” 16 U.S.C. 668dd(d)(1)(B). The National Wildlife Refuge System Improvement Act of 1997 did not amend this section of the 1966 Act and the legislative history of the 1997 amendments notes “There are numerous existing rights-of-way on National Wildlife Refuge System lands for roads, oil and gas pipelines, electrical transmission, communication facilities, and other utilities. The Committee does not intend for this Act to in any way change, restrict, or eliminate these existing rights-of-way, whether established by easement or permit, or to grant USFWS any authority that does not already exist to do so.” HR 105-106, p.13 (1997).

- 4. Comment:** The new PB/TMP alternative compounds these inadequacies by deferring decisions regarding most of the project until undetermined points in the future. The Service never concurred that the previously identified preferred alternative (Parallel Bridge with Phased Approach) should be identified as the preferred alternative due to the above-stated issues of compatibility (see the September 11, 2007 letter from the Acting Assistant Secretary of Interior to Governor Easley for reference). Nonetheless, the Phased Approach at least arguably provided some analysis of what could be considered a plan for a complete project

that met the stated purpose and need. To the contrary, the new preferred alternative described in the Revised Final Section 4(f) Evaluation provides no description for most of the project except to say that decisions regarding the later phases, “could consist of, but would not be limited to, one or more components of any of the alternatives already studied as part of the environmental review process” (Revised Final Section 4(f) Evaluation, Page 6). In other words, the project could include anything (studied or unstudied in the environmental review process) between the southern terminus of the new bridge and Rodanthe. As a result, the effects of these undescribed future phases of the project have not been analyzed in any meaningful way, or even placed within some reasonable bounds regarding impacts to the Refuge.

Response: *The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) is a complete alternative that meets the stated purpose and need. The purpose and need allows for deferred decision-making for NC 12 south of Oregon Inlet. The immediate need is to replace the Bonner Bridge. The Parallel Bridge Corridor with NC 12 Transportation Management Plan alternative would make decisions for future phases based on actual conditions existing on Hatteras Island at the point in time that additional action becomes necessary. These later phases could consist of, but would not be limited to, one or more components of any of the alternatives already studied as part of the environmental review process (including no action, as required by NEPA). If future conditions differ from what has been forecasted or if new technologies lead to additional alternatives, those changes would be studied in the future at the time when the previously studied alternatives are re-evaluated. This approach is consistent with FHWA’s NEPA regulations and it is consistent with former Secretary of Interior Dirk Kempthorne’s July 2006 letter (page A-67 of the FEIS), which states “I believe that the best way to proceed would be to separate the replacement of the Bonner Bridge ...from the more difficult and less urgent issues of the realignment of the road...”*

5. **Comment:** The Service cannot make decisions regarding impacts to the Refuge, including the decision to grant a minor modification of the existing right-of-way, based on the current document. As such, it is no longer clear to us that we can “separate the replacement of the Bonner Bridge... from the more difficult and less urgent issues of realignment of the road,” as discussed in the July 6, 2006, letter from the Secretary of Interior to Senator Burr and Governor Easley, without extensive additional analysis and documentation.

Response: *The Revised Final Section 4(f) Evaluation is an internal FHWA decision document, which was completed to fulfill FHWA’s Section 4(f) regulations in 23 CFR 774. This EA is intended to provide the analysis and documentation of the impacts of the NC 12 Transportation Management Plan Alternative (Preferred). NCDOT will submit separate documentation with a request for a new or amended easement and compatibility determination for Phase I of the project prior to construction. If future phases require additional right-of-way, NCDOT will submit the appropriate documentation at that time.*

6. **Comment:** The FHWA and NCDOT chose to describe a new preferred alternative in this Revised Final Section 4(f) Evaluation, and we understand that some form of revised NEPA document is being prepared. With that understanding we are providing the following comments for your use in preparation of that document. Based on statements contained in the Revised Final Section 4(f) Evaluation, FHWA and NCDOT appear to believe the NEPA documents prepared to date sufficiently evaluate the PB/TMP alternative because it would

represent some, as yet undetermined, combination of previously evaluated alternatives. However, the statement that the new preferred alternative would "...include but not be limited to one or more of the components already studied..." (Revised Final Section 4(f) Evaluation, pg. 6, emphasis added) implies that these actions may not be confined to the range of alternatives thus far considered. It is clear that construction of Phase I (replacement of the Bridge) would limit options for future actions to those that would adversely affect the Refuge. It is also clearly contemplated in the Revised Final 4(f) Evaluation that future maintenance of NC 12 would occur on an as needed basis and is not intended by NCDOT and FHWA to be restricted to the existing right-of-way. For example, Appendix E, Figure S-1 shows a shaded area within which future phases of the new preferred alternative would be located. This area extends well beyond the existing right-of-way. The PB/TMP also references activities, such as beach nourishment and abandonment of old roads that would likely occur outside of the current right-of-way. These activities could result in the net loss of high quality habitat on the refuge. Additionally, Appendix G (pg. 17) refers to the need to stay within the existing right-of-way as "...an artificial and imprudent constraint." The Service disagrees with this statement and maintains that requiring strict adherence to the existing right-of-way is a valid statutory requirement. By proposing to proceed with Phase I of the project while deferring decision-making for most of the project to unspecified future dates, and without providing any clear sense of what those decisions may be or upon what factors they will be based, NCDOT and FHWA have not fully analyzed the alternatives in the NEPA document. By going forward, the NCDOT and FHWA are proposing to make an irretrievable commitment of resources (construction of Phase I) while inappropriately segmenting the project.

***Response:** The impact assessment findings presented in the FEIS and this EA and referenced in the Revised Final Section 4(f) Evaluation for the various Parallel Bridge Corridor alternatives reflect the range of reasonably foreseeable impacts associated with the NC 12 Transportation Management Plan Alternative (Preferred) for all project phases. Because the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) includes firm commitments to assess environmental impacts associated with future environmental conditions prior to making decisions for later phases, it provides the best opportunity to mitigate the impacts to the Refuge. As noted in a citizen comment after the public hearing on March 29, 2007, "When you look at the short bridge alternatives, these are not mutually exclusive. One of the things you can do by replacing the Bonner Bridge immediately with the short bridge is look to see over time what you really need to do." When future phases become necessary, the NC 12 Transportation Management Plan allows all agencies to consider all alternatives previously addressed. It also allows agencies to make decisions based on real conditions that exist at that time instead of forecasts made 10 to 50 years out in the future. The NC 12 Transportation Management Plan takes into consideration that over 20 to 50 years there will be scientific and technological advances. Over that same time period there may be potential landscape and habitat changes. It may be at some point in the future that another mode of transportation will meet the travel demand for this part of the Outer Banks. If that is the case, then the NC 12 Transportation Management Plan commits to evaluate such an alternative.*

FHWA and NCDOT also recognize that future decisions, whether for short-term maintenance or the implementation of future phases, must be made in association with the Refuge and other environmental regulatory agencies. As discussed on page 12 of the Revised Final Section 4(f) Evaluation, this was the underlying motive for the draft partnership agreement included in Appendix H of the Revised Final Section

4(f) Evaluation. At this time, USFWS has indicated, in a letter dated March 22, 2010, that they do not feel it appropriate to sign a separate partnering or cooperative management agreement for this project. In light of this position, NCDOT plans to use the existing NEPA/Section 404 Merger Process for future coordination. USFWS is an active member of the Merger Team for the Bonner Bridge Replacement Project. Also see the response to USDOJ comment 7.

If the final outcome of that future decision-making is that maintenance activities and long-term improvements must remain in the existing NC 12 easement through the Refuge, then FHWA and NCDOT are prepared to do so. Figure S-1 of the Revised Final Section 4(f) Evaluation is a large scale map showing the location and limits of the action area. Figure S-1 does not depict future action outside of the current right-of-way and does not commit FHWA and NCDOT to any future action outside of the current right-of-way.

The quote from page 17 of Appendix G to the Revised Final Section 4(f) Evaluation is taken out of context. Section 4(f) does not prohibit all use of Refuge property. When there is no feasible and prudent alternative and FHWA undertakes all possible planning to minimize harm, protected property may be used for highway projects. In addition, when joint planning or development has occurred for both a Section 4(f) property and a transportation facility, the requirements of Section 4(f) do not apply to the subsequent use of the area for transportation.

The new preferred alternative does not unlawfully segment the project, as is discussed in Section 2.3.5 of this EA. Phase I has independent utility and logical termini and, therefore, can be implemented under FHWA NEPA regulations (23 CFR 771.111(f)) without a decision at this time for the future phases. In addition, the FEIS studied a corridor of sufficient length to ensure meaningful evaluation of alternatives and to avoid commitments of transportation improvement before they are fully evaluated. Choosing a corridor of sufficient length to ensure meaningful evaluation of the direct and indirect impacts does not preclude staged or phased decision-making.

- 7. Comment:** The PB/TMP alternative attempts to overcome the lack of specificity by referring to a Transportation Management Plan and/or Partnership Agreement, the essence of which is that “later phases of actions to manage NC 12 through 2060 would be decided based on actual conditions existing on Hatteras Island at the point in time that additional action becomes necessary” (Revised Final Section 4(f) Evaluation, pg. 5). A draft Partnership Agreement is included in Appendix H of the document. The Service was not consulted in the preparation of the draft Partnership Agreement and fundamentally disagrees with its content. The agreement as drafted fails to recognize the purpose for which the Refuge was established, fails to acknowledge that allowed uses of Refuge lands must be compatible with the purpose for which the Refuge was established, implies that parties to the agreement concur with the selection of the new preferred alternative, and would place the desire to maintain access to and through the Refuge above the wildlife management mission of the Refuge. The Service is in the process of developing detailed comments regarding the Partnership Agreement, but notes that the draft presented is so flawed that we believe it would be more productive for the prospective partners to meet first in an attempt to establish the basic principles upon which such an agreement could be built.

Response: *The concept of a Partnership Agreement was discussed with the Merger Team (of which USFWS is a part) on May 21, 2009. The first draft of the Partnership Agreement was first sent to USFWS in September 2009. FHWA and NCDOT discussed the Partnership Agreement concept again with USFWS during conference calls in January and February of 2010. USFWS indicated in a letter dated March 22, 2010, that they do not feel it appropriate to sign a separate partnering or cooperative management agreement for this project. In light of this position, NCDOT plans to use the existing NEPA/Section 404 Merger Process for future coordination. USFWS is an active member of the Merger Team for the Bonner Bridge Replacement Project.*

- 8. Comment:** As noted in the Revised Final Section 4(f) Evaluation, the idea of the new preferred alternative was put forth by the U.S. Environmental Protection Agency (EPA) at the May 21, 2009 meeting of the Merger Team. At the meeting, the EPA representative presented the alternative in the context of Adaptive Management. The Service noted at the time that we support the application of Adaptive Management principles where appropriate. We provided the Merger Team members a copy of the Department's 2007 Adaptive Management Technical Guide in order to further the discussion of the appropriateness of applying Adaptive Management principles to the current issue. We note that there has been no discussion of Adaptive Management related to this project involving Service representatives since that meeting, and the principles of Adaptive Management are not reflected anywhere in the Revised Final Section 4(f) Evaluation or the draft Partnership Agreement.

Response: *“Adaptive management” was used in early meetings with the NEPA/Section 404 Merger Team as an example of an activity analogous to the intent and commitments associated with the NC 12 Transportation Management Plan Alternative (Preferred). However, “adaptive management” as a formally adopted process is used by USDO I and not by the US Department of Transportation and FHWA. Adaptive management as defined by USDO I in its technical guide (USDO I, 2009, Adaptive Management: The US Department of Interior Technical Guide) is not directly applicable to a phased infrastructure project such as the Bonner Bridge Replacement Project. USDO I uses the term to mean managing natural resources under its jurisdiction in an adaptive manner. It is a “systematic approach for improving resource management by learning from management outcomes” (page 1). It is focused on adapting a management activity based on the outcomes of that activity. The technical guide (page 15) says “If resource decisions cannot be revisited and modified over time, then adaptive management cannot be meaningfully employed.” It further gives as an example of a decision not suited to adaptive management “the removal of a dam on a large river where the decision can be made only once.” Like USDO I’s example, the Bonner Bridge Replacement Project is not focused on carrying out an activity but rather implementing a public infrastructure project.*

Although not applicable to an infrastructure project, some of the components of USDO I’s approach to adaptive management could be used in planning future phases of the Bonner Bridge Replacement Project, including: stakeholder commitment (page 22); setting clear, measurable, and agreed upon objectives to guide decision making (page 24); and monitoring to increase decision-making certainty (page 31). In terms of NEPA, page 40 of the technical guide acknowledges that “on-going monitoring may reveal ‘new, significant information’ that requires an agency to

prepare a supplemental Environmental Impact Statement.” FHWA and NCDOT also recognize this possibility in association with planning of future phases of the Bonner Bridge Replacement Project.

The FEIS describes a planned system of monitoring and future phase implementation decision-making in Sections 2.3.2.2 and 2.10.2.5 of the FEIS and commits to the process in the FEIS’s Project Commitments section (items 15 and 16 in the FEIS; items 16 and 17 in the EA). NCDOT and FHWA have attempted to develop and finalize the details of its commitments within the context of a cooperative management approach (e.g., the draft partnership agreement in Appendix H of the Revised Final Section 4(f) Evaluation) with USFWS and, as appropriate, other state and federal environment regulatory agencies.

If desired by USFWS, adaptive management could be applied, in association with USFWS, to short-term maintenance activities on NC 12 that would occur until the final phase of the Bonner Bridge Replacement Project is complete. Such a program would seek to adapt NC 12 maintenance activities using the adaptive management process to meet, to the greatest extent possible, the combined objectives associated with keeping NC 12 open to travel, managing wildlife near NC 12, and allowing the shoreline to migrate naturally.

- 9. Comment:** Regardless of what form a Transportation Management Plan or Partnership Agreement may take, or the extent to which principles of Adaptive Management are incorporated into the plan, these features do not eliminate the NEPA requirements to describe a single and complete project and rigorously assess the effects of said project on the quality of the human environment. The Service does not understand how these issues, and the concerns previously expressed by us, can be addressed without preparing a Supplemental EIS.

***Response:** The FEIS and EA look at a corridor of sufficient length to ensure meaningful evaluation of alternatives and to avoid commitments of transportation improvement before they are fully evaluated. Choosing a corridor of sufficient length to ensure meaningful evaluation of the direct and indirect impacts does not preclude staged or phased construction.*

NEPA implementation regulations (23 CFR 771.130(c)) allow the preparation of this EA to assess the impacts of new information or new circumstances when the significance of new impacts is uncertain. Following the receipt of agency and public comments, FHWA and NCDOT will assess whether there are changes to the proposed action, or new information or circumstances relevant to environmental concerns and bearing on the proposed action or its impacts, that would result in significant environmental impacts not evaluated in the FEIS. If so, then a Supplemental FEIS will be prepared.

- 10. Comment:** The basic premise of the Revised Final Section 4(f) Evaluation revolves around two concepts. The first involves consideration of alternatives that are feasible and prudent and the second invokes “new information” that NCDOT and FWWA present to refine and define the concept of “use” as it applies to 4(f) properties. Then, FHWA selectively uses the information to incorrectly determine that there is no use of the Refuge as a refuge, but there is a use as a historic property.

Response: *The stated purpose of the Revised Final Section 4(f) Evaluation was: to change several determinations contained in the previous Final Section 4(f) Evaluation; to analyze a new preferred alternative that evolved through additional coordination and communication with federal and State resource agencies; to analyze the feasibility and prudence of the Pamlico Sound Bridge Corridor alternatives; and to reconsider the least overall harm determination in light of the development of a new preferred alternative. All information available to FHWA was considered.*

The land that comprises the Refuge is protected under Section 4(f) because of its status as a National Wildlife Refuge, its status as part of the National Park System, and because of its status as a historic landscape eligible for the National Register of Historic Places. The next step under the applicable regulations is to determine whether each alternative under consideration would “use” the Refuge. The Revised Final Section 4(f) Evaluation made two changes with respect to the determination of which alternatives would “use” the Refuge. First, as discussed on page 12 of the Revised Final Section 4(f) Evaluation, the Phased Approach/Rodanthe Bridge alternative, for which FHWA previously had determined there would be no “use”, was determined to “use” the Refuge. Second, as discussed on page 15 of the Revised Final Section 4(f) Evaluation, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) was also determined to “use” the Refuge. The rationale for determining there would be a “use” was because of the property’s status as a historic landscape.

- 11. Comment:** Regarding feasible and prudent alternatives, it must be noted that the Pamlico Sound Bridge Alternative was considered as a feasible and prudent alternative by all agencies until 2003. The record shows that all participants in the Merger Team, representing 13 state and federal agencies, agreed to sign a concurrence statement for studying this alternative when a North Carolina Board of Transportation member stopped the process. Since that time, both NCDOT and FHWA have expended considerable time and effort to transition to the “Phased Approach” as presented in the FEIS. In fact, as we have repeatedly stated throughout the planning process, all of the alternatives put forth to date within the Parallel Bridge Corridor (including the Phased approach and PB/TMP) will most likely require work outside the existing right-of-way, and as such are not likely to be found compatible with the purposes for which the Refuge was established. In this instance, none of the Parallel Bridge Corridor alternatives could be authorized under Federal law.

Response: *The process of evaluating the Pamlico Sound Bridge Corridor was not stopped by a Board member as suggested by the comment. NCDOT and FHWA studied the Pamlico Sound Bridge Corridor and carried that analysis through publication of the FEIS. USFWS commented that none of the Parallel Bridge Corridor alternatives could likely be authorized under Federal law. However, the construction cost of the Pamlico Sound Bridge Corridor was determined to be of extraordinary magnitude and the alternative was determined not to be a feasible and prudent alternative under Section 4(f). The alternative was also determined not practicable under Section 404 of the Clean Water Act because of cost and available funding by other resource agencies. (See the project’s LEDPA agreement on page D-12 of Appendix D in the FEIS.) NCDOT and FHWA believe that all agencies will need to work together to ensure that future actions balance the various joint use needs on the island. The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) allows agencies to make decisions based*

on actual conditions that exist at the time of need instead of forecasts of future conditions, which may or may not occur.

- 12. Comment:** The effects of climate change will likely shape the options available to NCDOT and FHWA for NC 12 and further hinder their efforts to confine work within the existing right-of-way. North Carolina's coast is on the front-line when it comes to addressing impacts from accelerating climate change. Normal erosion, sea level rise impacts in the next 20 years alone, and the effects of tropical storms and hurricanes have and will continue to change the coast-line and coastal habitats on this dynamic barrier island system. We believe, based on projections between now and 2030, sections of this highway will be consistently under water from erosion and the effects of sea level rise. These changes to the habitats at the Refuge will accelerate with climate change. Projects like this demand a visionary approach that contemplates the best adaptive science taking into account both ecological effects and the needs of our citizens.

Response: FHWA and NCDOT agree that all parties need to work together to develop a visionary approach to take into account the ecological and transportation needs on the island. The NC 12 Transportation Management Plan Alternative (Preferred) allows for the best adaptive science to be taken into account during the development and implementation of future phases, as described in Section 2.3.2.2 of this EA. FHWA and NCDOT are also monitoring current research on climate change and sea level rise, such as the March 2010 report published by the NC Coastal Resource Commission's Science Panel on Coastal Hazards (Section 1.3.2 of this EA).

- 13. Comment:** Regarding the use of the Refuge, a fundamental issue is that FHWA considers the Refuge to not be a Section 4(f) property as a refuge (pgs. 12-14), but only as a historic property. The FHWA's Section 4(f) Evaluation contains a number of additional inaccuracies relating to the Refuge, such as the relationship between the Service and the National Park Service (NPS), and the existence of a public thoroughfare across Pea Island prior to the establishment of the Refuge.

Response: The Revised Final Section 4(f) Evaluation did not conclude that the Refuge is not a Section 4(f) property. Page 7 of the Revised Final Section 4(f) Evaluation shows that the Refuge was identified as a Section 4(f) property and that determination was not changed. Specific inaccuracies in the Revised Final Section 4(f) Evaluation identified in USFWS comments will be addressed in responses to those comments below.

- 14. Comment:** The Service asserts that FHWA's Section 4(f) evaluation and their subsequent determination that the Refuge (as a refuge) is not a Section 4(f) property are based on a number of unsupported or inaccurate assumptions. In the Revised Final Section 4(f) Evaluation, FHWA incorrectly bases their argument on the premise that the Refuge and NC 12 were "concurrently and jointly planned and developed" (pg.12). In the section "Constructive Use," the FHWA underplays the Refuge as an example of an early 20th century "wildlife sanctuary" eligible under the historic context of "conservation." By underplaying this aspect, the FHWA argues that this undertaking "would constructively use the Refuge (as a historic property)" and avoid designating the Refuge as a Section 4(f) property. As Furr (2008) noted, "The Refuge was determined eligible for the National Register because it was part of two national movements, the creation of wildlife sanctuaries across the United States, and the employment of thousands in the CCC." We believe, based

on historical and legal analyses (refer to the attached July 31, 2009 letter and reference therein), that FHWA and NCDOT conclusions are incorrect and that they continue to confuse the Service and the NPS in their discussions. The Service and the NPS, although both housed in the Department, possess unique histories, different missions, organizational structures, and operate under different legislative mandates.

***Response:** The Revised Final Section 4(f) Evaluation did not conclude that the Refuge is not a Section 4(f) property. Page 7 of the Revised Final Section 4(f) Evaluation shows that the Refuge was identified as a Section 4(f) property and that determination was not changed. After an extensive review of the history of the islands, the Revised Final Section 4(f) Evaluation concluded that relocating NC 12's alignment within the Refuge would not be considered a use of 4(f) property in the Refuge's capacity as a wildlife and waterfowl refuge because a public road pre-dated the Refuge, its route was not considered permanently fixed to a single alignment, and the Refuge was explicitly created subject to valid existing rights. Rather than eliminating the road, from the time the Refuge was first created the road and the Refuge and Seashore were jointly developed. This determination means that FHWA is not required to make a specific Section 4(f) approval for use of the Refuge in its capacity as a wildlife refuge prior to approving the project. However, since FHWA is required to approve the use under Section 4(f) of the exact same Refuge property as an historic site, the distinction of the Refuge as a refuge versus the Refuge as a historic site has no practical effect. Prior to approving any Parallel Bridge Corridor alternative, FHWA must make a determination that there is no feasible and prudent alternative and that all possible planning to minimize harm has occurred.*

The Constructive Use section of the Revised Final Section 4(f) Evaluation does not underplay the Refuge as an example of an early 20th century "wildlife sanctuary" eligible under the historic context of "conservation" (see pages 16 and 17 of the Revised Final Section 4(f) Evaluation). To the contrary, the Constructive Use section responds to the State Historic Preservation Office (HPO) comment on the Final Section 4(f) Evaluation in the FEIS regarding the impact of the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative on the Refuge as a historic site. After considering the comment by HPO, FHWA agreed that the impact of the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would be so severe as to constitute a constructive use of the property. This determination does not avoid designating the Refuge as a Section 4(f) property. To the contrary, the determination means that FHWA is required to make a specific Section 4(f) approval for the use of the Refuge for that alternative. In addition, several mitigation measures have been committed to in order to minimize the impacts on the historic attributes as well as the ecological attributes of the Refuge. These are listed in the Draft Section 106 Programmatic Agreement in Appendix F of the Revised Final Section 4(f) Evaluation (see Appendix B of this EA) and in the "Project Commitments" located at the beginning of the FEIS and this EA.

The Revised Final Section 4(f) Evaluation did not confuse the relationship of the National Park Service's (NPS) management of the Seashore and USFWS's management of the Refuge. When the Refuge was created it was under the jurisdiction of the US Department of Agriculture, which at that time also housed FHWA's predecessor agency that mapped the existing road on the newly created Refuge. The Revised Final Section 4(f) Evaluation discussed the relationship of the Refuge within the Seashore (see pages 12 to 14 of the Revised Final Section 4(f)

Evaluation). FHWA and NCDOT pointed out that USFWS' management goals have at times been at odds with the development goals of the Seashore. FHWA and NCDOT also pointed out that Congress considered the existence of the Refuge within the Seashore and considered the possibility of impacts to its ecological value before deciding to go forward with the construction of the existing Bonner Bridge. Further, the Revised Final Section 4(f) Evaluation documents the joint and concurrent planning efforts by local government officials, the State, FHWA, and USDOJ agencies to enhance transportation on the Outer Banks while developing the Seashore and Refuge (see pages 12 to 14 of the Revised Final Section 4(f) Evaluation).

- 15. Comment:** As the Service explained in detail in our July 31, 2009 letter to NCDOT (attached), the Refuge is not an overlay on the NPS's Cape Hatteras National Seashores managed by the Service pursuant to a Memorandum of Agreement, as stated on page 13. The Refuge is a functioning unit of the National Wildlife Refuge System established in 1938 by Executive Order 7864, owned and administered by the Service. The Service's title chain, not only is robust, but documents that the agency acquired lands from private land owners unencumbered by any third party right-of-way. The State of North Carolina did not acquire a right-of-way across the Refuge until 1954, well after the establishment of the Refuge. As articulated in FHWA regulations (23 CFR Part 774.11), the concept of "joint planning" applies when a property is formally reserved for a future transportation facility before or at the same time a park, recreation area, or wildlife and waterfowl refuge is established. Clearly this did not happen with respect to the establishment of the NC 12 right-of-way through the Refuge.

Response: *The Revised Final Section 4(f) Evaluation portrayed the Refuge and Seashore as they are described on page 9 of the Refuge's 2006 Comprehensive Conservation Plan (see page 12 of the Revised Final Section 4(f) Evaluation). The judgment of condemnation for the Pea Island Club Tracts to create the Refuge contradicts USFWS' comment that its title is unencumbered. Dare County Deed Book 21, page 84 contains the following statement:*

*"The estate taken for said public use is **the full fee simple title thereto, subject only to existing public highways and public utility easements, if any, and subject to the perpetual easements and rights granted the State of North Carolina by agreement date February 8, 1934, recorded in Book 2, Page 414 of the records of Dare County, North Carolina, to construct, re-construct, maintain and repair, operate and pass through a canal from the Atlantic Ocean to Station 83.50, of such width and depth as may be determined by said State, and at such location as may start at any point south of the proposed dredging of Pamlico Sound for re-opening of New Inlet, Dare County, North Carolina, and a canal to the westward of Station 83.50 through the waters of Pamlico Sound; and subject to right of the State of North Carolina to deposit dredged material from said canal and channel on nereby (sic) lands of grantors of said agreement, provided however, that said material be dumped so as to leave open the present slough leading to Jack Channel; and subject to the right of the State of North Carolina to construct jetties at or near the easterly opening of said canal at the Atlantic Ocean; and subject to the right of said State to plant grass on the sides of said canal to prevent shifting of sands.**" [emphasis added]*

After acquiring the land for the Refuge, USFWS did not eliminate the public road through the Refuge. Instead, USFWS actively accommodated vehicular transportation while developing the Refuge for migratory bird conservation by constructing dikes, ponds, and dunes. The very first Annual Pea Island Refuge Report, from 1938, mentions Refuge birds "allowing cars to pass within 75-100 feet of them at times without being frightened enough to fly." The next year's Report notes that Refuge employees spent 1,767 man days maintaining 102 miles of "truck trails" from NC State highway 34 (a paved road ending at Nags Head) to the Refuge, and 666 man days building four temporary bridge structures over the dikes and sand fences, with plans for permanent bridges in the future.

The 1940 Annual Pea Island Refuge Report documents that "two ramps have been completed on the dykes. In the past before these ramps were completed the public, traveling from Oregon Inlet to points south of the refuge, were accustomed to going over the area without regard for any form of migratory wildfowl. The dyke after being thrown up created a serious menace to this travel because it was almost impossible to cross them without sticking, but since these bridges were completed the public remain on the established trail and cross the dyke without trouble on the bridges. This permits the usual flow of traffic without scaring the wildfowl as was the case before the bridges were constructed."

Local, State and the federal government worked together during the 1940s and 1950s to develop the Seashore and the Outer Banks. This included improvement of infrastructure to enhance transportation through the area, including the Refuge. While the comments submitted by USFWS assert that transportation was not confined to a single fixed corridor, the Annual Reports contain some contradictory statements as do USFWS's regulations from this period which state "Automobiles and other motor-propelled vehicles entering a refuge shall be mechanically safe and in good operating condition and shall be operated in accordance with the following conditions and restrictions: Such vehicles shall be confined to highways, roads, camp grounds, and parking areas designated for travel and public use." 50 CFR 12.12 (1940), 5 F.R. 5284 (December 19, 1940).

According to debate in the Congressional Record, by 1950 approximately 8,900 vehicles per year crossed the Oregon Inlet ferry and this section of road was the only portion of the 70 mile road not yet paved. In 1951, NCDOT proposed to pave this last section and requested documentation of its rights vis a vis the United States in the form of a perpetual easement. The Senate then debated whether to require appraisals of both North Carolina's title, and the easement to be conveyed by USDO I after the road was paved, with payment by NCDOT if the value of its current rights were less. One of the Senators estimated that the sand road through the Refuge had existed for 200 years and that the federal government would benefit from the State paving the road. 97 Cong. Rec. 13541-42 (October 19, 1951). Congress ultimately decided to authorize USDO I to convey to the State a permanent easement, at no cost, for the construction.

After the road was paved, NCDOT worked with USFWS to protect and relocate the road on numerous occasions. Approximately one-half of the length of the road has been relocated outside its original easement.

Some of the Refuge lands were not acquired by USFWS until they were obtained from the State in 1958. The lands acquired from the Pea Island Club and other private parties only included the fast land, or upland. The marshy lands, tidal lands, areas of submerged aquatic vegetation and navigable waters that completely encircle the Refuge below the mean high water line were not acquired by USFWS in 1938. These lands belonged to the State of North Carolina until 1958 when they were donated at the request of USDOJ. The 1958 deed conveying the lands below mean high tide states that the conveyance is subject to the "condition that the State of North Carolina and its subdivisions expressly retain title to and control of all public roads and highways now laid out or established over and upon said lands such other highways and roads as shall be decreed necessary by the State of North Carolina and political subdivisions thereof; and to such end the said land shall be subject to condemnation proceedings in the same manner and to the same extent as if said lands were privately owned." The lands comprising the Refuge are also part of the Cape Hatteras National Seashore Recreation Area. This donation of its lands below the mean high water line within the Refuge in 1958 was part of the creation of the Seashore. Thus, the creation of the Refuge and Seashore were not entirely separate.

In 1962, the House debated whether NPS should contribute to the cost of building Bonner Bridge. It was noted that Cape Hatteras is the only national park wherein the state had constructed and maintained the entire road system. A report from the Secretary of Interior called the bridge "a basic park feature necessary to recreational pursuits" but questioned if it conflicted with the preservation of wilderness in the Refuge. The impact on the Refuge of replacing the ferry with a bridge was then discussed: it was noted that the legislation would not endanger the Refuge (which the Congressmen referred to as "wilderness") because other than the existing road and the proposed Bonner bridge, no additional roads, bridges, or inlets were being authorized. The bill then passed. 108 Cong. Rec. 13697-700 (July 16, 1962).

- 16. Comment:** The FHWA's assertion that a public thoroughfare across Pea Island existed prior to the creation of the Refuge is based upon a 1938 State Highway and Public Works Commission map. Oral history, the Refuge's Annual Narrative, and NPS records do not support this assertion. The Service addressed this assertion in detail in the April 24, 2009, "Section 106 Effects Analysis Regarding Bonner Bridge Replacement Alternatives and Adverse Impacts to Pea Island National Wildlife Refuge" and in the attached July 31, 2009, letter from the Service. The case presented by FHWA ignores the fact that the transportation uses they base their conclusions upon are derived largely from informal use of the beach as a transportation corridor. People drove on the beach unless the tide was high to the point that the beach was impassable. The beach was also used as an ephemeral truck corridor by the Civilian Conservation Corps (CCC). The Service is not aware of any records that indicate that an actual "road" existed in any commonly understood use of the term. When the Refuge was established in 1938, none of the property deeds contained any reservations or easements for a public transportation facility. Consequently, there is no history of a public transportation infrastructure or joint planning or collaboration predating the Refuge, or on the Refuge, until a right to construct and maintain a road in a specific location with a specified width was conveyed in a permanent easement in the 1950's.

Response: *The 1938 map referenced in this comment states that it shows "only official roads." It was published by the North Carolina State Highway and Public Works Commission in cooperation with the Federal Works Agency, Public Road*

Administration (a predecessor agency of FHWA), and it shows the road ran from the Oregon Inlet ferry across the Refuge to Rodanthe, with bridges at New Inlet. The road from Oregon Inlet to Rodanthe and the bridges at New Inlet are also depicted on a 1942 US Commerce Department map, based on surveys conducted in 1937 and 1938. When these surveys were conducted, the Refuge had not yet been created because it is not depicted on the map. These federal maps are ample evidence that a road existed. The fact that it was an unpaved sand road is not a relevant distinction. The vast majority of American roads in the 1930s were non-surfaced, meaning there was no concrete, asphalt, gravel, or other material laid upon the bare earth. The Public Road Administration's records document that in 1942, there were 26,580 miles of such non-surfaced rural roads in North Carolina.

Contrary to the comment, every one of the Refuge's Annual Narratives through 1952 when the road was paved refer to the existence of the road. This is demonstrated in the following table of excerpts from the reports:

Year	Pea Island Refuge Annual Narrative Excerpt
1938	<p><i>“An unusual condition which we have here this year is about 100 Canada geese which did not go north in the spring and are continuing to use the refuge. None of them are breeding here however as they are largely last years birds. Some of them have become very tame, allowing cars to pass within 75-100 feet of them at times without being frightened enough to fly.”</i></p>
1939	<p><i>“Truck Trails. This work was approved for the maintenance of the trails from NC State Highway #34 to the Pea Island Refuge. In extremely dry weather it is almost impossible for heavy equipment to travel over the trails from the pavement to the refuge and it is necessary to maintain these trails to enable the trucks to travel to and from the refuge without such a great loss of time due to being stuck in the sand. During the past fiscal year we used a total of one thousand seven hundred sixty seven man days in maintaining one hundred two miles of trail.”</i></p> <p><i>“Bridges. The work consisted of cutting the materials for four ramps over the dykes and construction of four temporary ramps over the dykes and sand fences. The construction of the permanent structures have not been begun with the exception of setting piling in the dyke at points where the ramps will be located. All piling for these structures are in place and are ready for the work to proceed.”</i></p> <p><i>“Bridges. Vehicle. This work consist of the clearing of timber for four ramps over the dykes on Pea Island Refuge. The work in the fiscal year 1939 consisted of cutting the material and preparing it for the actual construction of the ramps. The work in the present fiscal year will consist mostly of the actual construction of the ramps or bridges. There will not be as many man days spent in 1940 as there were in 1939.”</i></p> <p><i>“The sand in dry weather becomes soft and cuts into deep ruts very readily. The result is that unless a constant effort is made on truck trail maintenance there is much trouble experienced by the truck drivers in getting stuck in the sand ruts. The sand out of the ruts is not packed as much as that in the road and this tends making it impossible to drive outside the established trails.”</i></p>

Year	Pea Island Refuge Annual Narrative Excerpt
1940	<p>“Two ramps have been completed on the dykes. In the past before these ramps were completed the public, traveling from Oregon Inlet to points south of the Refuge, were accustomed to going over the area without any regard for any form of migratory wildfowl. The dyke after being thrown up created a serious menace to this travel because it was almost impossible to cross them without sticking, but since these bridges were completed the public remain on the established trail and cross the dyke without trouble on the bridges. This permits the usual flow of traffic without scaring the wildfowl as was the case before the bridges were constructed.”</p>
1941	<p>“I find that a few common house cats are still on the refuge. I believe that these cats are being placed on the refuge by travelers passing through the area or are strays from the U.S. Coast Guard Stations.”</p>
1942	<p>“This work has consisted in hauling turf for repairing roads leading from the public road around the No. 1 impoundment to the overnight cabin.”</p>
1943	<p>“Violations have not been numerous but have occurred on several occasions from automobiles traveling along the public road.”</p>
1944	<p>“Reposting of much of the area along the public road and seashore has been necessary”</p>
1945	<p>“Violations. Violations have not been numerous and no one has been apprehended but car tracks indicate that there has been one or two along the public road.”</p>
1946	<p>“Due to the feeding areas on which the birds concentrate for feeding and resting being so easily accessible to the public, while traveling through the Refuge at all hours, constant observation and patrol was performed during the winter season.”</p> <p>“Muskrats continue to appear to be increasing. It is not uncommon to see them during the day and the houses can be seen all over the area. They have dug under the road inside the dike causing some damage and it is thought that possibly we will have to trap some of them in the near future.”</p> <p>“Violations. No one apprehended this period. Violations are mighty few and far between on this area. Probably a few shots are taken at the birds from automobiles passing through the Refuge but we will be lucky if we ever apprehend anyone for it.”</p>
1947	<p>“Before the plantings this site was used by vehicles passing from the wash to the inside road. Since vehicle operators depended on this "gap", an opening was left in one row of brush. This was done to avoid stalling of vehicles and to give the drivers a chance to learn a new "gap". As can be seen from the plate the driving is becoming rather difficult and at the time of this writing only vehicles equipped with four wheel drives can get through.”</p> <p>"The tide water from both sea and sound covered roads stopping all traffic for over a day."</p>

Year	Pea Island Refuge Annual Narrative Excerpt
1947	<p><i>"Two ramps over dikes of Pool #1 were constructed this period with asphalt mixed with sand and steel mats laid in. Good stable ramps and the public well satisfied."</i></p> <p><i>"Approximately 25 dead and dying birds were found during the entire period. This is believed to be 50% of the birds affected because the writer searched the marsh regularly in an effort to keep up with it. Naturally the public seeing a few of the birds along the roadway tried to start a public scandal."</i></p> <p><i>"Due to the fact the feeding areas on which the birds concentrate for feeding and resting are so accessible to the general public while traveling through the Refuge, constant patrol and observation was performed through the winter months."</i></p> <p><i>"Refuge signs have been replaced from time to time including reposting of the interior roadway with new 4x4 posts."</i></p> <p><i>The report includes a photograph of the North Carolina Bird Club visitors showing the well-defined public road in the background.</i></p>
1948	<p><i>"One violation was reported. This was when a trawler was anchored in Pamlico sound in the vicinity of the refuge. According to reports a man was placed on shore, and shots fired at geese. This type of hit and run shooting, as well as that from vehicles passing through the area is difficult to control especially with limited personnel."</i></p> <p><i>"Only one brood of eight Blue-winged teal was observed. They finally dwindled down until at the end of the period no young were observed. It is believed that this brood is the same one which hatched from a nest built within five feet of a well travelled road."</i></p> <p><i>"In order to remove any dead or dying geese from the public view considerable time was spent checking the roads and marshes."</i></p> <p><i>"Pierce plank landing mat was finally obtained to lay over the one remaining ramp." The report includes a photograph of the road, showing the pierced plank landing mat that was placed over the dike.</i></p> <p><i>"During January, February, and part of March the roads were continually full of water. It is at times amazing that the vehicles used on the beach run at all."</i></p> <p><i>"These forces also help to avoid monotony in driving. After passing over a road one never knows if it will be passable or even in the same place several hours later."</i></p> <p><i>"All four of the ramps over the dikes now have landing mats on them. The road between the dikes is in very poor conditions. One still hears faint murmurs of a paved road down the beach but nothing definite."</i></p>

Year	Pea Island Refuge Annual Narrative Excerpt
1948	<p><i>“At the beginning of winter a high ocean tide would over-flow and flood the road. These places and others were repaired.”</i></p>
1949	<p><i>“One timber runway was built over the North Dike on road right of way. Materials being furnished by the N.C. Highway Comm.”</i></p> <p><i>“The ramp over the north dike is in very poor condition. An attempt is being made to maintain it in passable condition pending receipt of landing mat or bridge lumber. At the present time it appears as if used bridge lumber will be the cheapest and may perhaps last until a highway is built down the beach.”</i></p> <p><i>“The problem of emaciated and dying geese continues to be the main obstacle to good public relations. Last year there was no reason for complaint but this year there was. With a public road running through the refuge and with geese to be found on the road unable to fly or even to walk out of the road, it can be imagined what the reaction is.”</i></p> <p><i>“Pierced-plank landing mat was placed on the roadway over one of the dikes. Another ramp is wearing out. If additional matting can be obtained, it will be placed and the old bar and rod mats removed.”</i></p> <p><i>The report includes a photograph of a truck carrying concrete posts that shows the well-defined road in the background.</i></p>
1950	<p><i>“Repairs to all but one of the Road runways over the dykes was one of the major repair jobs of the period. The old landing mats have rusted out to the point where two of the ramps became almost impassable, Repairs was made with such Materials as was available but is of a temporary nature at best. It is hoped to have the new landing mats earmarked for this project and now located at White River Refuge on hand and permanent repairs made within the next few weeks.”</i></p> <p><i>“It was necessary to expend several man days removing drift from most of the roads (except within the two pools) following the storm of Nov. 25, which covered the most of Pea Island to a depth of 18 to 24 inches with tide water from the sound side.”</i></p> <p><i>“Quite a few sightseers came in during Dec. to see the Snow Geese and other wildlife in general, and few were disappointed as several thousand snows can usually be seen from the road feeding along the flats.”</i></p> <p><i>“One runway was repaired where the road crosses the south pond Dike, but this operation was of a temporary nature, since it will take new landing mats to even make a semi-permanent job.”</i></p>
1951	<p><i>“The ramps over the four dykes required some repairs due to heavy traffic.”</i></p> <p><i>“Since the completion of the paved road from Nags Head to Oregon Inlet it seems to be a mecca for all the Surf fishermen within a radius of several hundred miles.”</i></p>

Year	Pea Island Refuge Annual Narrative Excerpt
1951	<p><i>"Had one extreme high sound tide that covered most of the marshy parts of the Island, did no damage except litter up the roads with a lot of drift requiring about three man days to clear off."</i></p> <p><i>"405 pieces of pierced plank landing mats were transported from White River refuge and hauled into the refuge which in itself developed into a major undertaking. All the old mats was removed from the dike crossing and the new ones laid into place. All crossing are completed now and in good condition. This project required a total of 59 man days."</i></p> <p><i>"Due to such frigid weather and the foul conditions of the Roads through the months of Jan-Feb, visitors were at a minimum during these two months, but with warmer weather and better roads starting the last two weeks of March surf fishing became popular again."</i></p> <p><i>"With the road from Nags Head to Oregon Inlet now in the process of being paved we can expect recreational uses of Pea Island to increase by leaps and bounds in the very near future."</i></p> <p><i>The report includes a photograph of a controlled burn that shows the well-defined road in the background.</i></p>
1952	<p><i>"One severe northeaster occurred Dec. 3-5 which is seasonal for this area, winds of 40 to 50 MPH lasted app. 48 hrs. bringing in extreme high tides from the ocean side but causing very little damage except to the new paved road thru the refuge."</i></p> <p><i>"The entire 12.33 miles of new state highway was posted with 4x7 ft creosoted post with standard refuge Shields attached. These were placed 8 to the mile. All old signs were dug out and hauled to the service building."</i></p> <p><i>"With the completion of the last 12 mile leg of the hatteras paved highway thru the refuge and opened to traffic on or about June 15, there has been from 200 to 350 vehicles ferried across Oregon Inlet almost daily, with some weekend days even more."</i></p>

Other evidence providing credence to the point that public vehicular transportation existed along Pea Island longer than the Refuge has existed includes:

- *The Pea Island National Wildlife Refuge Comprehensive Conservation Plan of 2006, pages 7, 25, and 39, notes that vehicular transportation existed on a sand pathway prior to 1951. The Comprehensive Conservation Plan also notes that the sand trails pre-dated the Refuge. The Refuge Comprehensive Conservation Plan notes that Captain J. B. Tillet established a tug and barge service across Oregon Inlet in the 1920's. The Comprehensive Conservation Plan notes that the North Carolina Highway Commission began subsidizing Tillet's business in 1934. It is further noted that full reimbursement of the ferry by the State occurred around 1942 and tolls were eliminated. Page 50 of the Refuge Comprehensive Conservation Plan notes that the dunes on Pea Island were originally low, broad dunes with relatively flat slopes. In the 1930's the Civilian*

Conservation Corps enhanced the dunes, making them higher and steeper to protect the road on the backside of the dunes.

- *J.B. Tillet’s 1939 application to the North Carolina State Utility Commission for a License to Operate a Ferry indicates that Captain Tillet operated a ferry over Oregon Inlet for 13 years prior to the 1939 application. The application shows that he operated two barges with capacities of 10 and 5 vehicles. The project file also includes photographs of the ferry, with cars on board, dated 1934 and earlier.*
- *The NPS book “Creation and Establishment of the Cape Hatteras National Seashore - The Great Depression Through Mission 66” contains a picture of Yellowstone Superintendent Toll and a vehicle boarding the ferry across Oregon Inlet in 1934. The book notes that Superintendent Toll described that there were various routes on Hatteras Island, but moving a vehicle any distance meant travel over sand, either by wending through the dunes or along the beach, preferably at low tide. In either case, travelers had to deflate and inflate tires and were routinely required to dislodge vehicles stuck in the sand. Because of both beach driving and the sand problem on inland routes, driving in this area involved significant uncertainties.*
- *A 1938 North Carolina Primary Highway System Map contains the following note: “the Outer Banks, shown in green, have been made a National Seashore Park and are being developed as rapidly as funds will permit. A sandy trail traverses this narrow strip of land from the Ferry at Oregon Inlet (Toll \$1.00) to Hatteras Inlet and while it is possible to drive an automobile – with partially deflated tires – either along this trail or along the beach, we do not recommend that it be attempted without the services of an experienced guide.”*
- *A Dare County highway map published by the State Highway and Public Works Commission in 1944 depicts the road through the Refuge area as a “primitive road.” This map shows a “free ferry” across Oregon Inlet and shows the Coast Guard stations but does not show the Refuge.*
- *USFWS comments in the April 24, 2009, “Section 106 Effects Analysis Regarding Bonner Bridge Replacement Alternatives and Adverse Impacts to Pea Island National Wildlife Refuge” document that the pilings of one of the old bridges at New Inlet remain visible today.*

17. Comment: By segmenting the original project into two parts consisting of the replacement of the Bridge and the NC 12 Transportation Management Plan, FHWA attempts to ignore or underplay the project's direct and indirect adverse impacts to the Refuge, both as a functioning unit of the National Wildlife Refuge System and as a National Register-eligible historic landscape. The Refuge will be irrevocably harmed by the preferred alternative and any subsequent actions implemented under the NC Transportation Management Plan, primarily due to the exacerbation of the shoreline erosion or loss caused by NCDOT's continuing interruption of the island's geomorphic processes. Recent history shows average winds and tides during storms do cause significant overwash across sections of NC 12 along several sections of highway. The Service has issued emergency special use permits to allow the state to clear the highway. We are currently evaluating that approach because of its impacts to wildlife, associated coastal and estuarine habitats and the complex ecological

dynamics of barrier islands, which will only be amplified by ongoing erosion and the growing effect of sea level rise along the North Carolina coast related to accelerating climate change.

Response: *The new Preferred Alternative does not improperly segment the project into two parts (see Section 2.3.5 of this EA). FHWA and NCDOT have not ignored or underplayed the project's direct and indirect adverse impacts to the Refuge, both as a functioning unit of the National Wildlife Refuge System or as a National Register-eligible historic site. The FEIS looked at a corridor of sufficient length to ensure meaningful evaluation of the alternatives and to avoid commitments of transportation improvements before they are fully evaluated. However, choosing a corridor of sufficient length to evaluate direct and indirect impacts does not preclude staged or phased construction. The other resource agency partners agreed that phased decision-making for future segments is the best course of action based on the dynamic conditions on the Outer Banks. It is possible that different approaches may be needed along different points of the Refuge. It should be mentioned that the No-Build Alternative, the baseline for NEPA evaluation, would retain the road on the Refuge and continue the conditions described in this USFWS comment.*

NCDOT is willing to participate in USFWS's re-evaluation of the current approach to responding to overwash on NC 12 within the Refuge, as is indicated in item 18 in the Project Commitments section of the FEIS, as revised in this EA (item 19 of this EA): "Reduce the Potential Impacts from NC 12 Maintenance Prior to the Completion of Each Phase (revised). Recognizing that storm-related NC 12 maintenance will occur before completion of future phases, particularly before the implementation of improvements in the three hot spot areas, NCDOT would continue to work with the Refuge to reduce potential impacts to the Refuge and NC 12 resulting from NC 12 storm-related maintenance."

- 18. Comment:** An issue not presented for discussion in the Revised Final Section 4(f) Evaluation is the Oregon Inlet Terminal Groin. We understand that FHWA has informed NCDOT that they will not provide funding for the project until the Service issues a new special use permit for retaining the terminal groin. Some dialogue between the Refuge, FHWA, and NCDOT has occurred on the issues around the terminal groin permit. At this time, the Refuge has submitted a scope of work to FHWA and NCDOT for data analysis by appropriate coastal experts as input to the decision-making process to help with the analysis associated with a permit decision. If FHWA intends to link these project features, we suggest both should be addressed in this revised document.

Response: *Since the terminal groin is already in place, retaining the structure is not a use of the Refuge for Section 4(f) purposes and retaining the groin would not require a Section 4(f) approval. Nor does the retention of the groin require any NEPA assessment for FHWA beyond that which has already occurred. At USFWS' request, NCDOT is preparing a request for a new or amended special use permit for retaining the terminal groin and associated NEPA documentation needed by USFWS for its action. Coordination with USFWS on the terminal groin permit is ongoing, and FHWA and NCDOT are working with USFWS on the additional documentation proposed.*

- 19. Comment:** Pg. 5 states "The new Preferred Alternative would allow all agencies to minimize risks by building what is needed now, and managing the rest of the project area on

an as needed basis.” The Service fails to see how this allows us to “minimize risks” considering that there is no plan beyond building the bridge. While it may minimize risks for the highway, the “plan” should also minimize risk to natural resources on the Refuge where possible.

***Response:** The NC 12 Transportation Management Plan Alternative is a plan for building all phases of the project and not only Phase I. The Project Commitments in the FEIS, as revised in this EA, also apply to future phases and are expected to be amended for future phases in order to minimize risk to natural resources in the Refuge where possible. Additional commitments to minimize risk and mitigate impacts that apply to all phases are presented in Section 4.7.10 of the FEIS. NCDOT plans to use the existing NEPA/Section 404 Merger Process for future coordination with environmental resource and regulatory agencies with one objective being to minimize risk to natural resources on the Refuge where possible. USFWS is an active member of the Merger Team for the Bonner Bridge Replacement Project.*

- 20. Comment:** Pg. 5 and the cover page to Appendix H reference agreements of the Merger Team regarding the possible need for a new Concurrence Point 3 form, at a September 17, 2009, meeting. Agreement on Concurrence Point 3 indicates agreement regarding the selection of the preferred alternative. The Service does not concur with the revised Concurrence Point 3 (Least Environmentally Damaging Practicable Alternative). We question why Appendix H is included in this document, since the Merger Team (which included most of the Merger Team agencies minus the Service, who was not present) decided not to move forward with this specific partnership agreement. We recommend that you remove Appendix H.

***Response:** As indicated in the introduction of Appendix H of the Revised Final Section 4(f) Evaluation, at the May 21, 2009 Merger Team meeting, the Merger Team agreed on a need for some type of “Memorandum of Understanding or Agreement” to document how project decisions will be made for future phases of the project. The draft Partnership Agreement contained in Appendix H represents the version discussed at the September 17, 2009 Merger Team meeting, during which it was decided that FHWA and NCDOT should only pursue such agreement with NPS and USFWS. A separate Least Environmentally Damaging Practicable Alternative (LEDPA) amendment was prepared following the September 17 meeting after it was decided that the Merger Process Dispute Resolution Board should amend their agreement that was reached on August 27, 2007; the LEDPA amendment approved by the Dispute Resolution Board (see Appendix A of this EA) stipulates that the Merger Team will be consulted about decisions on future phases of the project. At this time, USFWS and NPS have indicated that they do not feel it appropriate to sign a separate “Memorandum of Understanding or Agreement” for this project. In light of this position and the commitment in the LEDPA amendment, NCDOT plans to use the existing NEPA/Section 404 Merger Process for future coordination. USFWS and NPS are active members of the Merger Team for the Bonner Bridge Replacement Project.*

- 21. Comment:** Pg. 6 states “Under the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, later phases of actions to manage NC 12 through 2060 would be decided based on actual conditions existing on Hatteras Island at the point in time that additional action becomes necessary.” We point out that the NC 12 Transportation Management Plan portion is not actually a formal plan, but rather a deference to make plans

at a later time. The problem with this approach is well illustrated by recent events. During the week of November 9, 2009, a storm battered the eastern seaboard. The storm severely damaged the portion of NC 12 at the southern end of the Refuge near Rodanthe. The beach and berm that formerly protected the road from the ocean are largely gone and it would appear that these “actual conditions” indicate that additional action is necessary. Yet, there is no “plan” for dealing with what would be this next “phase” of the project explicitly stated in the PB/TMP alternative. The only response possible under these crisis conditions is to rush in and attempt to repair the damage. Clearly, waiting for emergencies to dictate action is not conducive to sound long-term decision-making. Yet, based on the FEIS, future decisions regarding the fate of NC 12 and the Refuge would be made under the PB/TMP alternative in this manner.

Response: *It is not the intent of the NC 12 Transportation Management Plan Alternative (Preferred) to wait for emergencies to dictate actions. Section 2.10.2.5 of the FEIS and Section 2.3 of this EA describe a process for determining when to implement future phases and for minimizing impacts from NC 12 maintenance. Its components are presented as commitments on the part of NCDOT and FHWA in the FEIS’s Project Commitments section (commitments 15 to 18) and in the EA’s Project Commitments section (commitments 16 to 19). These commitments apply to the NC 12 Transportation Management Plan Alternative (Preferred).*

- 22. Comment:** By “mixing and matching” components of the previously presented alternatives, the NC 12 Transportation Management Plan becomes a plan equating to emergency response for erosion and ocean overwash. Also, the FEIS preferred alternative was based upon the premise that bridging and NC 12 maintenance in the Phased Approach were all envisioned to be done within the existing right-of-way. The new preferred alternative clearly envisions work outside the existing right-of-way (note our comments above and references to Appendices E and G). We note again, that work outside the existing right-of-way is not likely to be found compatible with the purposes for which the Refuge was established and as such may not be allowed. We recommend that NCDOT and FHWA decide on a final alternative and work with us to conduct a compatibility determination so that you can maintain your schedule.

Response: *As suggested by USEPA, NCDOT and FHWA do not believe that it is in the best interest of the public to select a particular alternative for the future phases at the present time. NCDOT and FHWA believe that it is more appropriate to make decisions based on coastal conditions and trends closer to the time when NC 12 improvements are needed, and that this applies to compatibility determinations as well. As indicated in the LEDPA agreement amendment (see Appendix A), the Dispute Resolution Board agreed that: “The best available science has been used to forecast shoreline erosion and potential inlet formation. However, it is difficult to predict reasonably and accurately future storm events and their magnitude, intensity, and duration. Extensive coastal engineering studies have been completed to date. Because of uncertainty regarding future storm events, additional coastal and natural resource data will be collected and analyzed to evaluate the available range of alternatives for future phases.” The LEDPA agreement amendment supports FHWA and NCDOT’s recognition of the uncertainty in predicting future conditions for future phases of the NC 12 Transportation Management Plan Alternative (Preferred), and FHWA and NCDOT similarly believe that USFWS cannot accurately forecast the condition of the Refuge 20 to 50 years into the future to make a compatibility determination on a solution for the entire corridor at this time.*

23. Comment: Pgs. 9-13 present substantial information regarding historic use and deed reservations. Most of the information is relative to the Cape Hatteras National Seashore, while very little relevant to the Refuge as there were no restrictions, reservations, or easements within or attached to the deeds at the time the Refuge land was purchased. Consequently, the manner and format for presenting this information is very misleading and does not reflect an accurate assessment of the language within the deeds of respective lands. We recommend that NCDOT and FHWA revise their decision documents to acknowledge the fact that the Refuge and Cape Hatteras National Seashore are distinct properties, established under distinct authorities, and managed by separate federal agencies under separate authorities. We further recommend that NCDOT and FHWA revise their decision documents to reflect the requirement to ensure that their actions are compatible with the purposes for which the Refuge was established.

Response: See the responses to USDOJ comments 5 and 15.

24. Comment: Pgs. 22-23 and related content in Appendix E imply there is final agreement as to what constitutes a minor modification to the existing right-of-way for the southern terminus of the Parallel Bridge. It also implies that a shift may occur in the NC 12 right-of-way of about 216.5 feet further west as the Parallel Bridge makes landfall on the north end of the Refuge. The Refuge, NCDOT, and FHWA have had meetings with regard to what would constitute a minor modification to the existing right-of-way. Discussions at these meetings have been in the context of what could possibly be viewed as a minor modification with appropriate mitigation for the use of Refuge land. To date, there have been no agreements on either the right-of-way or mitigation. We are unaware of any finalized NCDOT proposal. Nothing has been presented to the Refuge that finalizes a shift in alignment and no requests have been made for a right-of-way modification. Therefore, the shift of 216.5 feet west should be considered tentative because we are still working on the specific details with NCDOT and FHWA. Appendix E also presents acreage estimates for new easement, but, because there have been no final agreements with the Refuge, acreage numbers are likely to change. We require a final design proposal for a request to modify the existing right-of-way along with adequate NEPA documentation and a compensatory mitigation plan. Only then we can determine if the proposed modification is minor under our regulations (50 CFR 26-41).

Response: As discussed on page 34 of the Revised Final Section 4(f) Evaluation, coordination with USFWS has occurred on Phase I. This alternative evolved after correspondence and discussions based on previous proposals. FHWA evaluated this alternative for a Section 4(f) approval of the Refuge as a site on or eligible for the National Register of Historic Places. The analysis concludes that FHWA would issue a Section 4(f) approval for this alternative based on the analysis presented in the Revised Final Section 4(f) Evaluation. NCDOT will submit separate documentation with a request for a new or amended easement and compatibility determination for Phase I of the project prior to construction. If this alternative is not compatible, but an alternative that is closer to the existing easement that is compatible is agreed upon, FHWA would not likely need to revise its Revised Final Section 4(f) Evaluation as the impacts to the 4(f) resource would be less than presented in that document.

25. Comment: Pg. 23 implies that the Service may discontinue recreational fishing as a Refuge use. That statement is incorrect. Recreational fishing is identified in the Refuge Improvement Act as one of the six public uses meeting the wildlife dependency criteria. If this statement in any way implies that the Service will assume responsibility for maintenance

of a remnant portion of the Bonner Bridge attached to the Refuge for fishing access then FHWA must clarify this section. The Service has stated in the past, and remains steadfast, that under no circumstances will we assume ownership or responsibility for maintenance of a remnant portion of the Bonner Bridge. We will continue to allow fishing along the shoreline near Oregon Inlet when compatible. We recommend you clarify this section.

***Response:** The Revised Final Section 4(f) Evaluation states that NCDOT can commit to providing public access to fishing at the northern end at Oregon Inlet, but that commitment is subject to future compatibility determinations for recreational fishing by USFWS (see page 23 of the Revised Final Section 4(f) Evaluation). The Refuge Comprehensive Conservation Plan indicates that such a use will be re-evaluated by August 2, 2021. The statement does not imply responsibility for the ownership of the Bonner Bridge once it is discontinued from service.*

- 26. Comment:** Pg. 27 states that the new preferred alternative "... is the alternative that causes the least overall harm." We cannot support such a conclusion, and question how FHWA and NCDOT made this determination since, based on the information contained in the document, they do not know what future phases of the project will look like based on the uncertainties of future conditions. We recommend clarifying text on how NCDOT and FHWA reached this conclusion.

***Response:** As indicated in the LEDPA agreement amendment (see Appendix A), the Dispute Resolution Board agreed that: "The best available science has been used to forecast shoreline erosion and potential inlet formation. However, it is difficult to predict reasonably and accurately future storm events and their magnitude, intensity, and duration. Extensive coastal engineering studies have been completed to date. Because of uncertainty regarding future storm events, additional coastal and natural resource data will be collected and analyzed to evaluate the available range of alternatives for future phases." The LEDPA agreement amendment supports FHWA and NCDOT's recognition of the uncertainty in predicting future conditions for future phases of the NC 12 Transportation Management Plan Alternative (Preferred), and FHWA and NCDOT similarly believe that USFWS cannot accurately forecast the future landscape of the Refuge 20 to 50 years into the future. NCDOT and FHWA understand that USFWS desires for the natural processes of overwash and inlet formation to take over on the island, and also understand the rationale for allowing the natural processes to occur so that the future viability of the island may be prolonged. However, such a condition has never existed on the Refuge because as soon as USFWS acquired land for the Refuge it began building a landscape to benefit migratory birds in the form of freshwater impoundments, dunes, and dikes. NCDOT has demonstrated that it does not have sufficient resources to fund a 17.5-mile bridge to bypass the island. Therefore, that alternative is not practicable. Further, FHWA determined that the Pamlico Sound Bridge Corridor is not a prudent and feasible alternative. Therefore, the analysis must look at the remaining options available to continue to provide transportation, while minimizing harm to the Refuge.*

- 27. Comment:** We have endeavored to work with the NCDOT and FHWA to resolve these and other issues throughout this process, but the current approach of the transportation agencies (as articulated in this Revised Final Section 4(f) Evaluation) continues to inadequately address fundamental concerns raised by the Service, and raises additional concerns that represent a substantial move away from a workable solution. We thank you for the opportunity to review and comment on this document.

Response: *It is NCDOT and FHWA's intent to continue to work with USFWS to resolve the issues raised in their letter and other issues as the environmental, design, and construction processes proceed.*

F.2 US Department of Interior (Supplement)

USDO I submitted supplemental comments on the Revised Final Section 4(f) Evaluation developed by the National Park Service and dated April 21, 2010, approximately 4.5 months after the end of the comment period (November 26, 2009). The letter submitted is contained in Appendix G. FHWA and NCDOT have taken these comments into consideration, and will continue to coordinate with NPS about their concerns during the comment period for the EA.

F.3 North Carolina Department of Cultural Resources

Comment: Thank you for your letter of October 12, 2009, transmitting the above referenced evaluation for the proposed undertaking. We have reviewed the evaluation and find that it correctly identifies the historic properties within the project's area of potential effects and the effects on historic properties for the several alternatives.

We would note that while the document states that there "are firm commitments to study and mitigate the future environmental conditions prior to making decisions for the later phases," those commitments are not clearly outlined and available for easy reference within the document. These commitments should be specifically stated at a single site within the document so as to be readily available to all parties involved in and/or affected by the undertaking.

The same holds true for the proposed NC 12 Transportation Management Plan, which at this point is more of a concept than an actual plan.

Response: *Those commitments are included in the draft Programmatic Agreement developed with NCDCR under the requirements of Section 106 of the National Historic Preservation Act of 1966. The signed final Programmatic Agreement will be included in the project's ROD. The NC 12 Transportation Management Plan Alternative (Preferred) is defined in Section 2.3.2 of this EA.*

F.4 Southern Environmental Law Center

- 1. Comment:** As discussed in more detail below, the Revised 4(f) Evaluation is inadequate and the project cannot go forward as planned for the following reasons: 1. In its cover letter for the Revised 4(f) Evaluation, NCDOT describes a new preferred alternative and a plan to supplement its NEPA documentation in a way that will violate NEPA by improperly segmenting the project, by engaging in improper reverse engineering, and by issuing an Environmental Assessment when a Supplemental Final Environmental Impact Statement is instead required.

Response: *Responses to each of the commenter's points are covered below.*

- 2. Comment:** The Revised 4(f) Evaluation is inadequate and does not satisfy the requirements of Section 4(f) of the Department of Transportation Act of 1966. The evaluation erroneously concludes that the new preferred alternative will not “use” Refuge lands (as a refuge) based on a joint planning exception that does not apply. That determination distorts the evaluation of the factors in the “least overall harm” analysis, which itself provides an incomplete assessment of harms. In addition, the revised evaluation improperly discounts viable avoidance alternatives.

Response: *The Revised Final Section 4(f) Evaluation complies with Section 4(f). The land that comprises the Refuge is protected under Section 4(f) because of its status as a National Wildlife Refuge, its status as part of the National Park System, and because of its status as a historic landscape eligible for the National Register of Historic Places. The next step under the applicable regulations is to determine whether each alternative under consideration would “use” the Refuge. The Revised Final Section 4(f) Evaluation made two changes with respect to the determination of which alternatives would “use” of the Refuge. First, the Phased Approach/Rodanthe Bridge alternative, for which FHWA previously had determined there would be no “use”, was determined to “use” the Refuge (see page 12 of the Revised Final Section 4(f) Evaluation). Second, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) was also determined to “use” the Refuge (see page 15 of the Revised Final Section 4(f) Evaluation). The rationale for determining there would be a “use” was because of the property’s status as a historic landscape. The joint planning exception mentioned in the comment is addressed on pages 13-16 of the Revised Final Section 4(f) Evaluation. Ultimately, the distinction of the Refuge as a refuge, versus the Refuge as a historic site, has no practical effect because the Revised Final Section 4(f) Evaluation determined that the Refuge would be used by all of the parallel bridge corridor alternatives. If any of these alternatives are selected, FHWA is therefore required to approve the use of the Refuge property under Section 4(f) before the project could proceed.*

Harm to the Refuge’s function as a wildlife Refuge was not ignored. First, the Refuge was recognized as the most significant of the Section 4(f) properties that would be affected by the project. Second, while the Refuge was considered “used” for Section 4(f) purposes only in its capacity as a historic site, FHWA and NCDOT recognize that the ecological activities, features, and attributes of the Refuge would incur impacts from all of the Parallel Bridge Corridor alternatives, and harm minimization and mitigation measures for those impacts would be included within any build alternative selected. The specific ecological activities, features, and attributes of the Refuge that have been studied for possible impacts include biotic communities, submerged aquatic vegetation, 10 different categories of wetlands, upland habitat, impoundments, aquatic bottom habitat, essential fish habitat, and protected species of plants, fish, birds, and animals. Impacts to the Refuge’s wildlife and waterfowl-related facilities and activities were studied as well. Among the project alternatives that were not eliminated as not feasible and prudent, there is not a substantial difference in impacts to the ecological activities, features and attributes of the Refuge, nor is there a substantial difference in impacts to the wildlife and waterfowl-related facilities and activities of the Refuge. All of the Parallel Bridge Corridor alternatives would have varying impacts and mitigation opportunities to the ecological features, activities, and attributes of the Refuge as described in the FEIS and the EA and Section 4(f) Evaluation. FHWA and NCDOT believe that for

purposes of determining the least overall harm, this factor is not a determining factor because the impacts after mitigation would be substantially equal.

3. **Comment:** The heart of the debate over the Bonner Bridge replacement project is its effect on Pea Island National Wildlife Refuge. The Refuge was created to be a “refuge and breeding ground for migratory birds and other wildlife.” Exec. Order No. 7864, 3 Fed. Reg. 863 (Apr. 12, 1938). It occupies the northern end of Hatteras Island, a barrier island separated from North Carolina's mainland by Pamlico Sound. The current Bonner Bridge passes from the southern end of Bodie Island, over Oregon Inlet, to the northern end of Hatteras Island, terminating in the Refuge; NC 12 then continues the transportation route through the length of Pea Island Refuge, and exits the southern end of the Refuge at the town of Rodanthe, then continues traveling southward through the remainder of Hatteras Island.

Bodie Island, Hatteras Island, and Oregon Inlet are part of a dynamic barrier island system, and the Pea Island Refuge relies on this dynamic process for ecological viability. Pea Island Refuge is subject to ocean overwash, high shoreline erosion rates, inlet formation, and other impacts associated with large storm events, sea level rise, and general barrier island dynamics. While many of these natural processes are incompatible with transportation corridors, they are beneficial to the abundant wildlife and are instrumental in creating nesting habitat, feeding grounds, and other natural habitats. Many species of migratory birds, shorebirds, and sea turtles, some federally protected, use Pea Island Refuge. It has 1,000 acres of waterfowl impoundments for migratory birds and 13 miles of ocean beach for wildlife nesting. Many members of our organizations regularly recreate in and enjoy the natural resources of Pea Island Refuge.

Efforts to maintain NC 12 through the Refuge has long contributed to the degradation of the Refuge. A long-term solution to the problems that the NC 12 transportation corridor poses to the Refuge's volatile system is necessary to meet the purpose and need of the Bonner Bridge Replacement project. For nearly a decade, the maintenance of the entire transportation route (from the southern end of Bodie Island, over Oregon Inlet, to the southern end of the Refuge at the town of Rodanthe, mid-way down Hatteras Island) has been treated as a single project to replace the failing bridge and the existing NC 12 corridor through the Refuge.

Any plan that relies on maintaining the transportation corridor through the Refuge instead of around it will continue to cause problems for both the Refuge and people attempting to drive on NC 12, and will be incompatible with the purpose of the Refuge. As the Revised 4(f) Evaluation acknowledges, “shoreline erosion” in the Refuge will be a “significant issue and new inlets are likely to form” and “future major storms are likely to affect NC 12.” Rev. 4(f) at 5. Moreover, there are three areas, known as “hot spots,” along the length of the Refuge between Oregon Inlet and Rodanthe, that are known to be particularly susceptible to storm-related erosion and are the likeliest spots that NC 12 will fail in the future. (*Id.* at 3-4.) The portion of NC 12 currently traveling through the Refuge has been plagued by erosion at these hot spots and other points, necessitating emergency repairs that encroach on the Refuge. There is no doubt that, if NC 12 is allowed to continue through the Refuge, there will continue to be the need for emergency repairs and construction of NC 12 caused by recurring storm events, erosion, climate change, and sea level rise, in highly predictable locations and manner. Indeed, we understand that, a week ago and then again yesterday, NC 12 had once more been breached and was impassable at the hot spot closest to Rodanthe, due to storm activity. As of today, NC 12 is reported as being impassable through the length of the Refuge. (Photographs and an emergency alert from websites maintained by Dare County,

<http://www.co.dare.nc.us/webcam/mirlo.php>, and <http://www.co.dare.nc.us/EmgyMgmt/Alert/index.asp>, are attached hereto as Exhibit B.)

Response: *The NPS book “Creation and Establishment of the Cape Hatteras National Seashore - The Great Depression Through Mission 66” notes that when the Refuge was created the land was “sub-marginal” for wildlife habitat. “To improve this land for habitat purposes, CCC crews from Camp Virginia Dare excavated a series of artificial ponds after first building a line of barrier dunes for their protection.” While the natural processes described in this comment are disrupted in part by NC 12, the natural processes are also disrupted by the dunes and impoundments that did not exist naturally but were constructed after the Refuge was created, and that continue to be maintained by active management of the Refuge environment. Throughout its entire existence the Refuge has been ecologically viable in spite of these intrusions on natural processes. The No-Build Alternative, the baseline for NEPA evaluation, would retain the road on the Refuge.*

Although FHWA and NCDOT have endeavored to minimize harm to the Refuge, the purpose and need for the Bonner Bridge replacement project does not require the alternatives to provide “a long-term solution to the problems that the NC 12 transportation corridor poses to the Refuge's volatile system.” The purpose and need for the Bonner Bridge replacement project is described in Chapter 1 of the FEIS. The impact of the need for emergency repairs prior to the completion of the final phase of a project within the Parallel Bridge Corridor is addressed in Sections 4.6.8.6 and 4.7.8 of the FEIS and Section 2.3.6 of this EA. Compatibility of the alternatives with Refuge objectives is addressed in Section 4.1.2.4 of the FEIS, where it is noted that all of the Parallel Bridge Corridor alternatives, except for the Phased Approach/Rodanthe Bridge Alternative, may not be compatible with Refuge objectives. A compatibility determination may not be required with the Phased Approach/Rodanthe Bridge Alternative because this alternative falls within the terms of the NC 12 easement permit. NCDOT will submit separate documentation with a request for a new or amended easement and compatibility determination for Phase I of the NC 12 Transportation Management Plan Alternative (Preferred) prior to construction. The importance of correcting the three “hot spots” in the near-term is addressed in Section 2.10.2.5 of the FEIS and 2.3.6 of this EA. In accordance with the NC 12 Transportation Management Plan, sections of all three “hot spots” may already meet one or more of the criteria for initiating an environmental review of those areas. The coastal monitoring program proposed as part of the NC 12 Transportation Management Plan will provide the information needed to determine when future phases of action will be initiated in these areas.

4. **Comment:** The new preferred alternative identified in the Revised 4(f) Evaluation, however, ignores these certainties. On the basis that shoreline erosion and storm effects are putatively too uncertain to predict, the new preferred alternative defers until “later phases” of the project decisions about the manner in which the NC 12 corridor will be maintained through the Refuge. It leaves open the opportunity for NCDOT to use any other alternatives identified in the FEIS, even those that the FEIS determined will cause the greatest adverse effects to the Refuge, including beach nourishment, building a string of bridges through the Refuge, attempting to maintain NC 12 in its current corridor, and moving the NC 12 corridor into other portions of the Refuge. It even leaves open the possibility of maintaining the NC 12 corridor through the Refuge using methods never identified or evaluated in the FEIS, the Revised 4(f) evaluation, or any prior version of either document. (Rev. 4(f) at 5,6.)

Response: *Before future phases of the NC 12 Transportation Management Plan Alternative (Preferred) could be implemented, all applicable environmental laws would have to be complied with for that phase. The analysis would take into account the actual conditions on Hatteras Island at that time. Although at this time it is impossible to predict every possible variation that might prove worthy of consideration in the future, the impacts determined in the FEIS and this EA for the various Parallel Bridge Corridor alternatives reflect the range of reasonably foreseeable impacts associated with the NC 12 Transportation Management Plan Alternative (Preferred). Once NCDOT and FHWA determine, based on the findings of the coastal monitoring program, to initiate work on a later phase, the selection and finalizing of that phase will be determined in association with USFWS and other stakeholders through the NEPA/Section 404 Merger Process, which is detailed in Section 8.3.1 of the FEIS. In addition to the coordination under the Merger Process, FHWA and NCDOT will complete the appropriate NEPA documentation for each phase (23 CFR 771.129-130). Environmental conditions and the timing of each phase will be the primary factors in determining what type of NEPA documentation (a re-evaluation, a supplement, or a separate NEPA process) is the most appropriate.*

- 5. Comment:** However, delaying the selection from among these alternatives cannot change the fact that none of them is an acceptable alternative. Each attempts to continue to maintain a fixed transportation corridor on a shifting barrier island at the cost of public safety, reliability, and ecological protection. More specifically, each will: (1) fail to protect NC 12 from shoreline movement during the project life, (2) fail to take into account channel migration and to let the channel move, and (3) fail to preserve the natural barrier island system. Furthermore, none of the alternatives for maintaining the NC 12 corridor through the Refuge is compatible with the purpose of the Refuge, pursuant to the National Wildlife Refuge System Improvement Act, and none is a viable alternative pursuant to Section 4(f) of the Department of Transportation Act of 1966.

Response: *The Parallel Bridge Corridor alternatives would meet the purpose and need of the project. Compatibility under the National Wildlife Refuge System Improvement Act will be determined by USFWS. NCDOT will submit separate documentation with a request for a new or amended easement and compatibility determination for Phase I of the NC 12 Transportation Management Plan Alternative (Preferred) prior to construction. FHWA will make its Section 4(f) approval in the ROD.*

- 6. Comment:** NC 12 and its associated maintenance are already steadily degrading the Refuge, and the new preferred alternative will only serve to continue this degradation. It will keep NC 12 under construction in the Refuge for the life of the project. The new preferred alternative amounts to a blank check that cannot pass legal scrutiny.

In contrast, the Pamlico Sound Bridge alternative is safer, more reliable, and more protective of the environment. FEIS 2-78 to 2-81. A Pamlico Sound Bridge would not be subject to ocean overwash, inlet formation, or erosion. It would allow the U.S. Fish and Wildlife Service (“FW”) to preserve and protect the Refuge and the associated wildlife. Furthermore, the Pamlico Sound Bridge is the only alternative that can be authorized pursuant to applicable federal laws. As discussed in greater detail below and in our comments of October 27, 2008, the Pamlico Sound Bridge is the only alternative that will work and can be authorized pursuant to applicable federal laws.

Response: *The NC 12 Transportation Management Plan Alternative (Preferred) is a long-term strategy that includes commitments to minimize impacts to Refuge resources. The purpose and importance of the Refuge is taken into account. This also is done within the context of what is practicable, feasible, and prudent from the perspective of available funding. Rather than being a blank check, it is expected that once NCDOT and FHWA determine, based on the findings of the coastal monitoring program, to initiate work on a later phase, the selection and finalizing of that phase will be determined in association with USFWS and other stakeholders through the NEPA/Section 404 Merger Process, which is detailed in Section 8.3.1 of the FEIS. In addition to the coordination under the Merger Process, FHWA and NCDOT will complete the appropriate NEPA documentation for each phase (23 CFR 771.129-130). Environmental conditions and the timing of each phase will be the primary factors in determining what type of NEPA documentation (a re-evaluation, a supplement, or a separate NEPA process) is the most appropriate. The Pamlico Sound Bridge Corridor, while avoiding the Refuge, is not practicable or feasible and prudent, as documented in this EA (Section 2.2) and the Revised Final Section 4(f) Evaluation (Appendix G). FHWA and NCDOT also received public comments that differ from the safety and reliability perspective presented in this comment.*

7. **Comment:** The cover letter for the Revised 4(f) Evaluation (attached hereto as Exhibit C) describes an improper plan to issue an Environmental Assessment (“EA”) that will describe the environmental impacts of the new preferred alternative and presumably finding them to be “not significant,” instead of issuing a revised or supplemental Final Environmental Impact Statement (“SFEIS”) as required by NEPA. This is improper on several counts.

The decision to issue an EA instead of an SFEIS was apparently driven by an improper purpose – that is, a desire to preclude public review and comment on the new preferred alternative and its compliance with applicable laws. According to NCDOT status reports on the Bonner Bridge Replacement Project, NCDOT intended to issue an SFEIS as late as July 24, 2009, but by July 31, 2009, had changed its mind and was considering alternative forms of “supplemental NEPA documentation.” The change of heart is explained in handwritten notes by NCDOT Project Planning Engineer Beth Smyre. On July 21, 2009, she wrote that the “concern is allowing the public to comment on the ‘new’ alternative.” Her notes go on to cite to federal regulations that govern supplemental EISs, and indicate apprehension that NCDOT would have to issue a draft SFEIS for comment before issuing the SFEIS and Record of Decision. Her notes also point out that any NEPA document on the new preferred alternative will not be complete without agreement on how the later phases involving maintenance of the NC 12 route through the Refuge to Rodanthe will be accomplished. (Ms. Smyre’s notes and the two NCDOT status reports are attached hereto as Exhibit D.)

Significantly, neither Ms. Smyre’s notes nor the status reports nor any other public record indicate any basis for the decision to issue an EA instead of an SFEIS that would be permissible under NEPA. Federal regulations implementing NEPA list the circumstances in which an SFEIS will and will not be required, all of which relate to the substance and significance of new impacts or new information related to the proposed action. 23 C.F.R. § 771.130; 40 C.F. R. § 1502.9(b). The regulations do not, however, allow the decision whether to issue an SFEIS to be made on the basis of expediency or a desire to exclude the public from the process – for instance, to avoid the time and effort to issue a draft SFEIS or to prevent members of the public from commenting on a proposed action or alternative.

Indeed, because NCDOT and FHWA concluded that the proposed project warrants an EIS, any significant new information or circumstances affecting the project or the selection of an alternative must also be reviewed in an SFEIS. As the U.S. Supreme Court explained, “It would be incongruous with [NEPA’s] approach to environmental protection, and with the Act’s manifest concern with preventing uninformed action, for the blinders to adverse environmental effects, once unequivocally removed, to be restored prior to the completion of agency action...” *Marsh v. Oregon Natural Res. Council*, 490 U.S. 360, 371 (1989) (emphasis added) (discussing requirement for SFEIS).

Response: *The notes referenced in the comment are personal notes by Ms. Smyre used as a reminder of a discussion in which she participated and as such do not necessarily include complete thoughts or final conclusions reached by the agencies. The notes were obtained under the North Carolina Public Records Law by the commenter.*

Implementing NEPA regulations allow FHWA to prepare this EA to assess the impacts of new information or new circumstances when the significance of new impacts is uncertain. This EA is being made available for public comment. If it is determined that changes to the proposed action would result in significant environmental impacts that were not evaluated in the FEIS, or new information or circumstances relevant to environmental concerns and bearings on the proposed action or its impacts would result in significant environmental impacts not evaluated in the FEIS, then a Supplemental FEIS will be prepared.

The commenter interprets Ms. Smyre’s notes as saying: “any NEPA document on the new preferred alternative will not be complete without agreement on how the later phases involving maintenance of the NC 12 route through the Refuge to Rodanthe will be accomplished.” Ms. Smyre’s notes on this point, however, are referencing a discussion on the timing of a potential Partnership Agreement with USFWS and others and not the timing of final decisions on the characteristics of later phases.

8. Comment: In the present case, significant new information and circumstances that have arisen since the issuance of the FEIS in September 2008 justify the issuance of an SFEIS for public comment. The new information and circumstances not previously addressed in the FEIS include, but are not limited to, the following:

- the selection of a new preferred alternative that includes “later phases of actions to manage NC 12” that “could consist of, but would not be limited to, one or more components of any of the alternatives already studied” – in other words, selection of a new preferred alternative that includes components not previously identified and studied in the FEIS (Rev. 4(f) and 6) (emphasis added);

Response: *This alternative is not significantly different from the Parallel Bridge Corridor alternatives presented in the SSDEIS and the FEIS. Public comments from the March 2007 Corridor Public Hearing demonstrate that the general public understood that the Parallel Bridge Corridor alternatives allowed NCDOT to mix and match the components of each alternative at later dates, and also understood that the alternatives were not mutually exclusive. All known components of a future phase have been studied. The NC 12 Transportation Management Plan Alternative (Preferred) does not foreclose the possibility of studying additional alternatives in the future, for future phases, because changes in the landscape or changes in*

technology could result in new alternatives by 2060. As stated in the LEDPA agreement amendment (see Appendix A): “At this time, there is no formally prescribed alternative for the remaining phases of the project south of Oregon Inlet. One or more of a combination of options, drawing from the alternatives previously studied, as well as any other alternatives determined at the time to be reasonable, practicable and feasible, will be evaluated, designed, and finalized prior to the implementation of actions beyond Phase I. Any option will be evaluated and selected with multi-agency input and concurrence as part of the Merger Process. The agencies do agree that permits will not be granted for the remaining phases of work until their applicable laws and regulations have been satisfied.” Based on the terms of the LEDPA agreement amendment, the NC 12 Transportation Management Plan Alternative (Preferred) is not significantly different from the other Parallel Bridge Corridor alternatives because NEPA regulations require the periodic re-evaluation of highway projects.

- the fact that the new preferred alternative will absolutely require the re-permitting of the terminal groin, which will have significant biological impacts (as confirmed by the FWS and, when one is convened in response to FWS requests, a panel of experts) that have never been evaluated in a NEPA document;

Response: At USFWS’ request, NCDOT is preparing a request for a new or amended special use permit for retaining the terminal groin and associated NEPA documentation needed by USFWS for its action. Coordination with USFWS on the terminal groin permit is ongoing, and FHWA and NCDOT are working with USFWS on the additional documentation proposed.

Retaining the terminal groin would not require a Section 4(f) approval for the use of the Refuge. The terminal groin is an existing feature constructed in cooperation between USDOJ, USACE, and NCDOT. It was found compatible with the purposes of the Refuge when constructed, and its existence has never been determined incompatible. USFWS will determine whether a new compatibility determination is required to retain the terminal groin. NCDOT and FHWA have considered the effects of retaining the terminal groin on the Refuge. The FEIS presumes the continued presence of the terminal groin in its shoreline forecast modeling (FEIS Section 3.6.3) and its assessment of cultural, coastal, and natural resource impacts (FEIS Sections 4.4, 4.6, and 4.7, respectively).

The NEPA process for installation of the terminal groin, including consultation required under Section 7 of the Endangered Species Act and a compatibility determination under the National Wildlife Refuge Act, concluded with a Finding of No Significant Impact. USFWS issued a permit to NCDOT for construction of the terminal groin in 1989. In the cover letter transmitting the permit for construction of the terminal groin, USFWS stated: “We offer to enter into this long-range planning effort to insure that the future highway corridor will not only fully consider human transportation needs, but will, at the same time, be compatible with the long range goals and objectives of Pea Island National Wildlife Refuge and Cape Hatteras National Seashore Recreation Area.”. Monitoring the shoreline for impacts from the terminal groin was a condition of the permit. In 20 years of monitoring, no adverse impact to the shoreline along the 6-mile area of the Refuge studied has been identified.

NCDOT also has been monitoring the progress of a recent study (<http://www.nccoastalmanagement.net/CRC/tgs/terminal%20groin%20study.html>) of the use and effects of terminal groins undertaken by the North Carolina Coastal Commission. This study focused on the Oregon Inlet terminal groin along with four other terminal groins in North Carolina and Florida. The 530 page final report was issued on March 1, 2010 and final recommendations were issued on April 1, 2010. The study was not able to draw any overall conclusions on the environmental impact of terminal groins because of the individual nature of each groin studied, and because of the difficulty in identifying any effects of the terminal groin itself as apart from other inlet management activities such as dredging. The conclusions note that removing a terminal groin would be disruptive to natural resources.

- designation in October 2008 of significant portions of the Refuge, including sections that will be impacted by the later phases of the project, as critical habitat for the federally threatened piping plover (73 Fed. Reg. 62,816 (Oct. 21, 2008));

Response: *Prior to construction of the terminal groin, the north end of Hatteras Island was not designated as critical habitat for the piping plover. Coastal sand movement filled in the area behind the groin creating the habitat behind the terminal groin where the majority of piping plovers are nesting. The FEIS thoroughly considered impacts to the piping plover. The following paragraphs describe additional consultation under Section 7 of the ESA that was conducted after the critical habitat was formally designated in October 2008 (see Section 3.6 of this EA).*

Effective November 20, 2008, subsequent to the October 2008 formal designation of the critical habitat, USFWS officially adopted the conference opinion that was included in the July 10, 2008, biological opinion as the biological opinion for critical habitat affected by the proposed project.

A meeting was held on April 1, 2009, between NCDOT, FHWA, and USFWS to identify any further ESA consultation requirements should a different Preferred Alternative be chosen by FHWA. It was confirmed that USFWS would treat any future changes to the biological opinion as an “amendment” to the biological opinion. It was agreed that USFWS, FHWA, and NCDOT would work together to draft an amendment prior to FHWA selecting a different Preferred Alternative. It also was agreed that re-initiation of ESA Section 7 consultation was not warranted should the Parallel Bridge Corridor with Road North/Bridge South Alternative be selected as the Preferred Alternative.

In August 2009, following the development of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred), FHWA and NCDOT again requested assistance from USFWS in determining whether re-initiation of consultation would be necessary with the change of the Preferred Alternative to the NC 12 Transportation Management Plan Alternative. USFWS agreed with FHWA that re-initiation of consultation is unnecessary for the new Preferred Alternative.

Based on the results of the additional consultation under Section 7 of the ESA, there is no new significant impact as a result of the formal designation of the critical habitat.

- the supposed unearthing in the Spring of 2009 of old deeds that putatively give NCDOT the right to move the NC 12 right-of-way in the Refuge and in Cape Hatteras National Seashore;

Response: *The Revised Final Section 4(f) Evaluation does not claim that NCDOT has the right to move the NC 12 easement. The historical research was conducted in response to comments on the FEIS. The research led FHWA to issue the Revised Final Section 4(f) Evaluation. The research did not result in significant changes or significant environmental impacts not evaluated in the FEIS.*

- continuing progress in the scientific study of the effects of global climate change and sea level rise on coastal landscapes, combined with President Obama's directive to federal agencies to base decisions on sound science, including decisions related to mitigating the threat of climate change, in 2009;

Response: *The FEIS documented the results of an expert panel meeting that was convened to evaluate the effects of sea-level rise on the project and to determine whether the FEIS coastal conditions analyses adequately considered the effects of accelerated sea level rise as a result of climate change. The information contained in the reports attached to FEIS comment letters was considered by the expert panel, and Dr. Riggs presented much of this information as part of his participation on the panel.*

- identification by various federal agencies of federal laws that will be violated by both the old and new preferred alternative, in comments to the FEIS and throughout 2009;

Response: *Interagency coordination created the NC 12 Transportation Management Plan Alternative (Preferred) and no federal laws will be violated in its implementation.*

- an analysis of options for funding a Pamlico Sound Bridge, performed in the summer of 2009.

Response: *The additional analysis of options for funding a bridge in the Pamlico Sound Bridge Corridor determined that the alternative was not a feasible and prudent avoidance alternative under Section 4(f) (see page 20 and Appendix G of the Revised Final Section 4(f) Evaluation for a discussion of this analysis). This is not a significant change as the FEIS already concluded that the Pamlico Sound Bridge Corridor was not a practicable alternative because its construction cost exceeded available funding. The FEIS and project record show that this decision was reached by multiple agencies.*

There is ample precedent supporting the proposition that an SFEIS is required in light of such significant new developments. See *N.C. Alliance for Transp. Reform, Inc. v. U.S. Dep't of Transp.*, 151 F. Supp. 2d 661, 699 (M.D.N.C. 2001) (requiring SFEIS for highway project in light of notification of violation of a federal law); *Portland Audubon Soc'y v. Lujan*, 795 F. Supp. 1489, 1500 (D. Or. 1992), *aff'd* 998 F.2d 705 (91st Cir. 1993) (requiring SFEIS for sale of timber in light of new information on effects of sale on owl species); *Stop H-3 Ass'n v. Lewis*, 538 F. Supp. 149, 168 (D. Haw. 1982) (requiring SFEIS for proposed highway project where FEIS did not include information relevant to the highway design). Accordingly, issuance of an EA instead of an SFEIS will violate NEPA.

Response: *The lawsuits cited by the commenter concern different projects, with different facts, that are distinguishable from the Bonner Bridge Replacement Project studies.*

- 9. Comment:** As mentioned above, for nearly a decade, NCDOT and FHWA have treated the Bonner Bridge Replacement Project not only as including the construction of a new bridge from the southern end of Bodie Island over Oregon Inlet to Hatteras Island, but also as including the maintenance of a transportation corridor all the way to the mid-point of Hatteras Island at the town of Rodanthe. For the first time in years, though, NCDOT has identified a new preferred alternative that would complete only a portion of the project to connect the southern end of Bodie Island to the northern end of Hatteras Island via a new short bridge built parallel to the existing bridge, and would force the maintenance of the remainder of the transportation corridor to the mid-point of Hatteras Island into “later phases,” to be completed using methods yet to be selected. The new preferred alternative seeks to avoid scrutiny by simply delaying the decision among impermissible alternatives to a later point in time.

It is well settled that breaking such a project “into small component parts” to avoid reviewing them together “is to engage in illegal ‘segmentation.’” *New River Valley Greens v. U.S.D.O.T.*, No. 97-1978, 1998 U.S. App. LEXIS 22127, **8-9 (4th Cir, Sep. 10, 1998) (quoting 40 C.F.R. § 1508.27(b)(7)). A hallmark of segmentation is an initial proposed action involving “such a large and irretrievable commitment of resources that it may virtually force a larger or related project to go forward notwithstanding the environmental consequences.” *Id.* Building a replacement short bridge to the northern end of the Refuge is just such an “irretrievable commitment of resources” that will inevitably force later projects to go forward, even though their environmental consequences would preclude their approval if included as part of the original project.

With the new preferred alternative, these later projects include the re-permitting of the terminal groin to protect any new short bridge, as well as managing and maintaining NC 12 through the length of the Refuge for the life of the new bridge. The existing bridge cannot be replaced with another bridge that connects to the northern end of Hatteras Island, without creating the necessity to maintain the terminal groin and to maintain NC 12 through the Refuge for the life of the new bridge, as storms, erosion, and new inlet formation threaten the transportation route. Otherwise, the new bridge would truly become a “bridge to nowhere.” Accordingly, to treat the project as anything but a single transportation route from the southern end of Bodie Island to Rodanthe will constitute illegal segmentation.

Because maintenance of a transportation route from the northern end of Hatteras Island to Rodanthe is an essential component of any project alternative, and maintenance of the terminal groin and NC 12 through the Refuge is an essential component of any alternative involving a short bridge, NEPA requires the analysis of their impacts now. The CEQ Guidelines are clear: “proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.”

40 C.F.R. § 1502.4(a). Circumstances in which actions should be considered and evaluated together include:

- the situation in which one action “automatically trigger(s)” another action,
- the situation in which one action “cannot or will not proceed unless” another action is “taken previously or simultaneously,”

- the situation in which two actions “are interdependent parts of a large action,” and
- the situation in which two actions have “cumulatively significant impacts.”

40 C.F.R. § 1508.5(a). An action will have a “cumulatively significant impact” if, although its individual effect is minor, its effect is “collectively significant” when considered together with “*other past, present, and reasonably foreseeable future actions* regardless of what agency or person undertakes such action.” *Western N.C. Alliance v. N.C.D.O.T.*, 312 F. Supp. 2d 765,771 (E.D.N.C. 2003) (emphasis in original).

Each of the four bullet-pointed criteria above aptly describes the new preferred alternative. If the new preferred alternative is implemented, a replacement bridge will be built to the northern end of Hatteras Island, instead of a longer bridge through the Pamlico Sound all the way to Rodanthe. Such a short bridge will “automatically trigger” the need to re-permit the terminal groin and to maintain NC 12 through the Refuge by, for instance, bridging, beach nourishment, or relocation of sections as necessary in response to storm events and erosion. In addition, the construction of the short bridge “cannot . . . proceed” unless the terminal groin re-permitting first takes place. And the construction of the short bridge, along with the maintenance of the terminal groin and NC 12, “are interdependent parts of a large action,” with “cumulatively significant impacts.” The maintenance of the terminal groin and NC 12, no matter how it is accomplished, will impact the Refuge in many ways, including those identified in our October 27, 2008, comments on the FEIS. It will interrupt the natural processes of overwash and migration of the island, reduce the quantity and quality of wildlife habitat available within the Refuge, and in general disrupt the biological integrity, diversity, and environmental health of the Refuge.

NCDOT employee Ms. Smyre's notes effectively acknowledge the fact of segmentation: they explain that any NEPA document on the new preferred alternative will be incomplete without agreement on how the later phases involving maintenance of the NC 12 route through the Refuge to Rodanthe will be accomplished. Yet we understand that the members of the merger team has not been able to agree on plan for how to make decisions regarding future phases, much less an actual decision on construction of those future phases. Moreover, to date, NCDOT and FHWA have been unable to identify a preferred alternative involving a short bridge that is not plagued with criticism and serious legal flaws related to the NC 12 corridor through the Refuge. They now seek to avoid such criticism by deferring their decision on which of the flawed means of maintaining NC 12 they will implement, until such time as a storm event or other crisis forces Refuge management to allow emergency highway repairs, dune building, beach nourishment, or some other measure the Refuge management would not have permitted absent an emergency. Accomplishing in such a backhanded way what cannot be accomplished directly amounts to segmentation, in violation of NEPA.

Response: *The FEIS studied a corridor of all the way to Rodanthe. However, choosing a corridor of sufficient length to evaluate direct and indirect impacts need not preclude staged or phased construction of a project. In fact, most of the resource agency partners agreed that phased decision-making for future segments is the best course of action based on the dynamic conditions on the Outer Banks. It is possible that different approaches may be needed along different points of the Refuge. It should be mentioned that the No-Build Alternative, the baseline for NEPA evaluation, would retain the road on the Refuge and associated maintenance of the road would continue.*

The NC 12 Transportation Management Plan Alternative (Preferred) does not illegally segment the environmental analysis. The alternative recognizes that the project area is complex and the shoreline is constantly changing. It also recognizes that the ability to predict the effect of future storms on the project area is extremely difficult to quantify, and that the various alternatives may need to be reassessed in the future as the shoreline and other landscape features change. As such, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I. However, the impacts presented for the Parallel Bridge Corridor alternatives consider the environmental consequences of the full project and reflect the reasonably foreseeable range of impacts for the various phases of the NC 12 Transportation Management Plan Alternative (Preferred). Further, it includes a process for determining the implementation timing and extent of future phases, and does not propose to rely on emergency procedures to maintain NC 12 over the long-term.

A response to the comments related to the terminal groin contained under this comment is presented in the response to SELC comment 8, second bullet. Cumulative impacts are addressed in Section 4.12.6 of the FEIS, and the NC 12 Transportation Management Plan Alternative (Preferred) would not change those findings since its potential impact is reflected in the findings of the various other Parallel Bridge Corridor alternatives. Regarding the commenter's misinterpretation of Ms. Smyre's notes, see the response to SELC comment 7.

- 10. Comment:** An EIS must “serve as the means of assessing the environmental impact of proposed agency actions, rather than justifying decisions already made.” 40 C.F.R. § 1502.2(g); *see also* 40 C.F.R. § 1502.5 (EIS must “be prepared early enough so that it can serve practically as an important contribution to the decision making process and will not be used to rationalize or justify decisions already made”). To reverse the order, and instead first decide on an alternative, then structure the analysis to justify that decision, is to engage in improper reverse engineering. *Stop H-3 Ass 'n v. Lewis*, 538 F. Supp. 149, 168 (D. Haw. 1982).

The Revised 4(f) Evaluation includes, for the first time, a financial analysis that NCDOT contends justifies its conclusion that the Pamlico Sound Bridge alternative is not a feasible or practicable avoidance alternative. (Rev. 4(f), Appendix F.) Yet the financial analysis was clearly performed in the last few months, long after NCDOT and FHWA had made the decision to justify selection of a short parallel bridge alternative by labeling the Pamlico Sound Bridge alternative to be not feasible, practicable, or “financially viable” in the FEIS published over a year ago. (*See* FEIS xxix, 2-148, 5-45.) Adding to the appearance that the recent analysis was done merely to justify a foregone conclusion is the fact that the analysis was done without the usual aid of an expert consultant. In contrast to the cursory financial analysis of the Pamlico Sound Bridge alternative attached to the Revised 4(f) Evaluation as Appendix G, a nationally recognized transportation consulting firm, Wilbur Smith & Associates, performed a thorough evaluation of funding options for the approximately seven-mile-long Mid-Currituck Bridge, resulting in a 71 page report on toll funding alone (available at http://www.ncturnpike.org/pdf/Mid-Currituck_Preliminary_Traffic_and_Revenue.pdf). Significantly, the Mid-Currituck financial analysis was performed long before the publication of even a draft EIS for that project, in marked contrast to the order of events for the Bonner Bridge replacement.

In other words, the Pamlico Sound Bridge financial analysis was performed after an alternative had been selected, and it was designed to justify that decision, rather than to inform and aid that decision. To the extent that the proposed EA, or an SFEIS, relies on the same financial analysis, it will be in violation of the NEPA requirements proscribing reverse engineering. More generally, it is clear that the environmental documents - the Revised 4(f) Evaluation and the forthcoming EA - were both drafted *after* the selection of the new preferred alternative, with an eye toward justifying and rationalizing the decision, rather than aiding the decision. Such reverse engineering is not proper under NEPA.

Response: *The financial analysis undertaken by FHWA in 2009 was in response to comments received on the earlier financial analysis that had been conducted by NCDOT during preparation of the FEIS. As part of the NEPA/Section 404 Merger Process, the merger agencies concluded that the Pamlico Sound Bridge Corridor is not a practicable alternative because of the high cost and finance issues. The meeting minutes from the Merger Process as well as the project files contain documentation of the detailed cost and financial information that was developed prior to the FEIS.*

NCDOT and FHWA received little comment regarding the methodology and data used in the financial analysis for the FEIS, although USDOJ requested additional analysis of the Pamlico Sound Bridge Corridor Alternative. In response, FHWA conducted its own independent financial analysis of NCDOT's determination that the Pamlico Sound Bridge Corridor Alternative is not financially viable. As part of this review FHWA considered the feasibility of several innovative finance methods and even had its own national transportation finance expert, Jim Hatter, review the analysis. Mr. Hatter concluded in an in-house memorandum dated April 16, 2010:

“Per your request I have reviewed the financial assumptions and calculations utilized in Appendix G to evaluate the viability of funding the construction of the Pamlico Sound Bridge Corridor Alternative. It is my professional opinion that the financial assumptions and calculations in Appendix G are reasonable for the purposes of this analysis. Further, Appendix G concludes that ‘the construction cost of the Pamlico Sound Bridge Corridor Alternative would be of extraordinary magnitude in consideration of the funding available to NCDOT to operate, improve and maintain its state highway system.’ I find this to be a reasonable conclusion. As part of my review I did not verify the accuracy of the raw data utilized in Appendix G including the estimated construction cost, FHWA apportionments, obligation limitation, program funding, and projected traffic counts since the Division office is in a better position to verify the accuracy of those inputs.

In addition to my review of Appendix G, I have reviewed the stakeholder comments that were submitted on Appendix G. I also reviewed the agency's responses and found them to be appropriate. Contrary to the comments, I find the Appendix G approach to be reasonable considering the limited average daily vehicle use of the NC 12 facility and the magnitude of the alternative costs. The stakeholders' reference to utilizing a Public Private Partnership to fund the Pamlico Sound Bridge Corridor Alternative is not a viable funding method due to lack of a substantial revenue stream. Public Private Partnerships are a procurement approach wherein a private sector concessionaire provides capital (either its own equity or borrowed funds) to invest in a potentially profitable infrastructure project. The concessionaire's potential profit comes from the cash

flow generated by toll revenues or availability payments (direct payments to a concessionaire by a public entity for a given facility). Where toll revenues are envisioned, the concessionaire often expects a significant increase from five to seven years after the facility opens to traffic. In this case, however, a significant increase in toll revenues in the five- to seven-year time frame does not seem likely, nor is the State likely to make availability payments. Accordingly, a Public Private Partnership may not be a viable procurement approach to develop the Pamlico Sound Bridge Corridor Alternative.

The range of financing mechanisms considered in this evaluation is consistent with what we see across the nation with this type of project. The use of Grant Anticipation Revenue Bonds (GARVEEs) and Transportation Infrastructure Finance and Innovation Act (TIFIA) loans are the most common tools used to extend the period of financing thereby lowering debt service and increasing project feasibility. The methodology and assumptions used in Appendix G to calculate the revenues and debt service are reasonable and in line with what we see in today's financial markets. The only area that I would question is not lowering the daily traffic counts when implementing tolling where there had not been tolling prior. We normally see a reduction in ADT when tolling is instituted. However since lowering the ADT would reduce revenues, the failure to adjust actually increases the ability to finance this alternative from tolls thereby making the Pamlico Sound Bridge Corridor Alternative appear to be more feasible than it actually is.

The Pamlico Sound Bridge Corridor Alternative, as many that we see which are in less populated areas of the country, does not appear to have the economic benefits to generate the revenues from general property taxes, special assessments, tax increment and sales tax. Therefore, the Pamlico Sound Bridge Corridor Alternative does not have the capability of utilizing innovative finance techniques to move ahead as readily as more urban projects that provide much greater economic benefits. I believe the financial evaluation of the Pamlico Sound Bridge Corridor Alternative is reasonable in today's market. The raising of revenues through tolling for this project in my estimation is not going to be sufficient to warrant the financial rating necessary to allow debt financing of this project. This project must primarily rely on grant funding of which is in short supply and therefore may not be a viable source for advancement of the Pamlico Sound Bridge Corridor Alternative.”

The Mid-Currituck Bridge study referenced in the comment is not an analogous situation. The toll funding analysis undertaken for that project was justified because in the case of the Mid-Currituck project, unlike the Bonner Bridge, the preliminary analysis showed that tolls are feasible. It is standard practice to conduct a preliminary toll feasibility analysis prior to deciding whether to invest in a comprehensive traffic and toll revenue study to support the issuance of toll revenue bonds. Such comprehensive studies often cost in excess of \$1 million. In the case of the Bonner Bridge, the preliminary analysis clearly demonstrated that toll revenues could not support the construction cost of the Pamlico Sound Bridge Corridor, so it would have been an unreasonable use of public funds to conduct the comprehensive traffic and toll revenue study requested by this commenter.

Finally, final selection of an alternative has not occurred as suggested by the comment. FHWA's final selection of an alternative will be documented in a ROD as required by NEPA. The Revised Final Section 4(f) Evaluation was published and shared with agencies and interest groups to obtain their input in the decision-making process.

11. Comment: Section 4(f) of the Department of Transportation Act of 1966 prevents a federal project from using publicly owned land unless “(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.” 49 U.S.C. § 303 (c). When there is no feasible and prudent avoidance alternative, the regulation implementing Section 4(f) states that “the Administration may approve only the alternative that . . . [c]auses the least overall harm,” using a balancing of seven factors. 23 C.F.R. § 774.3 (c)(1); *see* 49 U.S.C. § 303 (2). At the heart of Section 4(f) lies the policy that “special effort should be made to preserve the natural beauty of the countryside,” including “wildlife and waterfowl refuges” in the development of transportation plans. *See* 49 U.S.C. § 303 (a), (b).

The previously prepared Section 4(f) analysis (accompanying the FEIS) was premised on the flawed assumption that the preferred alternative at that time, the Parallel Bridge - Phased Approach/Rodanthe Bridge (“Phased Approach”), would not “use” Refuge lands under Section 4(f) because that alternative purportedly would stay within the existing NC 12 easement. *See* FEIS 5-18. Comments provided pointed out that the preferred Phased Approach and all of its associated construction, maintenance, and management activities would, in fact, cause both physical encroachments and constructive uses of the Refuge within the meaning of Section 4(f). As a practical matter, avoiding “use” of the Refuge appeared entirely infeasible. *See* SELC Comments on FEIS 12-15 (Oct. 27, 2008) at Rev. 4(f), App. A. The flawed assumption that Refuge lands would not be “used” skewed the least overall harm analysis in favor of the Phased Approach, even though the Pamlico Sound Bridge alternative indisputably was (and is) the sole alternative that bypasses the Refuge. *See id.* 16-17.

In the Revised 4(f) Evaluation, FHWA and NCDOT no longer submit that the alternatives the Parallel Bridge alternatives, which bisect the Refuge, will not “use” Refuge lands; indeed, the revised analysis acknowledges use of the Refuge by all six Parallel Bridge alternatives, including the new preferred alternative, the “Parallel Bridge Corridor with NC 12 Transportation Management Plan.” Rev. 4(f) at 8, Table 2, 15. However, in an effort to bend the law to its will, NCDOT attempts to fit Refuge impacts (except those related to its designation as a historical property) into the joint planning exception under 4(f) - an exception that does not apply. The result is, again, an analysis that plays down impacts to the Refuge in order to justify an alternative that will cause significant impacts and threatens to put the Refuge in a state of phased, or quite possibly perpetual, construction.

In another apparent effort to justify selection of the new preferred alternative and again without adequate study, the analysis also wrongly deems infeasible the Pamlico Sound Bridge alternative, which causes the fewest environmental impacts. FEIS p. 5-44. Ultimately, the Parallel Bridge alternative selected - which is an undetermined mix- and-match of existing five Parallel Bridge alternatives, reserving the opportunity to add additional, unidentified management techniques - impermissibly defers selection of an alternative for the NC 12 portion of the project and, likewise, defers full evaluation of the environmental impacts. *See* Rev. 4(f), App. E. Ironically, this alternative has potential to cause the greatest overall harm, because the potential impacts are broad, undetermined, and unquantified. This approach

prevents a full assessment of environmental impacts associated with the new preferred alternative, and hence, cannot possibly permit meaningful comparison among other alternatives to deduce least overall harm. In addition, as discussed above, the approach also results in unlawful segmentation of the project under NEPA. Finally, the Pamlico Sound Bridge alternative, which is the sole avoidance alternative that promises to entirely bypass the Refuge and avoid other 4(f) properties, is discounted as infeasible based upon only a cursory and inadequate economic analysis.

***Response:** The commenter makes four primary points in this comment: 1) the joint planning exception finding “plays down impacts to the Refuge;” 2) the NC 12 Transportation Management Plan Alternative (Preferred) “defers full evaluation of the environmental impacts” and “cannot possibly permit meaningful comparison among other alternatives to deduce least overall harm;” 3) the NC 12 Transportation Management Plan Alternative (Preferred) results in unlawful segmentation; and 4) the Pamlico Sound Bridge Corridor alternatives are “discounted as infeasible based upon only a cursory and inadequate economic analysis.” The commenter discusses their concerns on these points in greater detail in other comments. Regarding the joint planning exception, see the response to SELC comment 12. Regarding deferring the full evaluation of environmental impacts, see the response to SELC comment 15. Regarding segmentation, see the response to SELC comment 9. Regarding the adequacy of the economic analysis, see the response to SELC comments 8 (seventh bullet) and 16.*

- 12. Comment:** The Revised analysis concedes that all Parallel Bridge alternatives studied in the FEIS “use” 4(f) property, specifically the Refuge, and that the new preferred alternative also would “use” the Refuge, but only insofar as it is a historic property. Rev. 4(f) at 8, 15. However, the Revised 4(f) Evaluation erroneously concludes that section 4(f) does not apply to uses of the Refuge “as a refuge” under the new preferred alternative because of concurrent or joint planning of development” of the Refuge and NC 12. Rev. 4(f) at 12-15. This is simply not the case.

The 4(f) Evaluation attempts to support its conclusion that the joint planning exception applies with a meandering narrative describing the development of roadways through the Refuge that eventually became what is now NC 12. It misses the crucial point, however, that the easement for the roadway was not “formally reserved . . . before or at the same time” as the Refuge was created. 23 C.F.R.. § 774.11 (i). The relevant section of the regulation states as follows:

When a property is formally reserved for a future transportation facility before or at the same time a park, recreation area, or wildlife and waterfowl refuge is established and concurrent or joint planning or development of the transportation facility and the Section 4(f) resource occurs, then any resulting impacts of the transportation facility will not be considered a use as defined in § 774.17.

Id. In the case of the Refuge, property for NC 12 (or the predecessor dirt road described in the 4(f) Evaluation) was not “formally reserved” until 1954, some sixteen years after the establishment of the Refuge, not before or at the same time. Moreover, there has not been concurrent or joint planning of the road and the Refuge since then; indeed, the events described by the 4(f) Evaluation show that, instead, each time the road has needed to be moved outside of its existing easement because of some storm event or erosion, the Refuge has required that NCDOT apply for a Special Use Permit. A careful review of the deeds,

maps, and other documents that record the history of the establishment of the Refuge and the NC 12 corridor through it supports the conclusion that the joint planning exception does not apply.

The 4(f) Evaluation mistakenly conflates the creation of the NC 12 corridor through the Refuge with the NC 12 corridor through Cape Hatteras National Seashore. The corridors for the two sections of NC 12, however, were formed through two entirely different mechanisms.

Cape Hatteras National Seashore was authorized by Congress in 1937 and established in 1953, but without an appropriation of funds to purchase land. Congress instead authorized the National Park Service to accept donations of land. The North Carolina legislature established the Cape Hatteras Seashore Commission in 1939 for the purpose of acquiring land and transferring it to the federal government for the National Seashore. (Ch. 257, pp. 522-528, Public Laws of N.C. (1939).) The Commission acquired such lands, and then, in the 1950s, the State conveyed those lands to the federal Department of the Interior (“DOI”) in several transfers. In both the legislation creating the Commission and several of the subsequent transfers of property from the State to DOI for the Seashore (those in 1952, 1953, 1955, and 1958), the State purported to reserve an easement for existing roads as well as a right to build and maintain additional roads in the future. The lands transferred in those deeds now comprise portions of Cape Hatteras National Seashore. Those deeds, however, have nothing to do with the NC 12 right-of-way through Pea Island National Wildlife Refuge.

Response: *The public road through the Refuge was formally reserved at the same time the Refuge was established. The Refuge was created by Executive Order 7864 in 1938. The Executive Order reserved the Refuge lands "subject to valid existing rights." The public road already in existence was a valid existing right. The public road was shown on official state and Federal maps created during the same period that the Refuge was established, the road included bridges at New Inlet that were constructed by the State several years before the Refuge was established, and ferry records dating to the 1920s document car ferry operations at Oregon Inlet. In addition, the judgment of condemnation for the Pea Island Club Tracts for the Refuge contains the following statement:*

“The estate taken for said public use is the full fee simple title thereto, subject only to existing public highways and public utility easements, if any, and subject to the perpetual easements and rights granted the State of North Carolina by agreement date February 8, 1934, recorded in Book 2, Page 414 of the records of Dare County, North Carolina, to construct, re-construct, maintain and repair, operate and pass through a canal from the Atlantic Ocean to Station 83.50, of such width and depth as may be determined by said State, and at such location as may start at any point south of the proposed dredging of Pamlico Sound for re-opening of New Inlet, Dare County, North Carolina, and a canal to the westward of Station 83.50 through the waters of Pamlico Sound; and subject to right of the State of North Carolina to deposit dredged material from said canal and channel on nereby (sic) lands of grantors of said agreement, provided however, that said material be dumped so as to leave open the present slough leading to Jack Channel; and subject to the right of the State of North Carolina to construct jetties at or near the easterly opening of said canal at the Atlantic Ocean; and subject to the right of said State to plant grass on the sides of said canal to prevent shifting of sands.”

After acquiring the Pea Island Club tracts for the Refuge, USFWS did not eliminate the public road through the Refuge. Instead USFWS accommodated vehicular transportation concurrently with managing the Refuge for migratory bird conservation. The very first Annual Pea Island Refuge Report, from 1938, mentions some of the Refuge birds "allowing cars to pass within 75-100 feet of them at times without being frightened enough to fly." The next year's Report notes that Refuge employees spent 1,767 man days maintaining 102 miles of "truck trails" from NC State highway 34 to the Refuge, and 666 man days spent building four temporary bridge structures over the dikes and sand fences, with plans for permanent bridges in the future.

The 1940 Annual Pea Island Refuge Report documents that "two ramps have been completed on the dykes. In the past before these ramps were completed the public, traveling from Oregon Inlet to points south of the refuge, were accustomed to going over the area without regard for any form of migratory wildfowl. The dyke after being thrown up created a serious menace to this travel because it was almost impossible to cross them without sticking, but since these bridges were completed the public remain on the established trail and cross the dyke without trouble on the bridges. This permits the usual flow of traffic without scaring the wildfowl as was the case before the bridges were constructed."

Some of the Refuge lands were not acquired until 1958 and these were donated by the State in 1958. The lands acquired from the Pea Island Club and other private parties only included the fast land. The marshy lands, tidal lands, areas of submerged aquatic vegetation and navigable waters that completely encircle the Refuge below the mean high water line were not acquired by USFWS when the Refuge was established. These lands belonged to the State of North Carolina until 1958 when they were donated at the request of USDOJ. The 1958 deed states that it is subject to the "condition that the State of North Carolina and its subdivisions expressly retain title to and control of all public roads and highways now laid out or established over and upon said lands such other highways and roads as shall be decreed necessary by the State of North Carolina and political subdivisions thereof; and to such end the said land shall be subject to condemnation proceedings in the same manner and to the same extent as if said lands were privately owned." The lands comprising the Refuge are also part of the Cape Hatteras National Seashore Recreation Area. This donation of its lands below the mean high water line within the Refuge in 1958 was part of the creation of the Seashore. Thus, the creation of the Refuge and Seashore were not entirely separate.

- 13. Comment:** In contrast, although Pea Island Refuge technically lies within the boundaries of Cape Hatteras National Seashore, the right-of-way for NC 12 through the Refuge was created in a different manner. The Refuge was created in 1938, by Executive Order 7864, as a refuge for migratory waterfowl. The lands constituting the Refuge were acquired directly by the United States from private landowners (the Simpson, Byers, and Chaffee Families) through three condemnation proceedings in 1937 and 1938, long before the 1950s-era deeds upon which NCDOT relies. The State did not own these lands at the time they were acquired for the Refuge and therefore could not convey them to the United States or reserve an easement through them, either in the 1950s era deeds or otherwise; it is axiomatic that an entity cannot reserve a right in a property that it does not own and is not transferring. Later, in 1951, Congress authorized DOI to grant an easement to the State for a road through Pea Island Refuge over the lands it had previously acquired. In May 1954, North Carolina quitclaimed

to the United States all interest it had in any routes or roads through Pea Island Refuge except for the then-existing NC 12 corridor. In exchange, in July 1954, DOI granted an easement specified by metes and bounds for a 100-foot-wide NC 12 corridor. This series of events, and the State's interest in the NC corridor through Pea Island Refuge, is accurately summarized by NCDOT itself in a 1979 memo:

The right of way on NC 12 from Oregon Inlet to a point north of Rodanthe was constructed under this [NC road construction program] and was completed July 23, 1954. The project plans show 100 feet of right of way and is all inside of Pea Island National Wildlife Refuge. On May 20, 1954, the State of North Carolina granted a Quitclaim deed to the United States of America for all interest that it had on Pea Island National Wildlife Refuge, except an easement of right of way 100 feet in width (copy attached). On July 21, 1954, the United States of America conveyed a Deed of Easement to the State of North Carolina for a strip of land 100 feet wide for highway right of way (copy attached).

(Copies of the three original condemnations and the 1979 memorandum are attached as Exhibit E.) The alignment of NC 12 through Pea Island Refuge was moved in 1963 and 1995 in response to erosion and storm events. These new alignments were again specified in metes and bounds and, importantly, required a special use permit from DOI.

***Response:** The State owns a perpetual easement that is 100 feet wide. More than half the alignment has been relocated since the road was paved. Every time the road has been moved, NCDOT has sought and received an easement or permit from USDOI. Any future road relocation in conjunction with the Bonner Bridge Replacement Project would also proceed only after a permit, or other sufficient documentation of consent, is received from USDOI.*

14. Comment: Thus, the State's interest in the right-of-way for NC 12 through Pea Island Refuge is as specified in the 1954 deed from DOI to the State: a specific metes and bounds easement in the then-existing NC 12 corridor, as subsequently modified by two realignments in 1963 and 1995 through special use permits, North Carolina simultaneously quitclaimed any other interest it had, if it had any, in other rights-of-way or easements. Accordingly, NC 12 is fixed within its current corridor and cannot be moved at will by NCDOT. Any alternative that depends upon construction of NC 12 outside of its current corridor will likewise require a new easement and special use permit from DOI, which the FWS has consistently stated it cannot issue because such construction would be incompatible with the purposes of the refuge under the 1996 Refuge Administration Act.

The right-of-way was established in 1954, 16 years after the Refuge was established. It was not, in any way, “formally reserved . . . before or at the same time” as the Refuge was created. Thus, on that basis alone, the joint planning exception described in 23 C.F.R. § 774.11 (i) does not apply. *Contra Tahoe Tavern Prop. Owners Ass 'n v. U.S. Forest Serv.*, 314 Fed. Appx. 919 (9th Cir. 2008) (in the sole case we found interpreting 23 C.F.R. § 774.11 (i), court held that the joint planning exception applied, where the agency simultaneously began pluming to use land for both recreation and transportation at the time it acquired the land). Moreover, even if the exception did apply, which is denied, it would only exempt from 4(f) analysis the adverse effects caused by construction of NC 12 within the corridor described in the easement, but not construction outside the easement. This is because the regulation describing the exception speaks of exempting “impacts” by the “transportation facility” on the refuge, but says nothing about expanding the “transportation facility” outside of its original boundaries.

Response: *The roadway has been relocated outside of the original 100-foot easement location on at least four occasions with USFWS consent and coordination. The formal reservation of the road is described in the response to SELC comment 12. The joint planning that occurred is documented on pages 13-15 and Appendix B of the Revised Final Section 4(f) Evaluation.*

15. Comment: As a result of misplaced reliance on the joint planning exception, the Revised 4(f) Evaluation mistakenly omits use of the Refuge (as a refuge) from the calculus in evaluating the degree to which each alternative uses Section 4(f) properties. Although the Revised 4(f) Evaluation recognizes that the Refuge is the “most significant Section 4(f) property affected by this project” (Rev. 4(f) at 24), the evaluation only recognizes use of the Refuge insofar as it is a historic property, confining consideration of the Refuge’s significance to its value as a “historical landscape.” See Rev. 4(f) at 8, Table 2; Rev. 4(f) at 15-17. The analysis, therefore, categorically excludes the use and adverse impacts that go to the purpose for which the refuge was created, as a “refuge and breeding ground for migratory birds and other wildlife.” Exec. Order No. 7862, 3 Fed. Reg. 734 (Apr. 12, 1938).

Because NCDOT’s revised analysis is grounded in an exception that does not apply, the “use” determination under 4(f) is incomplete and suffers from the same deficiencies identified in SELC’s previous 4(f) comments. See SELC Comments on the FEIS 12-15. Moreover, since the new preferred alternative will permit a “mixing and matching of the five Parallel Bridge Corridor alternatives” (Rev. 4(f) at 6 and App. E), any Refuge uses and impacts presented by those individual alternatives are possibilities which must be fully assessed. Because of the misapplication of the joint planning exception, these uses are not even acknowledged, much less fully evaluated or understood.

“Use” within the meaning of Section 4(f) includes uses that result in the actual incorporation of land into a transportation facility, as well as constructive uses that create proximity impacts causing substantial impairment to a resource. See 23 C.F.R. §§ 774.17, 774.15. In addition, temporary occupancies that do not satisfy all of conditions set forth in 23 C.F.R. (§ 774.13 (d) fall within the definition of “use.”

Here, the Revised 4(f) Evaluation fails to address project uses stemming from incorporation of additional Refuge lands in the “transportation management plan” phase of the project, including for example, physical encroachments associated with the relocation of NC 12, beach nourishment, and dune building and maintenance activities to shield the road from overwash. See, e.g. Rev. 4(f) at 14 (stating that “Section 4(f) is not applicable to the Refuge (as a refuge)... [and] impacts resulting from relocating NC 12 from its current alignment through the Refuge would not be considered a use”). So too, for uses short of physical encroachments, the Revised 4(f) fails to assess anticipated proximity impacts, and therefore constructive uses, arising from the mixing-and-matching of the five Parallel Bridge alternatives in the new preferred alternative. The various alternatives will require some combination of elevated bridges, beach nourishment, realignment of NC 12, and dune building, as well as other ongoing construction activities related to road improvement projects, like construction of service roads. See FEIS 2-114 to 2-129 (describing NC 12 Maintenance Alternative Characteristics). The Revised 4(f) Evaluation does not acknowledge or assess proximity impacts resulting in substantial impairment, and therefore constructive use, of the Refuge that would result from each of these alternatives in isolation, much less any heightened impact from their combined implementation. Specific proximity impacts (and therefore potential project uses) that go unaddressed include, for example,

“ecological intrusion[s]” and “esthetic” impairments stemming from the above activities. 23 C.F.R. § 774.15 (listing specific situations that rise to the level of a constructive use)

With regard to ecological impacts, the 4(f) analyses essentially fail to address the long-term impacts from altering the landscape within the Refuge under the different alternatives at NCDOT’s disposal in its new preferred alternative. While many of these activities should be deemed actual uses by reason of physical incorporation of Refuge lands, even if they were not, the proximity impacts would render them constructive uses.

The Refuge encompasses 5,834 acres of barrier island habitat, including 1,000 acres of waterfowl impoundments and 13 miles of ocean beach, which support over 300 species of migratory birds, federally listed sea turtles and piping plovers, and other wildlife. *See, e.g.*, SELC Comments on FEIS 2-4; DOI Comments on FEIS, at Rev. 4(f), App. A. The westward relocation of NC 12 as a result of storm events, natural processes, or sea level rise will push the transportation corridor further into the Refuge and diminish and impair wildlife and waterfowl habitat in its path. The introduction of elevated bridges and hardened piles into the Refuge will affect sand and water migration and erosion, and eventually could impact habitat in the ocean hazard zone, as the barrier island continues to migrate beneath elevated portions of the highway, NC 12. The introduction of additional dune systems and ongoing maintenance activities to shield the road will interfere with natural coastal processes, like overwash and inlet formation, and will degrade the quality of habitat in the Refuge. We described concerns about proximity impacts to the Refuge in our October 27, 2008, comments with respect to the then-preferred alternative; we incorporate those comments by reference, as the Revised 4(f) Evaluation did not remedy the situation, but simply ignores the proximity impacts and the resulting use of the Refuge under a different, but equally misplaced, rationale. *See also* DOI Comments on FEIS (describing proximity impacts related to visual character, noise, access, and ecological impairments).

Finally, the Revised 4(f) Evaluation does not address use of the Refuge, including proximity impacts, from retaining the terminal groin. The Parallel Bridge alternatives assume NCDOT will secure a new permit to retain the terminal groin in its existing location on the Refuge, as discussed in section I(B), *supra*. Neither the original nor revised evaluation analyzes the extent of use and environmental impacts on the Refuge posed by permitting and retaining the terminal groin, which by its design interferes with natural coastal processes.

For these reasons, further analysis under section 4(f) must be conducted since the new preferred alternative will “use” Refuge lands, via physical encroachments or proximity impacts, no matter which combination of alternatives is eventually employed during later phases of the project. The failure to recognize the uses and impacts that will degrade the very purpose for which the Refuge was established (as a refuge and breeding ground for migratory birds and other wildlife) renders the Revised Section 4(f) Evaluation inadequate.

Response: *Irrespective of the basis for the conclusion of use, the Revised Final Section 4(f) Evaluation concludes that there is a “use” of the Refuge by all of the Parallel Bridge Corridor alternatives and, therefore, Section 4(f) applies. Section 4(f) influences the basis and priorities for making transportation decisions by imposing certain restrictions on decision-making. It, however, has nothing to do with the degree to which impacts for a project are assessed. While the outcome of impact assessment is used in the Section 4(f) evaluation, the presence of a Section 4(f) resource or its “use” does not determine the environmental issues that need to be addressed under NEPA or the level of analysis. That is determined by the*

characteristics of the affected environment and the proposed project being introduced to that environment. Therefore, one cannot reach the conclusion that if a Section 4(f) use is defined in one way, that less impact assessment is required or was completed than if a Section 4(f) use was defined in another way. The impact assessment presented in the FEIS and this EA, and referenced in the Revised Final Section 4(f) Evaluation, addresses impacts to the Refuge irrespective of its Section 4(f) status, including “physical encroachments,” “proximity impacts,” “ecological intrusions,” “esthetic impairments,” “altering the landscape,” affects on “wildlife and waterfowl habitat,” and affects on “natural coastal processes.” The impact assessment findings presented in the FEIS and this EA, and referenced in the Revised Final Section 4(f) Evaluation, for the various Parallel Bridge Corridor alternatives reflect the range of reasonably foreseeable impacts associated with the NC 12 Transportation Management Plan Alternative (Preferred).

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative does not specify any action at this time on Hatteras Island beyond the limits of Phase I. If a later phase of the Preferred Alternative requires the use of Section 4(f) property, additional Section 4(f) analysis would be undertaken prior to FHWA’s approval of the later phase.

The Revised Final Section (f) Evaluation adequately addresses the impacts associated with the approval of the use for Phase I. Based on the preliminary designs used to assess impacts in the EA, FHWA and NCDOT propose to use approximately 3.5 acres (1.4 hectares) of the Refuge. (This number is different from that presented in the Final Section 4(f) Evaluation for reasons presented in Section 2.3.2.1 of this EA.) The Section 4(f) regulations define a constructive use as one that can only occur in the absence of an actual physical encroachment. Thus, for the Preferred Alternative and other alternatives that would actually use the Refuge, there is no need to discuss proximity impacts at length. Proximity impacts to the Refuge were considered in detail in the FEIS and this EA.

USFWS issued a permit to NCDOT for construction of the terminal groin in 1989. In the cover letter transmitting the proposed permit, USFWS stated: “We offer to enter into this long-range planning effort to insure that the future highway corridor will not only fully consider human transportation needs, but will, at the same time, be compatible with the long range goals and objectives of Pea Island National Wildlife Refuge and Cape Hatteras National Seashore Recreation Area.” Since the terminal groin is already in place, retaining the structure would not require a Section 4(f) approval for a use of the Refuge and would not require any NEPA assessment for FHWA beyond that which has already occurred. At USFWS’ request, NCDOT is preparing a request for a new or amended special use permit for retaining the terminal groin and associated NEPA documentation needed by USFWS for its action. Coordination with USFWS on the terminal groin permit is ongoing, and FHWA and NCDOT are working with USFWS on the additional documentation proposed.

- 16. Comment:** In addition to the flawed “use” determination, the Revised Section 4(f) Evaluation dismisses a viable avoidance alternative, and hence, fails to comply with the mandates of Section 4(f). It correctly states that FHWA cannot approve the use of a Section 4(f) property if there is a feasible and prudent avoidance alternative available that will avoid using Section 4(f) properties. See Rev. 4 (f) at 19; 23 C.F.R. § 774.17. Yet it erroneously rejects a Pamlico Sound Bridge as just such an avoidance alternative.

The Pamlico Sound Bridge alternative satisfies all the criteria for an avoidance alternative. The Revised 4(f) Evaluation recognizes the Pamlico Sound Bridge as the only alternative that entirely avoids Section 4(f) properties. *See* Rev. 4(f) at 8, Table 2; Rev. 4(f) at 20. This determination would be unchanged by a corrected analysis that appropriately accounts for “use” of the Refuge (as a refuge) by all of the Parallel Bridge alternatives. As both the original and revised 4(f) analyses recognize, the Refuge is the “most significant Section 4(f) property affected by this project,” and a Pamlico Sound Bridge would entirely bypass the Refuge and hence avoid all use and impacts. *See* Rev. 4(f) 24; FEIS at 5-44.

Notwithstanding that the Pamlico Sound Bridge alternative entirely avoids Section 4(f) properties, the Revised 4(f) Evaluation summarily dismisses it as an avoidance alternative on the unsubstantiated basis that it is too costly, without adequate analysis or explanation and without the usual aid of a transportation consultant to assist with a more thorough analysis. As discussed above, the cursory financial analysis of the Pamlico Sound Bridge, drafted by NCDOT after a decision had already been made, stands in marked contrast to the thorough financial analysis of the Mid-Currituck Bridge, performed by Wilbur Smith & Associates long before a decision was made.

Appendix G of the Revised 4(f) Evaluation purportedly enumerates the reasons why NCDOT believes that the Pamlico Sound Bridge does not qualify as a Section 4(f) avoidance alternative. According to Appendix G, the Pamlico Sound Bridge would cost between \$942 and \$1.441 billion, and “results in *additional* construction, maintenance, or operational costs of an extraordinary magnitude.” (Rev. 4(f), App. G at 2-3, citing 23 C.F.R. § 774.17(3)(iv)). But nowhere in Appendix G does NCDOT specifically define his general “additional” cost that it alleges the Pamlico Sound Bridge would carry. Nor does the Revised 4(f) Evaluation allow for a precise deduction of that additional cost because it never specifics “the total end-to-end cost estimate for [the preferred] alternative compared to the others,” Rev. 4(f) at 26. As the Revised 4(f) Evaluation explains, the new preferred alternative “incorporates costs from all the Parallel Bridge Corridor Alternatives since this alternative does not make a decision about the future phases at this time.”*Id.*

The Revised 4(f) Evaluation does estimate various costs associated with the alternatives that NCDOT may decide to adopt in the future, and these range from \$602 million to \$1.524 billion. Comparing the high estimate of the Pamlico Sound Bridge's cost versus the low estimate for the new preferred alternative, and vice versa, the “additional” cost of the Pamlico Sound Bridge ranges from \$839 million to savings of \$582 million. *Compare* Rev. 4(f) at 26, Table 4, *with* Rev. 4(f), App. G, at 3, Table 3-1. This \$1.421 billion range between the low and high estimate of “additional” cost provides a poor basis for making an informed determination of whether the Pamlico Sound Bridge is a “prudent avoidance alternative.”

In addition to this inadequate comparison of overall life-cycle costs, Appendix G also indicates that the Pamlico Sound Bridge poses financing challenges that signify additional costs of an extraordinary magnitude. Much of this discussion focuses on state legislative restrictions. For example, the Revised 4(f) Evaluation argues that the North Carolina equity formula (codified at N.C. Gen. Stat. § 136-17.2A) would complicate efforts to allocate federal funding for the project. It further argues that the prohibitions on tolling existing roadways and on using tolls without an alternate, non-toll route, N.C. Gen. Stat. §§ 136-89.187, 136-89.197, would stand in the way of issuing toll-revenue bonds to finance the project. The Revised 4(f) Evaluation fails to explore creative solutions - for instance, by exempting full-time residents from paying tolls, by charging tolls only from travelers traveling in one direction and not during emergency evacuations, by eliminating fees for ferry travel from the Outer Banks to create a free alternative route, etc. More importantly, under

the federal constitution's Supremacy Clause and principles of conflict preemption, state budgetary directives cannot trump federal law; otherwise the states could simply legislate around the more costly elements of statutes like Section 4(f). US Const. art. VI, ¶2; *Nat'l Audubon Soc'y v. Davis*, 307 F.3d 835, 851-52 (9th Cir. 2002); *Wyoming v. U.S.*, 279 F.3d 1214, 1234 (10th Cir. 2002). In sum, the state statutes cited by NCDOT are not an adequate basis for rejecting a Pamlico Sound Bridge as an avoidance alternative.

Moreover, in North Carolina, the General Assembly's support of similar projects with comparably high upfront costs - such as the \$1 billion Triangle Expressway around Raleigh and the \$700 million Mid-Currituck Bridge - suggests that the Pamlico Sound Bridge alternative could be constructed without the dire consequences predicted in Appendix G. The Triangle Expressway and Mid-Currituck Bridge have depended on various funding sources, including "gap funding," which Appendix G does not adequately address. The Appendix does not even mention the possibility of a public-private partnership like the one that is responsible for funding the construction of the Mid-Currituck Bridge. And while it claims that "funding the construction of the Pamlico Sound Bridge Corridor Alternative with GARVEE bonds, state bonds, toll revenue bonds, or financial package with a combination of funding sources was shown not to be reasonable," the analysis leaves much to be desired. The General Assembly has appropriated \$25 million of "gap funding" to be paid each year, over the next 30 years, for debt service on Triangle Expressway project. Financing that project has also relied on TIFIA loans and toll-revenue bonds, but the "gap funding" has played a critical role, supporting preferred debt that is entitled to the gap-funding appropriations stream even if toll revenues are insufficient to meet other obligations. The "gap funding" necessary to finance the Pamlico Sound alternative would not appear to exceed the average cost associated with the yet-to-be-defined "nourishment" or "transportation management plan" phases of the preferred alternative. Appendix G, however, does not specify what level of annual "gap funding" appropriation might suffice. It simply concludes that the "toll rates are relatively high considering that some form of other tax would be necessary to provide funding or revenue to support bonds to bridge the funding gap." Rev. 4(f), App. G at 14.

The toll rates cited in the Appendix appear to reflect a crude analysis that incorporates a number of questionable assumptions. For instance, Tables G-12 through G-15, which support the calculation of "the toll rate of an individual trip to support a TIFIA loan," assume that traffic volumes will remain fixed at the 2025 annual average of 9,600 vehicles per day for the life of the project. Yet various factors indicate this assumption is too low, including the bridge's capacity for much larger traffic flows (the average summer weekends are expected to approach 20,000 vehicles per day by 2025), and current upward trends in visitation to the Outer Banks. The analysis also assumes that toll rates will not increase, and that toll rates will not vary between winter and summer seasons. In addition, creative possibilities, such as the use of partial public funding to supplement lower tolls, were not examined. Such failures and unrealistic assumptions belie a serious evaluation of whether the Pamlico Sound alternative is a feasible and prudent option for the purpose of Section 4(f).

***Response:** The Pamlico Sound Bridge Corridor was not summarily dismissed. The response to SELC comment 10 discusses the extensive consideration given by FHWA to NCDOT's analysis of cost estimates and financing issues with the Pamlico Sound Bridge Corridor. Appendix G of the Revised Final Section 4(f) Evaluation was prepared by FHWA. FHWA determined that the Pamlico Sound Corridor alternatives would require the construction of a 17.5-mile bridge in a single phase construction contract at a cost ranging from \$942.1 million to \$1,441.1 million. As a*

single phase action, the alternative is not prudent because of the construction cost being of extraordinary magnitude in consideration of the funding available to NCDOT to operate, improve and maintain its state highway system. Implementation of the alternative would create a unique maintenance problem of extraordinary magnitude for NCDOT as it would have to defer much needed improvements on the remainder of the state highway system in North Carolina for a significant period of time. The commenter expresses concern that the "additional construction, maintenance, or operational costs of an extraordinary magnitude" referenced in Appendix G are not specified. The quotation referenced in the comment is to FHWA guidance on determining whether an avoidance alternative is prudent (23 CFR774.17) (see page 2 of Appendix G of the Revised Final Section 4(f) Evaluation). The conclusion reached on page 14 of Appendix G is that: "...the initial construction cost of the Pamlico Sound Bridge Corridor alternatives surpass the threshold of construction cost of extraordinary magnitude and is therefore not a prudent alternative." This conclusion is based solely on the costs presented in Appendix G and this EA. There are no unquantified "additional" costs that are the basis for the conclusion on page 14. This conclusion also is made with the recognition that the NC 12 Transportation Management Plan Alternative (Preferred) may ultimately prove more costly than the Pamlico Sound Bridge Corridor alternatives because portions of it may be built well into the future. However, the costs of the Pamlico Sound Bridge Corridor alternatives reach extraordinary magnitude because all of their construction costs would occur now, whereas the construction costs for the NC 12 Transportation Management Plan Alternative (Preferred) can be expended in phases and, therefore, funded from available funding sources over time.

Further, the cost estimates for the Preferred Alternative are based on low and high cost estimates to reflect the potential range of costs as they are known at this time (see Tables 2-5 and 2-6 of this EA). Section 2.12.1.1 of the FEIS list the items that are unknown, or for which only partial knowledge exists during the planning process, that are taken into account in the range for the project costs (e.g., geotechnical conditions, material availability, material costs, etc.). The high cost estimate essentially reflects a "worst-case" cost estimate if all of the unknowns end up costing the maximum potential amount.

The three solutions suggested by the commenter -- exempting full-time residents from paying tolls; charging tolls only from travelers traveling in one direction and not during emergency evacuations; or eliminating fees for ferry travel from the Outer Banks to create a free alternative route would not make the project financially viable because all three would result in less toll revenue.

While the commenter states that the FEIS analysis is constrained by current State statutes, the FEIS analysis did consider the financial feasibility of other financial options outside current statutes. However, it is not likely that those statutes will change, nor a public-private partnership evolve, as the Pamlico Sound Bridge Corridor does not benefit from the same level of public and elected leader support as other North Carolina Turnpike Authority (NCTA) projects.

The comment questions the toll analysis and the possibility of public-private partnerships as a possible way to finance the project. Further, it references the Triangle Expressway and gap funding to finance the project. The Triangle

Expressway is much different than the replacement of the Bonner Bridge. The Triangle Expressway is a project to enhance mobility in the Triangle area. It will afford commuters a choice to improve the current level of service in travel. This project was generally supported by the public and private groups. Local constituents brought the project to NCTA to develop. The project was supported and endorsed by the Capital Area Metropolitan Planning Organization (CAMPO) and the Durham-Chapel Hill-Carrboro (DCHC) Metropolitan Planning Organization. The technical advisory committee made up of local elected leaders generally supported tolling the project. The Bonner Bridge replacement project will simply replace the existing bridge. The level of service would be generally equal for local citizens traveling to and from Bodie Island to villages south of Rodanthe. However, the length of a single trip from Bodie Island to visit the Refuge would increase by over 20 miles with the Pamlico Sound Bridge Corridor. The local elected leaders and the public in the local area generally do not support the Pamlico Sound Bridge Corridor and tolling. Further, local leaders have not brought the project to NCTA for development. It should be noted that NCTA did not select projects for development. Instead, it relied upon local leaders to nominate projects for consideration. NCTA only agreed to take on projects after demonstrated local public and political support. Another reference was made to the public-private partnership for the Mid-Currituck Bridge project. NCDOT does not have funding in that project. That project will be financed by the tremendous distance and time savings for travelers from Virginia and north getting to that section of the Outer Banks over the existing route. Similar to the Triangle Expressway, travelers using that facility will receive an increase in the quality of service over the existing condition. Generally, in the case of innovative finance or public-private partnerships, the public and elected leaders are supportive of these projects if there will be an improvement in transportation services. There is generally very little support for tolling existing routes with no benefits in travel time savings.

A comment suggested that the analysis did not indicate the gap funding that would be needed to move the project forward. The analysis did look at using funds dedicated for the short bridge (\$395 million) and forecasted the toll revenue to support a TIFIA loan (1/3 of total project cost). The analysis provides a gap between the cost of the Pamlico Sound Bridge Corridor at roughly \$300 million for the low range estimate and roughly \$665 million for the high range of the estimate. This gap funding is based on the toll rates shown in Tables G-12 and G-14 in Appendix G of the Revised Final Section 4(f) Evaluation (Appendix B of this EA).

The analysis of toll viability incorporated the traffic projections from the FEIS, which is the standard practice for such analysis. The traffic projections projected an average annual daily traffic of 9,600 vehicles per day, and peak traffic of 25,200 vehicles per day, in 2025. The traffic projections used state of the practice techniques. Traffic projections cannot reliably forecast volumes 50 years into the future.

The toll analysis made reasonable assumptions based on professional judgment about toll rates. Tolls were considered as a way to make up the lack of sufficient highway funds, thus the use of partial public funding to supplement lower tolls would not make the alternative financially viable. The comment challenges the assumptions in the toll feasibility analysis. It suggested that the analysis was flawed as it did not consider the bridge's capacity for much larger traffic flows and the upward trends in

visitation to the Refuge. The analysis used the travel growth rates forecasted for the FEIS. Those numbers were applied based on a year-long average that accounts for high and low usage during seasonal and non-seasonal peaks. This analysis will typically underestimate the toll rate to support toll revenue bonds because the analysis does not account for those individuals that would reduce trips because of tolls and those individuals that would not make trips because of tolls. The average of the FEIS forecasts also considers the trends in visitation to the Refuge. However, under the Pamlico Sound Bridge Corridor with tolls, those trends would likely decrease from current numbers. The reason why the number visiting the Refuge from the north would decrease is the increase in travel time and cost. The one-way trip from the north to the Refuge visitor center would increase by 20 or more miles. In addition, the one-way trip would cost \$11 to \$14 to provide debt service for a loan at one-third of the project cost. The assumptions used in the financial analysis for the Pamlico Sound Bridge Corridor erred on the side of over-estimating revenue for the bridge rather than under-estimating revenue.

- 17. Comment:** If no feasible and prudent avoidance alternative truly exists, “the Administration may approve only the alternative that . . . [c]auses the least overall harm in light of the statute’s preservation purpose.” FHWA determines which alternative causes the “least overall harm” by balancing of seven factors prescribed by regulation. 23 C.F.R. § 774.3 (c)(1).

The least overall harm analysis in the Revised 4(f) Evaluation is based upon the erroneous conclusion that there is no feasible and prudent avoidance alternative. Because the Pamlico Sound Bridge alternative is a feasible avoidance option (*see supra* section II(C)), the evaluation need not move on to the balancing of harms among remaining alternatives, all of which use Section 4(f) properties. However, even if there were no feasible avoidance alternatives (and there are), the revised least overall harm analysis is nonetheless indefinite and incomplete.

Since the revised 4(f) analysis categorically excludes Refuge uses (as a refuge) from the evaluation of alternatives, the analysis also stops short of evaluating adverse impacts of those uses and mitigation of those impacts, as well as the severity of remaining harm to the Refuge (as a refuge).” As a consequence, an assessment of the ecological impacts to the Refuge is not part of the calculus of least overall harm in the revised evaluation. By defining the scope of use of Section 4(f) property too narrowly, which stems from misplaced application of the joint planning exception, the revised evaluation misses an entire suite of environmental harms. This violates Section 4(f).

In addition, not only is the assessment of relative adverse impacts incomplete, the revised evaluation, in fact, also fails to choose between alternatives at all. *See* Rev. 4(f), App. E (noting the new alternative “does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I”). The revised evaluation instead defers selecting an alternative under the guise of an ill-defined “transportation management plan,” which permits mixing and matching of the five Parallel Bridge alternatives but does not endeavor to evaluate the extent of adverse impacts likely to result from the potential assortment of combinations.

For those limited adverse impacts under the preferred approach which are recognized, namely impacts to the Refuge as a historical property, the revised evaluation does not even attempt a complete analysis, explaining: “It is not possible to precisely quantify or qualify the extent of the remaining adverse effects to the Refuge after mitigation, due to the deferred decision-

making for later phases of the project with the preferred Parallel Bridge corridor with NC 12 Transportation Management Plan Alternative.” See Rev. 4(f) at 24.

The proffered justification for the deferred Parallel Bridge approach relies on reasoning that is evasive, tortuous, and disconcertingly circular. On the one hand, the Revised 4(f) Evaluation attempts to justify the new preferred alternative, and its choice to defer decision-making regarding later phases, by pointing to the uncertainty of future conditions, including storm events, shoreline erosion and inlet formation. See Rev. 4(f) at 5. On the other hand, the Revised 4(f) Evaluation, in the least overall harm analysis, (which purportedly informed selection of the preferred alternative), claims it cannot quantify remaining adverse impacts to the Refuge for the new preferred alternative because of the deferred decision-making approach, instead promising a “firm commitment to study and mitigate future environmental conditions.” See Rev. 4(f) at 24. Such tortuous justification does not satisfy the balancing requirement for a least overall harm analysis and underscores the problem with the new preferred alternative. The preferred “transportation management plan” approach simply weds the agencies to a short, replacement bridge without a solution in place for the NC 12 transportation corridor to the deal with the realities of a dynamic barrier island system. As the Revised 4(f) Evaluation acknowledges, shoreline erosion will continue to be a significant issue, storm events will continue to break through the manmade dune systems, and inlets are likely to form, in identified “hot spots.” See Rev. 4(f) at 3-5; see also Riggs et al., *supra* note 2, at 66-67 (discussing natural processes of barrier islands and affects of human modification on barrier-island dynamics). However, the solution to these known realities (the new preferred alternative) is poorly defined, and the harms flowing from that solution - whatever ever mix of alternatives it ends up utilizing - also have not been evaluated and are not fully assessed or understood.

In the absence of a complete evaluation of overall harms pursuant to 23 C.F.R. § 774.3 (c)(1), which must include a full assessment of adverse impacts to the Refuge from the deferred mixing-and-matching approach and must account for impacts to the Refuge as a wildlife and waterfowl refuge, a meaningful comparison among alternatives to deduce least overall harm is not possible.

For all of these reasons, the Revised Section 4(f) Evaluation is inadequate and incomplete and cannot justify the new course of action charted by FHWA and NCDOT.

Response: *The Pamlico Sound Corridor alternatives are not feasible and prudent avoidance alternatives because they are not prudent.*

FHWA and NCDOT have not ignored the impacts to the Refuge’s function as a wildlife refuge; those impacts are simply not described as comprising a “use” of the property for Section 4(f) purposes. Phase I of the revised Preferred Alternative is almost identical to Phase I of the former Preferred Alternative. Both would have the impacts on the Refuge’s function as a wildlife refuge that were described in the FEIS. These impacts, and measures to minimize the harm, are summarized on pages 28-29 of the Revised Final Section 4(f) Evaluation.

As indicated in the response to SELC comment 15, the impact assessment findings presented in the FEIS and this EA, and referenced in the Revised Final Section 4(f) Evaluation, for the various Parallel Bridge Corridor alternatives reflect the needed quantitative and qualitative assessment and understanding of the range of reasonably foreseeable impacts associated with the NC 12 Transportation Management Plan

Alternative (Preferred) for all project phases. As stated on page C-22 of the Revised Final Section 4(f) Evaluation, these impacts are based in part on future conditions that have been “predicted using the best available scientific models.” However, there is “inherent uncertainty involved in predicting the exact timing and location of shoreline changes of a coastal barrier island in the future. Because the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) includes firm commitments to study and mitigate the future environmental conditions prior to making decisions for the later phases, it provides the best opportunity to mitigate the impacts to the Section 4(f) properties in the project area.” As such, the decision to leave until a future time the final decision on the specific characteristics and timing of future phases does not represent a negative, but rather an opportunity and commitment to address the inherent uncertainties associated with a changing affected environment. These uncertainties exist regardless of whether the complete details of the project are decided now by selecting a complete alternative, such as the Phased Approach/Rodanthe Bridge Alternative, or some details of the project are decided at a future time, such as with the NC 12 Transportation Management Plan Alternative (Preferred).

- 18. Comment:** As explained above, the new preferred alternative identified in the Revised 4(f) Evaluation involves building a short bridge parallel to the current Bonner Bridge now, and then leaving until “later phases” decisions about how to maintain a transportation corridor through Pea Island Refuge to Rodanthe, Public records retrieved from NCDOT refer to the new preferred alternative as constituting “adaptive management” during the later phases for maintaining the transportation corridor through Pea Island Refuge.

According to federal regulations, though, agencies should use adaptive management only when the response of a natural resource to a proposed action is what is uncertain, and adjustments to the proposed action may be necessary for the protection of resources, for instance, if the resource does not respond well. *See* 43 C.F.R. § 46-145. The key to adaptive management is the uncertainty about *impacts of a proposed action on natural resources*, and not uncertainty about factors such as the weather or the availability of funding. Yet these are precisely the types of factors that NCDOT and FHWA have identified to justify their delay in deciding about the later phases of the project. Rev. 4(f) at 5.

Indeed, the impacts on natural resources of each of the options for the later phases of the project have been identified and examined in the FEIS. It is precisely the enormity and certainty of those impacts on natural resources that NCDOT and FHWA are attempting to obfuscate by their impermissible delay in decision-making.

The Department of Interior's Technical Guide to Adaptive Management identifies the conditions that warrant an adaptive management approach. (A copy of the Guide is available at <http://www.doi.gov/initiatives/AdaptiveManagement/documents.html>.) Those conditions are not present here. First and foremost, “there must be a mandate to take action in the face of uncertainty.” Technical Guide at 9. For instance, a Refuge manager may be uncertain about which of several methods would be the best way to eradicate a parasite that is quickly killing a species of tree; yet, there is a need to act quickly to try to stop the spread of the parasite. In that instance, there is a mandate to try one method, monitor the trees, and adapt by trying another method if the first does not work. Here, however, there is no mandate to take action - that is, to build the short bridge and maintain NC I2 through the Refuge - because the adverse effects to natural resources are already known, each method of

maintaining NC 12 through the Refuge is known to be incompatible with the Refuge, and there are better, viable options, including the Pamlico Sound Bridge Alternative.

Another condition for adaptive management is that there must be “an opportunity to apply learning,” which is also absent here. *Id.* at 10. In the present case, when the natural resources inevitably do not respond well to the maintenance of NC 12 through the Refuge, there will be no opportunity to react by creating a different transportation corridor to Rodanthe. As described in section I(B) above, the decision to build a short bridge will constitute such a significant, irretrievable expenditure of resources, that there will be no way to “apply learning” and do anything but continue to maintain NC 12.

Finally, the Technical Guide to Adaptive Management also prescribes specific steps for implementing a program of adaptive management, involving steps such as identifying clear management objectives (again, with the focus being on natural resource well-being), identifying specific potential management actions along with models and monitoring plans to determine how well the objectives are being met, and planning how to assess whether goals were met and to react if they were not. *Id.* at 21-37. Yet the putative adaptive management plan in the present case (attached at Appendix H to the Revised 4(f) Evaluation), does not include these required components. For instance, it contains no objectives or goals related to natural resource responses and no plans for monitoring and assessing those responses. Rather, the plan is merely an agreement to wait until later to decide how to react to inevitable weather events.

Accordingly, the new preferred alternative violates federal guidelines governing adaptive management. For this and other reasons, it should not be implemented.

Response: “Adaptive management” was used in early meetings with the NEPA/Section 404 Merger Team as an example of an activity analogous to the intent and commitments associated with the NC 12 Transportation Management Plan Alternative (Preferred). The regulation cited in the comment (43 C.F.R. § 46-145) applies to USDOJ and not the US Department of Transportation and FHWA. See the response to USDOJ comment 8.

The impacts on natural resources from future phases of action are not certain. The project records reflect much disagreement among the experts consulted; for example, as to where even in which decade the various predicted breaches might occur. FHWA and NCDOT have reviewed the USDOJ materials on adaptive management and do not believe USFWS would be precluded from agreeing to the use of such principles as part of the approach to maintaining NC 12 in the future.

19. Comment: In conclusion, we recognize the pressing need to replace Bonner Bridge, and we support construction of a new bridge that provides the most dependable and safest transportation to and from Hatteras Island, is environmentally sound, is economically reasonable over the long term, and does not violate federal law. We support the Pamlico Sound Bridge alternative and believe that it best satisfies these objectives.

Response: The commenter’s preference is noted.

Appendix E

Final Environmental Impact Statement Comment Letters

E. Final Environmental Impact Statement Comment Letters

This appendix contains copies of written public, agency, and non-governmental organization (NGO) comments on the September 2008 Final Environmental Impact Statement (FEIS).

PUBLIC COMMENTS	E-2
AGENCY COMMENTS	E-15
US Department of the Army, Wilmington District, Corps of Engineers	E-15
US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	E-17
US Department of the Interior	E-19
National Park Service	E-19
Office of the Secretary	E-21
US Fish and Wildlife Service	E-24
US Environmental Protection Agency	E-25
North Carolina Department of Administration	E-28
North Carolina Department of Cultural Resources	E-28
North Carolina Department of Environment and Natural Resources	E-30
Division of Coastal Management.....	E-30
Division of Marine Fisheries	E-38
Division of Water Quality.....	E-39
North Carolina Wildlife Resources Commission.....	E-41
The Albemarle Commission	E-42
NGO COMMENTS	E-43
North Carolina Coastal Federation	E-43
Southern Environmental Law Center	E-46
WildLaw	E-77



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NORTH CAROLINA GENERAL ASSEMBLY

PRESIDENT PRO TEMPORE

SENATOR MARC BASNIGHT

RALEIGH 27601-2808

Reconstruction
Project Development and
Environmental Analysis Branch

October 27, 2008

Secretary Lyndo Tippet

c/o Gregory J. Thorpe, PhD

North Carolina Department of Transportation

1583 Mail Service Center

Raleigh, North Carolina 27699-1501

Re: Comments on the Final Environmental Impact Statement

Herbert C. Bonner Bridge Replacement, TIP Project B-2500

Dear Secretary Tippet:

As you are aware, the replacement of the Bonner Bridge is critical to the Outer Banks as this bridge is the only highway connection to Hatteras Island in Dare County and its replacement is long overdue. The bridge's structural condition is rated two (2) out of 100, and the study of the replacement bridge has been ongoing since 1990. For the safety of local residents and visitors alike, this bridge must be replaced as soon as possible. I am submitting these comments on the Final Environmental Impact Statement for the Herbert C. Bonner Bridge Replacement at Oregon Inlet, TIP Project B-2500.

I applaud the study team's efforts since 2005 in collaboration with all Federal and State agencies, as well as citizens groups, to find reasonable and feasible alternatives. I fully concur with the selection of the Parallel Bridge Phased Approach as the Least Environmentally Damaging Preferred Alternative. I believe this alternative would balance the need for continued access to Pea Island National Wildlife Refuge, with substantially fewer environmental impacts as compared to the previous parallel bridge options and the Pamlico Sound Bridge alternative. In fact, the phased approach would have no new direct impacts to Pea Island since it utilizes existing rights-of-way. It would have substantially less impact on the National Seashore and the outstanding resource waters, essential fish habitat, and aquatic areas of concern within the Pamlico Sound compared to the 8 miles of dredging required by the Pamlico Sound Bridge alternative. The Parallel Bridge Phased Approach is the only option that is financially feasible, minimizes harm to protected lands, allows for the retention of the Terminal Groin, and maintains guaranteed access to Pea Island by citizens and visitors to the region.

Since this is a significantly improved document since 2005, my specific comments are limited to the following:

1. **Compatibility** - NCDOT and Federal Highway support the position that as long as highway and maintenance operations are confined to the existing easement on Pea Island Wildlife Refuge, then a compatibility determination is not required. Although several Federal agencies have questioned this position, I fully concur and support NCDOT's and FHWA's interpretation. I have also included a letter from US Department of Interior Assistant Secretary Craig Manson which supports this interpretation. The land on Hatteras Island which comprises the Pea Island Wildlife Refuge was accumulated by the State of North Carolina from individual property owners and conveyed by the State to the US Department of Interior. Public Law 229 resulting from HR 4808, approved October 28, 1951, authorized granting a permanent road easement to the State of North Carolina through the Pea Island National Wildlife Refuge in return for the conveyance of land from the State to form the Refuge. It also authorized rights for such other uses as necessary for the operation of the road. Therefore, the easement on NC 12 is different from other uses on the Refuge as it is one that was specifically authorized by Congress as a permanent easement. Also, since it was an existing use prior to the passage of the National Wildlife Refuge System Improvement Act of 1997, Section 6 of that act specifically limits the reevaluation of this existing use to the examination of compliance with the terms and conditions of the authorization, not the authorization itself. The authorization was through Public Law 229 with terms and conditions being permanent use of the easement for highway construction and operations.
2. **Continued Road Access Required to State-Owned Property** - Unless the US Fish and Wildlife Service purchases the 10 acres of state-owned property at the north end of Hatteras Island, road access by NCDOT must be maintained, even with the Pamlico Sound Bridge alternative. Several alternative strategies were included in the Final EIS for access via other means; however, unless concurrence is obtained from the NC Council of State which allows this property to become landlocked, highway access using existing easements to this property must be maintained including any maintenance strategies for the existing easement. The Parallel Bridge Corridor Phased Approach is the only maintenance strategy which stays within the existing easement on the refuge. Therefore, Phases II through IV of the phased approach would be required as part of the Pamlico Sound Bridge Alternative unless the 10 acres of state-owned property were acquired by US Fish and Wildlife. The Final EIS should indicate the fact that unless the state-owned property is acquired by other parties, the existing NC 12 easement (as a secondary road) must be maintained even with the Pamlico Sound Alternatives that moves NC 12 itself off Pea Island. The Final EIS erroneously states that the Pamlico Sound Bridge Alternative allows for the removal of NC 12 and the removal of storm-related maintenance even though under all scenarios the paved easement must remain.
3. **Terminal Groin** - Retention of the Terminal Groin is critical to the protection of northern Hatteras Island as well as the long-term stability of the Oregon Inlet. **CAMA Development Rules** - The Final EIS states in several locations that the Parallel Bridge Corridor Phased Approach LEDPA may not be compatible with CAMA rules. This is incorrect, as CAMA stated within its own written comments on page 8-107 that based on the information within the 2007 Supplemental EIS, the phased approach alternatives are both consistent with and not in conflict with the 1994 Dare County Land Use Plan which was approved by

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October 21, 2008

Mr. Greg Thorpe, PhD.
NCDOT

Project Development & Environmental
Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

REF: Bommer Bridge FEIS

Dear Mr. Thorpe:

I fully support the Preferred Alternative - the Parallel Bridge Corridor with Phased Approach/Rodanthe Alternative as contained in the Bommer Bridge Final Environmental Impact Statement. I urge NCDOT to move as quickly as possible in issuing the ROD and holding the Design Public Hearing. Construction must begin immediately as soon as these steps of the process have taken place. Any further delay is only prolonging the exposure to unacceptable risks.

No one needs to labor over the need for the Bommer Bridge replacement any longer. In fact, too many lives have already been put at risk and will continue to be until the new bridge is in place. In addition, tax payers' dollars are continuously being spent in an attempt to reduce the risks and there is no assurance that with these efforts the Bridge is safe enough for public travel.

I also urge you to move ahead as quickly as possible with the remaining Phases, II through IV. While the human risk factors are not as great as those related to the Bridge, it is still important to complete these phases in order to provide for safe road travel, reduction of environmental impacts to the coast line and impacts to the economy.

My family and I are natives of North Carolina and the State will always be our home. We also own property in Hatteras that provides us with pleasure unsurpassed in our later years in life. I also do business in North Carolina and have several wetland and stream mitigation projects in the Western and Piedmont regions of the State. I feel that my position on the Bommer Bridge Replacement is credible and is supported by the tax dollars we willingly pay to the State.

In conclusion, it is time to move and move rapidly on the dire need for the Bridge Replacement. I offer my full support of moving ahead with the Preferred Alternative, and in fact if there are ways this can be accelerated I would urge you to do so.

I appreciate the opportunity to offer my comments and hope they will be fully considered.

Sincerely,

J. Lamar Beasley
J. LAMAR BEASLEY

the Office of Coastal Resource Management and further states that a formal review of the project to determine consistency with the CAMA program cannot occur until a major permit application is received. Therefore, it is unknown whether there are conflicts with the phased approach and specific CAMA rules since these rules rely on reviewing detailed design features that will not be developed until the detailed design phases. I strongly recommend working with CAMA closely as these details are developed in order to avoid costly delays.

5. Fishing Activities on northern Hatteras Island - I strongly support and encourage the retention of portions of the traffic maintenance bridge or the existing Bommer Bridge during Phase I of the Parallel Bridge Corridor for a fishing pier to support fishing related activities on northern Hatteras Island.
6. Blockage of the Natural Bridge to Old House Channel - Charter fishing boats use the natural channel known as "the Crack" to reach the Bommer Bridge navigation spans from the Oregon Inlet Marina and Fishing Center. The Final EIS states that with all alternatives this natural channel will be blocked and increase travel time by approximately 130 vessels per day by 30 minutes each. I would recommend a one-time relocation slightly westward of the southern entrance to "the Crack" during the construction of Phase I of the Parallel Bridge. This would eliminate the proposed blockage to the Crack by the new alignment of the replacement bridge.

In summary, I applaud the efforts and progress made by NCDOT and its partners since 2005 on this project. Specifically commendable are the efforts of Ms. Lori Kroll who has worked tirelessly and effectively in meeting project requirements, sensitive environmental concerns, and the transportation needs of the citizens and visitors to the Outer Banks. I strongly support the Parallel Bridge Phased Alternative as the only reasonable and feasible alternative which provides the necessary transportation linkage to Hatteras Island, provides the least overall environmental damage to the National Seashore and the Pamlico Sound Outstanding Resource Waters, and is the most responsible approach to serving the communities and the taxpayers of North Carolina. I am prepared to assist in any way possible in order to ensure that the construction phase will begin at the earliest possible date.

Thank you for your efforts on this important issue.

Sincerely,

Marc Basnight

Marc Basnight

Attachment

Cc: Senator Elizabeth Dole
Senator Richard Burr
Congressman Walter Jones
Governor Michael F. Easley
Dare County Board of Commissioners

Comment History
Tracking Number: GUIGRWXQ7N

Sent By: Dale Deane

Date/Time: 9/26/2008 5:35:01 PM


Comment:
Ms.Smyre,

I fully support the immediate the in kind, in-place replacement of the Herbert Bonner Bridge (the "Short Bridge" Plan). I support the elevated roadway as long as access to the beach and sound is not limited further than current alignment allows.

I see no information, other than biased opinions of the non-governmental environmentalist groups (NGEG's) of environmental impact greater than potential for the disastrous economic impact to the Residents and Businesses of Hatteras Island if a in-kind, in-place replacement is not performed at the earliest opportunity. I fully disagree with the non-governmental environmentalist groups (NGEG's) position on this issue. It is clear, that along with the horrendous NPS consent decree that the NGEG's are attempting to use threat of legal action to eliminate human activity on Hatteras Island.

I and my family make 3 to 5 trips to Hatteras Island annually. I wonder about the condition of the bridge on every trip. I respectfully request that all efforts to expedite this replacement be made.

We want to visit and contribute to the local economy, but we want to do it safely.

 Thank you for the opportunity to participate.

Dale Deane
Albemarle County Virginia

Norburn, Robert E.

From: Smyre, Elizabeth A [bsmyre@ncdot.gov]
Sent: Monday, October 27, 2008 4:42 PM
To: Page, John; Norburn, Robert E.
Subject: FW: Bonner Bridge Comments

[Additional citizen comment...](#)

Beth Smyre, P.E.
Project Planning Engineer
NC Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-7844 ext. 333

From: Gery, Michael [mailto:michael.gery@carolinacountry.com]
Sent: Monday, October 27, 2008 4:18 PM
To: Smyre, Elizabeth A
Subject: Bonner Bridge Comments

I am on the mailing list for Bonner Bridge Update but received the October issue too late to send comment by US Mail. Please accept these comments by today's deadline. Thanks.

As a taxpayer for Dare County, North Carolina and the United States, I oppose the N.C. Department of Transportation's reversal of its preferred alternative to replace the Bonner Bridge with the "Parallel Bridge Corridor" version. As has already been shown, this alternative is more expensive, less safe and more environmentally damaging than the "Long Bridge" alternative that was favored formally by NCDOT along with 11 other state and federal agencies in 2003.

The "Parallel Bridge Corridor" bridge and attending causeway structures will result in the following problems not likely to occur with the Long Bridge:

- Far greater effects of storm damage at Oregon Inlet
- Much shorter life span
- Expensive maintenance and repair
- Destroy more than 30 acres of Pea Island National Wildlife Refuge
- Require far more expense of taxpayer money

Michael E.C. Gery
104 Seatone Lane
Manteo, NC 27954

Smyre, Elizabeth A

From: Catherine James [cathjames@mac.com]
Sent: Monday, September 29, 2008 5:44 PM
To: Smyre, Elizabeth A

It's high time something has gotten underway regarding the Bonner Bridge. What about the interest on the money appropriated years ago to fix this problem?

Smyre, Elizabeth A

From: jclathamnc@aol.com
Sent: Thursday, September 25, 2008 1:18 PM
To: Smyre, Elizabeth A
Subject: Bonner Bridge - Public Comment

It's hard to believe we're FINALLY at this point. Hallelujah! I'm a recreational surf fisherwoman hoping to spend a great deal of my upcoming retirement on the Outer Banks. Ever since last year's collapse of the MN bridge, I dread every crossing of the Bonner. I own every escape tool made in case my truck submerges. As stunningly beautiful as it, a failure is easy to conjure up. The environmentalists delays have put human life at greater risk. This is no longer acceptable.

Please, please, please, do all you can to get this greatly needed bridge built as soon as possible.

Sincerely,
Judy Latham
7905 Tulip Circle
Raleigh, NC 27606

Find phone numbers fast with the [New AOL Yellow Pages!](#)

Smyre, Elizabeth A

From: Thomas Lindsay II [tommy.lindsayii@gmail.com]
Sent: Friday, September 26, 2008 2:46 PM
To: Smyre, Elizabeth A
Subject: Bonner Bridge Replacement, FEIS comments

Ms.Smyre,

I fully support the immediate the in kind, in-place replacement of the Herbert Bonner Bridge (the "Short Bridge" Plan). I support the elevated roadway *as long* as access to the beach and sound *is not* limited further than current alignment allows.

I see no information, other than biased opinions of the non-governmental environmentalist groups (NGEG's) of environmental impact greater than potential for the disastrous economic impact to the Residents and Businesses of Hatteras Island if a in-kind, in-place replacement is not performed at the earliest opportunity. I fully disagree with the non-governmental environmentalist groups (NGEG's) position on this issue. It is clear, that along with the horrendous NPS consent decree that the NGEG's are attempting to use threat of legal action to eliminate human activity on Hatteras Island.

I and my family make 8-10 trips to Hatteras Island annually. I wonder about the condition of the bridge on every trip. I respectfully request that all efforts to expedite this replacement be made.

We want to visit, but we want to do it safely.

Thank you for the opportunity to participate.

Thomas L. Lindsay II, PMP
Wakefield, Va

10/27/2008

Smyre, Elizabeth A

From: Jim and Ginny [jmandginnny@scentarticies.com]
Sent: Thursday, October 02, 2008 10:58 AM
To: Smyre, Elizabeth A
Cc: FW4ESRaleigh; Mike Murray
Subject: Herbert C. Bonner Bridge Replacement, comment
Attachments: Bonner Bridge Comment.doc

Dear Beth Smyre:

In my comment dated, April 7, 2007, I recommended that NCDOT implement the Oregon Inlet Bridge with Road North/Bridge South alternative. This recommendation was based upon my conclusion that the Oregon Inlet Bridge with Road North/Bridge South alternative is not only the most cost effective, but also the most viable solution to maintaining the infrastructure of Hatteras Island (see attached comment). That said, I would support the preferred alternative (Phased Approach/Rodanthe Bridge) if it will facilitate the replacement of the structurally deficient bridge. Under **NO** circumstances do I support the Pamlico Sound bridge and I urge you not to fold to the politically correct environmental agencies that are pushing for this unrealistic alternative.

Sincerely,
Virginia L. Luizer
P.O. Box 1092
Buxton, NC 27920
252 995-4968

10/27/2008

James C. Luizer &
Virginia L. Luizer
P.O. Box 1092
Buxton, NC 27920

April 17, 2007

Mr. Carl Goode, PE
Head, Human Environment Unit
NCDOT
1583 Mail Service Center
Raleigh, NC 27699-1583

RE: Replacement of the Herbert C. Bonner Bridge Over the Oregon Inlet—TIP Project No. B-2500

Dear Mr. Goode:

I recommend that NCDOT implement the Oregon Inlet Bridge with Road North/Bridge South alternative.

As I will endeavor to show, this alternative is not only the most cost effective, but also the most viable solution to maintaining the infrastructure of Hatteras Island.

COST EFFECTIVENESS

Please find below a comparison of the alternatives presented for the Bonner Bridge replacement. Upon review of this comparison, it should be obvious that the Oregon Inlet Bridge with Road North/Bridge South will provide adequate protection from storm related Island breaches at the lowest possible cost.

OPTION	ESTIMATED COST (millions) ¹	INCREASED PROTECTION FROM STORM RELATED ISLAND BREACHES	
		NORTH END	RODANTHE
Road North/Bridge South	\$ 612.1 - \$ 740.2	Yes	Yes
Nourishment	\$ 678.8 - \$ 970.4	No	No
All Bridge	\$1,119.9 - \$1,435.3	Yes	Yes
Phased Approach Rodanthe Bridge	\$1,125.7 - \$1,439.0	Yes	Yes
Phased Approach Rodanthe Nourishment	\$1,219.4 - \$1,582.4	Yes	No
Pamlico Sound Bridge	\$1,354.3 - \$2,371.2	Yes	Yes

Estimated cost includes all highway costs (including operation and maintenance), utilities, terminal groin removal, Oregon Inlet US Coast Guard Station Relocation (excluding preparation costs), visitors center relocation, tram service to Pea Island on the low end of the Pamlico Sound Bridge, and tram plus ferry service to Pea Island on the high end of the Pamlico Sound Bridge.

¹ Supplement to the Bonner Bridge Replacement SDEIS, February 14, 2007, pp. 2-16, 2-17, 2-22, and 2-23. Comment Submitted by Virginia L. Luizer

VIABILITY

Pamlico Sound Bridge Options are Not Viable

The Pamlico Sound Bridge options are not financially viable. This conclusion is based upon the fact that NCDOT has stated that funding either of the two Pamlico Sound Bridge options would severely limit the ability of NCDOT to undertake other needed projects throughout the state for a period of at least six years.

The Pamlico Sound Bridge options are not economically viable. This conclusion is based upon the fact that USFWS has stated that if either of the Pamlico Sound Bridge options are selected, the USFWS will revise the current Conservation Plan in favor of the alternatives 4 or 5. Alternatives 4 and 5 call for abandoning all or part of highway 12 and allowing ocean overwash to dominate Pea Island.² The economic implications of alternatives 4 and 5 are addressed below.

Residents of Hatteras Island can expect their utility rates to increase by more than 26% per annum.³ Additionally, visitation to Pea Island will decline due to limited access.⁴ As I demonstrated in my comment on the ORV Management Plan and my comment on the Interim Protected Species Plan (copies attached), the economy of Hatteras Island is already feeling the effects of a downward trend in visitation (2006 decreased 27% from 2002 levels). Given the current state of the economy of Hatteras Island, the implementation of USFWS alternative 4 or 5 could be devastating.

Because the Pamlico Sound Bridge options include the removal of the terminal groin, and will likely result in changes to the dredging activities that the USFWS will permit,⁵ these options could serve to destabilize the Oregon Inlet and adversely impact upon the fishing fleets that operate out of Oregon Inlet. The fishing industry that operates out of Oregon Inlet contributes significant revenues to Dare County.⁶ Finally, if implementation of the Pamlico Sound Bridge options preempt funding of other road/bridge projects throughout the state, the economies of other counties will suffer.

The Pamlico Sound Bridge options do not provide a viable Storm Evacuation Route. Current Dare County policy is to close the Bonner Bridge only if there is high water or damage to the bridge. Motorists are cautioned when winds reach 40 mph. With a 17.5 mile bridge, allowing traffic when winds exceed 40 mph does not constitute an acceptable risk. That said, unless there is significant advance warning of a northeaster or hurricane, the number of visitors and residents who do not evacuate for major storms will increase. Increases in the number of people that remain on Island during major storms not only increases the risk of bodily harm to those trapped on Island, but also complicates the task of providing emergency services in the aftermath of severe weather. To underscore this concern, it should be noted in-season, Island population is estimated at 50,000.⁷

² Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, Executive Summary, p. 2.
³ Cape Hatteras Electric Cooperative Comments on SDEIS NCDOT Project B-2500, p.5.
⁴ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, Executive Summary, p. 2.
⁵ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 159.
⁶ Replacethebridge.com, Herbert C. Bonner Bridge Fact Sheet.
⁷ *ibid*.

Oregon Inlet Bridge Options are Viable

The primary issues related to the Oregon Inlet Bridge options are an "Unresolved" biological conclusion regarding the impacts on two threatened species (Piping Plover and Green Sea Turtle) and refuge compatibility. As I will demonstrate below, the Oregon Inlet Bridge will not have any substantial impact on threatened species and should not be blocked based upon refuge compatibility issues.

Impacts on Threatened Species

With respect to the Atlantic Coast Breeding Population of the Piping Plover, Pea Island is on the northern most edge of the range for this species. In fact, during the past 9 years, only 12 nests were attempted with a total of 5 chicks fledged.⁹ All of these nests occurred on the sandy area behind the terminal groin that protects the current bridge.¹⁰ This area was created by NCDOT as part of a sand mining project for the purpose of protecting the Oregon Inlet Bridge. Apparently, the groin that protects the Oregon Inlet Bridge actually contributes to the breeding success of this species.

With respect to the Great Lakes Wintering Population of the Piping Plover, the USFWS does not provide any data with respect to the numbers of this species that rest or forage on Pea Island. Because the construction activity for the Oregon Inlet Bridge would affect less than one acre of potential nesting or foraging habitat,¹¹ the impact on this species would be minimal.

With respect to the Green Sea Turtle, USFWS does not provide any specific data with respect to the numbers of this species that nest on Pea Island. USFWS does provide data on Loggerhead Sea Turtles—average 10 nests per annum. By comparison USFWS states that Green Sea Turtles are less common than Loggerhead Sea Turtles and use Pea Island Refuge beaches for nesting on occasion.¹² Based upon this description of Green Sea Turtle nesting patterns, it is not likely that this species will visit the area during the construction phase. That said, in the event that a Green Sea Turtle does nest in the area, the methods outlined by NCDOT for the purpose of limiting the impact on nesting turtles will provide adequate protection for the Green Sea Turtle.¹³

Refuge Compatibility

With respect to the Oregon Inlet Bridge, Dick Kempthorne, Secretary of the Department of the Interior has affirmed refuge compatibility as follows:

We believe that the replacement of the Bridge itself could be accomplished in a way which is compatible with the Refuge Act, and other laws, if it is constructed within the same alignment or with minor changes to the current alignment.¹⁴

In summary, the Oregon Inlet Bridge is viable both from the standpoint of protecting threatened species and from the standpoint of refuge compatibility.

⁹ Supplement to the Bonner Bridge Replacement SDEIS, February 14, 2007, pp. xx.
¹⁰ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 31.
¹¹ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 50.
¹² Supplement to the Bonner Bridge Replacement SDEIS, February 14, 2007, pp. xvii.
¹³ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 50.
¹⁴ Supplement to the Bonner Bridge Replacement SDEIS, February 14, 2007, pp. xxvii, xxviii.
¹⁵ Letter from Dick Kempthorne to The Honorable Richard Burr, July 05, 2006.

Comment Submitted by Virginia L. Luizer

Road North/Bridge South is Viable

With respect to the realignment of Highway 12, Dick Kempthorne suggested that the Bonner Bridge replacement be separated from the "more difficult and less urgent issues" related to the realignment of Highway 12.¹⁵ While separating the bridge replacement from the realignment of Highway 12 will facilitate the replacement of the Bonner Bridge, the Bonner Bridge is of no use without a road that connects the bridge to the villages south of Pea Island. In this regard, two segments of Highway 12 experience frequent overwash. They are, the segment at the south end of Pea Island in Rohdame and the segment in the northern section of Pea Island. With respect, to the realignment of Highway 12, according to the USFWS,

Requests for large-scale, long-term, repetitive beach building and dune building permits or for major new right-of-way permits are not likely to be compatible.¹⁶

Refuge compatibility as it relates to the realignment of Highway 12 is discussed below.

Bridge South

The proposed bridge in Rodamthe will not require any new right-of-way permits. In fact, once completed the bridge will actually reduce the amount of dune building required to keep this segment of Highway 12 open. Because the construction of this bridge does not raise issues with respect to compatibility, this bridge should be constructed ASAP.

Road North

Moving Highway 12 west of the forecast worst-case 2060 shoreline will reduce the uncertain nature of travel on this section of Highway 12. Realignment of this section of Highway 12 will greatly reduce the amount of dune building required to keep this section of Highway 12 open. This realignment of Highway 12 is not only compatible with the refuge, but it will actually contribute to the USFWS objective of allowing natural processes to dominate the shoreline area in the hopes of providing more habitat for the threatened Piping Plover, the threatened Green Sea Turtle, and other shorebirds.

Realignment of this section of Highway 12 will require new right-of-way permits and will require the filling of wetlands. The majority of the wetlands affected include the edge of what is referred to by USFWS as managed wetlands. These managed wetlands include 3 manmade impoundments (390-acre North Pond, 192-acre New Field Pond, and 208-acre South Pond). Management techniques for these wetlands are summarized in the following manner.

The refuge staff manages these areas by draining water in the spring to create mudflats for shorebirds and allow annual seed-bearing plants, maintaining it at a low elevation through the late summer shorebird migration, and allowing them to fill or pumping water to fill them for waterfowl migration in the fall. The staff fills the impoundments by opening the water control structures when the tide is appropriate to fill or drain them whenever possible. The impoundments are burned, mowed, and/or disked as needed to suppress succession to perennial herbaceous and woody plants.¹⁷

¹⁵ Letter from Dick Kempthorne to The Honorable Richard Burr, July 05, 2006.

¹⁶ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 1.

¹⁷ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 28 & 29.

Comment Submitted by Virginia L. Luizer

Since the majority of wetlands impacted are artificially created and managed, USFWS could easily adjust these wetlands so as to mitigate the impact of the realignment of Highway 12. The point is, quite simply, that realignment of Highway 12 will not destroy any natural wetlands. Realignment of Highway 12 only requires the relocation of wetlands created, maintained, and managed by USFWS. That said, the concern expressed by USFWS that the realignment of Highway 12 will result in the destruction of wetlands is, in my opinion, disingenuous. Furthermore, I question the extension and applicability of federal statuses to artificially created and managed wetlands.

SUMMARY

Planning for the replacement of the Bonner Bridge began in 1993. Initially, USFWS objected to the bridge replacement based upon its assessment that the bridge replacement proposals were not compatible with section 7 of the ESA.¹⁸ It should be noted that this assessment was not based upon observed occurrences of threatened species. Instead, it was based upon the presumption that, prior to 1996, Piping Plovers may have nested on overwash areas and beaches on the refuge.¹⁹

In 1997, Congress passed the National Wildlife Refuge System Improvement Act. Citing this new legislation, USFWS asserted that the replacement bridge proposals were not compatible with the refuge. As noted above, Dick Kempthorne, Secretary of the Department of the Interior, has asserted that the bridge replacement does not constitute a refuge compatibility issue.

Despite the fact that both the ESA and the refuge compatibility objections have not been substantiated, the replacement of the Bonner Bridge has been delayed for 13 years. During this 13 year period:

1. NCDOT has committed hundreds of millions of dollars in futile attempts to stabilize the areas damaged by the Halloween Storm of 1991,²⁰ and
2. the Bonner Bridge has deteriorated to the point of presenting a threat to public safety.²¹

At present the Bonner Bridge has a safety rating of 4 out of 100.²² It is estimated that NCDOT will be required to spend an additional 40 million dollars to return the Bonner Bridge to a structurally sound condition. This expenditure is expected to maintain the Bonner Bridge for a period of 10 years.²³

As of this date, USFWS has not altered its position that the only replacement bridge option considered compatible with the refuge is the Pamlico Sound Bridge. Forcing NCDOT to proceed with the Pamlico Sound Bridge options will have a devastating impact:

1. on NCDOT's ability to complete other needed highway projects throughout the state for a period of at least 6 years,
2. on the fishing industries of Oregon Inlet, Manteo, and Wanchese, and
3. on the economies of the villages of Hatteras Island.

¹⁸ Replacethebridgenow.com, Herbert C. Bonner Bridge Fact Sheet.

¹⁹ Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, pp. 50.

²⁰ The conclusion with respect to the amount of funds expended for stabilization is drawn from the high estimated cost of nourishment specified in the Supplement to the Bonner Bridge Replacement SDEIS, February 14, 2007, table 2-2 (approximately 12 million per year times 13 years or \$156 million). Additionally, during this 13 year period, a major sandbag project was completed in order to repair damage caused by the 1991 Halloween Storm. While I do not have the cost of this project, it is reasonable to assume the cost was substantial.

²¹ This fact has been recognized by Dick Kempthorne in his Letter to The Honorable Richard Burr, July 05, 2006.

²² Replacethebridgenow.com, Herbert C. Bonner Bridge Fact Sheet.

²³ NCDOT press release, Bonner Bridge In-Depth Structural Condition Assessment, dated January 11, 2007.

Comment Submitted by Virginia L. Luizter

So what are the benefits to be derived from the Pamlico Sound Bridge options? According to USFWS, the Pamlico Sound Bridge options will:

1. eliminate the need to provide for a right-of-way through the refuge,
2. allow for the removal of impediments to natural processes on the shoreline, and
3. allow for implementation of policies which consider the needs of fish and wildlife first.

It is unconscionable for an agency of the Federal Government to designate a wildlife refuge in the middle of established communities and then seek to enforce policies that endanger the life and well being of the residents of those communities. Current USFWS proposals, which consider the needs of fish and wildlife first, pose real threats not only to the livelihood of the residents of this island, but also to their very existence. In my opinion, USFWS proposals are not only extreme, but they violate my constitutional right to life. Surely, there must be some way to prevail upon agencies of the Federal Government to not only protect endangered species, but also to safeguard the well being of the citizens that inhabit this ribbon of sand.

In the event that USFWS service cannot be convinced to issue a favorable biological conclusion for the threatened species and to issue a determination of compatibility for Oregon Inlet Bridge with Road North/Bridge South, I suggest that you either

1. request Congress to authorize the Oregon Inlet Bridge with Road North/Bridge South,²⁴ or
2. request that Congress enact legislation removing Pea Island from the wildlife refuge system.

Sincerely,

James C. Luizter &
Virginia L. Luizter

cc: Warren Judge, Chairman, Dare County Board of Commissioners
Dick Kempthorne, Secretary, Department of the Interior
The Honorable Michael F. Easley, Governor of North Carolina
The Honorable Mark Basnight, Senator
The Honorable Richard Burr, United States Senate
George W. Bush, President

²⁴ Congress has authorized such projects in the past. For example, as per page 18 of the Comprehensive Conservation Plan, Pea Island National Wildlife Refuge, September 2006, "In 1950, Congress authorized the Corps of Engineers to dredge a 400-foot-wide by 14-foot-deep channel through the Inlet, but the actual dredging did not begin until 1962. This dredging has been ongoing sporadically since that time."

As always, much thanks to you and the NCBBA for working hard to help maintain the public's access and recreational use of the Outer Banks fantastic shoreline!

Regards,

BILL MEREDITH
139 Homestead Drive
Camden, DE. 19934
NCBBA #3317

10/28/2008

Norburn, Robert E.

From: Smyre, Elizabeth A [bsmyre@ncdot.gov]
Sent: Tuesday, October 28, 2008 7:48 AM
To: Page, John; Norburn, Robert E.
Subject: FW: Comments to NCDOT re: Bonner Bridge Replacement Project FEIS
Attachments: Bonner Bridge replacement. FEIS comment letter. October 26, 2008.doc

[Another comment letter...](#)

Beth Smyre, P.E.
Project Planning Engineer
NC Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-7844 ext. 333

From: wsmeredith@comcast.net [mailto:wsmeredith@comcast.net]
Sent: Tuesday, October 28, 2008 3:33 AM
To: President@NCBBA.org
Cc: Smyre, Elizabeth A
Subject: Comments to NCDOT re: Bonner Bridge Replacement Project FEIS

E-10

JIM KEENE, President
North Carolina Beach Buggy Association

Dear JIM:

Attached below is a letter dated 10/26/08 that I sent to NCDOT's Greg Thorpe regarding the Bonner Bridge Replacement Project's FEIS. As you might recall, my primary concern for this project as a frequent out-of-state visitor is to try to maintain the great "24/7/365" access along Rt. 12 on the south side of Oregon Inlet and within Pea Island National Wildlife Refuge for purposes of shoreline fishing and other recreational uses, which in turn necessitates both good parking facilities and ready walkover access. While the Preferred Alternative is indeed better for such purposes than other possible options that could have been chosen, it still has some deficiencies for these purposes that could be rectified with some more thought, planning and appropriate implementation (and of course some more dollars too).

I've now also copied this e-mail and its attachment to NCDOT. As a demonstration for how much these types of matters mean to out-of-state visitors (or "tourists" if you will), plus to some beachfront diehards and soundside wanderers like me, you might want to share my communication with the Outer Banks Chamber of Commerce, Outer Banks Visitor Bureau, Dare County Board of Commissioners, and Senator Marc Basnight. Additionally, this could also be shared with appropriate local U.S. Fish and Wildlife Service and National Park Service personnel, since it will take additional cooperation on the part of these two federal agencies to help achieve what I've called for in the attached letter.

10/28/2008

October 26, 2008

Mr. Greg Thorpe, Ph.D.
NCDOT
Project Development and Analysis Branch
1548 Mail Service Center
Raleigh, N.C. 27699-1548

Re: comments on Bonner Bridge FEIS

Dear Mr. Thorpe:

My main interest in following and commenting upon the Bonner Bridge replacement project has been to see that the excellent "24/7/365" public access along Rt. 12 through the Pea Island NWR is not lost or significantly decreased due to the bridge's replacement and any associated effects upon Rt. 12 through the Refuge. I am concerned that both NCDOT and the USFWS still take measures to ensure such outstanding ready public access to both the ocean/beachfront and sound/marsh sides of Rt. 12, allowing for adequate parking along Rt. 12 and walkover access for purposes of fishing, swimming, hiking, beachcombing, shelling, bird-watching, nature study, etc.

The FEIS's Preferred Alternative (Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative) is certainly much better than either of the two Pamlico Sound Bridge Corridor Alternatives, since I was concerned that if either of the latter routes were chosen that the USFWS wouldn't then give very high priority to trying to maintain the existing great public access along what would then become an isolated, dead-ended Rt. 12. However, even for the now chosen Preferred Alternative, I still have some concerns about maintaining the currently outstanding public access, which before all this is over the public will probably now want to see further addressed.

First, the chosen Preferred Alternative involves in part that 2 public access points (or what should really be described as public access areas) will be provided, one at the north end that I assume would be along the south side of Oregon Inlet, and a second somewhere south of the Refuge ponds. This is good as long as these 2 public access areas have adequate size parking lots to accommodate the amount of public use that the public would like to have, along with provisions for several foot pathways to both ocean and sound sides. Both NCDOT and the USFWS will need to provide whatever acreage is needed to adequately accommodate such parking lots and footbound access (along of course with some public use facilities such as port-a-johns, a few picnic tables, trash bins or dumpsters, etc.), and of course also incorporate a convenient and safe on/off design for accessing or leaving Rt. 12.

However, only allowing for 2 such public access areas within the total stretch along Rt. 12 within the Refuge seems quite inadequate compared to the current outstanding public access along this stretch of road, and as such more public access areas need to be planned and eventually constructed. I recommend that at least 3 more such public access areas be included, each having features similar to the 2 that are currently proposed at the north and toward the south ends, with the final design to call for a total of at least 5 public access areas along Rt. 12 within the Refuge, about equidistant apart if possible. For sure the placement of these 5 public access areas should try to accommodate convenient public access along the south side of Oregon Inlet, near the northern end of the North Refuge Pond, near the Pea Island Refuge Visitors Center, near New Inlet, and nearby or for a few other key locations too. Someday having an elevated highway through the Refuge with only 2 public access areas at the northern and toward the southern ends will become but a shadow of today's current outstanding public access along Rt. 12, which is why at least 3 more public access areas are needed. Whatever the added expense or additional acreage needed on the part of NCDOT and the USFWS should be provided.

I would also like to see if the new Bonner Bridge replacement's design could somehow provide for or allow some convenient foot access for recreational uses at the far southern end of Bodie Island, along the north side of Oregon Inlet. I'm not sure what might be done here to plan for and accommodate such walk-on recreational access, but I'm confident that some good minds within NCDOT and the National Park Service could come up with something that would work.

In determining what will become the fate of the current Bonner Bridge after the new bridge takes its place, and from the standpoint of how the oceanside catwalk along the south end of the current bridge is so heavily used for recreational fishing atop an Oregon Inlet channel, measures must be taken by NCDOT and other appropriate parties to still maintain this great fishing facility.

Finally, it appears that someday by design the new elevated highway through the Refuge will, due to beachfront erosion, become situated either over the beach itself or even out in the nearshore ocean. This would seem to have then become a somewhat perilous environment for maintaining the elevated highway's structural integrity, but in proposing such a design and fate instead of going with one of the Alternatives that also called for periodic beach nourishment (sand-pumping along the beachfront) and perhaps some dune building, it seems that NCDOT's engineers don't think this would really be much of a concern. However if over time the nourishment or even dune building to the eastern, seaward side of the new elevated highway would always seem possible, but admittedly involving more money (with I'd guess the tradeoffs to then consider being the cost of some beach nourishment and/or dune building versus coping

with possible structural damage to the elevated highway given what will become by NCDOT's design a new beachfront or even nearshore ocean transit for the new highway).

Thank you for the opportunity to once again comment about the Bonner Bridge replacement project.

Sincerely,



William H. Meredith
139 Homestead Drive
Camden, DE. 19934

CHUCK OHMSTEAD
470 WASHINGTON STREET
P.O. BOX 847
FOREST CITY, NC 28043-0847
828-245-4126

10/27/08

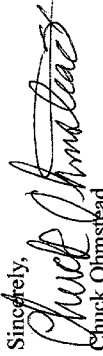
Ms. Beth Smyre, PE
NC Dept. of Transportation
Project Development and Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Ms. Smyre, PE;

I have read the latest (October 2008), 'Bonner Bridge Update' newsletter with the Final Environmental Impact Statement for the Replacement Project of the Bonner Bridge. I liked what I read about the bridge replacement, Parallel Bridge Corridor Plan, along with Phased Approach to the project. I also liked the idea of elevating portions of NC 12, within the existing NC easement, were and when needed, based on coastal conditions.

Thank-you for keeping us informed.

Sincerely,


Chuck Ohmstead

Smyre, Elizabeth A

From: SUSAN AND CHARLES PEELE [thepeeles@embarqmail.com]
Sent: Saturday, September 27, 2008 10:09 PM
To: Smyre, Elizabeth A
Subject: Favor the parallel bridge with the phased approach

I live in Frisco and my wife travels NC 12 alot during the evening hours. I am happy to learn that the short bridge option was selected and that improvements to Hwy 12 will follow. Her safety is my main concern.

Charles and Susan Peele
PO Box 369
Frisco, NC 27936

Smyre, Elizabeth A

From: Alan Pitt [apitt@jewellautomation.com]
Sent: Thursday, September 25, 2008 11:05 AM
To: Smyre, Elizabeth A
Subject: Build it NOW!!!!

Before the old one falls into the sea. I cannot believe it has taken almost 20 YEARS for this to come to fruition. Environmentalists have too much power in this country, and simply do not care about the fate of humankind, or the local islanders and tourists.

Build it, and build it NOW!!!!!!!!!!!!

Alan Pitt
Richmond, VA/Frisco, NC

RECEIVED
Division of Highways

OCT 24 2008

Preconstruction
Project Development and
Environmental Analysis Branch

October 20, 2008

Mr. Greg Thorpe, Ph.D.
NCDOT
Project Development and
Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Mr. Thorpe:

Following are our comments on the Final Environmental Impact Statement (FEIS) for the Bonner Bridge Replacement Project.

As North Carolina taxpayers and frequent visitors to Oregon Inlet, Cape Hatteras National Seashore, Pea Island National Wildlife Refuge and Hatteras Island, we offer the following comments to aid your agency in the preparation of a Record of Decision (ROD) for this project that adequately considers the full range of environmental impacts while meeting the charge of the North Carolina General Assembly legislation (House Bill 747) that called for the efficient, cost-effective completion of this project.

After our careful comparison of the alternatives (Pamlico Sound Bridge Corridor and Parallel Bridge Corridor-Phased Approach), we advocate that you recommend the Pamlico Sound Bridge Corridor as the Preferred Alternative for the following reasons:

1. *A negative economic impact (estimated ranging from \$5-146 million) to Hatteras Island as well as the Outer Banks will continue to exist now and into the foreseeable future with the Parallel Bridge Corridor-Phased Approach due to temporary closures during and immediately after storm and hurricanes events. The Pamlico Sound Bridge Corridor will eliminate the need for road closures and the maintenance costs to re-open the existing NC12 roadway.*
2. The Cape Hatteras National Seashore and Pea Island National Wildlife Refuge are national treasures. We the people of North Carolina have been entrusted with the care of these lands. *The Pamlico Sound Bridge Corridor Alternative is the least environmentally damaging to these lands and we have an obligation to select the alternative that affords us this option. This is an opportunity to be good stewards of the land for the people of North Carolina, for all Americans and especially for our children and grandchildren.*
3. *Maintaining access to and off of Hatteras Island is of utmost importance for the provision of emergency medical services, fire and police protection, schools, solid waste disposal, and utility services. The Pamlico Sound Bridge Corridor is the best long-term "insurance policy" of providing these services to the people of Hatteras Island. The Parallel Bridge Corridor-Phased Approach would continue to experience temporary closures and needed repairs over the life of the project due to storms (e.g. tropical, nor'easters and hurricanes).*
4. The natural shoreline movement and dynamic interface of the ocean and the beach is powerful force and *the Parallel Bridge Corridor-Phased Approach bridge in this area is constantly*

subjected to the forces of the ocean and the environment which requires continuous and costly maintenance and repairs. The Pamlico Sound Bridge Corridor would not be subjected to this natural shoreline movement, therefore, greatly reducing maintenance and repair costs. Furthermore, the Parallel Bridge Corridor-Phased Approach assumes that NC 12 would remain in its current location, and beach nourishment combined with dune enhancement would be used to maintain an adequate beach and dune system. Beach nourishment and dune enhancement will be required to be part of the Bridge Corridor-Phased Approach and are completely unnatural processes that will cost taxpayers millions over the life of the bridge.

In conclusion, the estimated costs of the Parallel Bridge Corridor-Phased Approach ranges from \$1.17-\$1.49 billion and the estimated costs of the Pamlico Sound Bridge Corridor ranges from \$1.29-\$1.79 billion. *The additional \$120-\$300 million required for the Pamlico Sound Bridge Corridor is easily justified by the offsets in environmental benefits (i.e. natural shoreline movement and environmental stewardship), in economic savings to visitors to Hatteras Island and the Outer Banks Region (i.e. limited bridge/road closures), in enhancing public safety (i.e. improves access to and from Hatteras Island during storms/hurricanes) and it meets the spirit and intent House Bill 747 to be a cost-efficient project for the current and future citizens of North Carolina.*

Further justification was put forth by environmental resource and regulatory agencies included on the NEPA/Section 404 Merger Team in which they indicated a strong preference for the Pamlico Sound Bridge Corridor because of its lower potential natural resource impacts. However in the FEIS summary, it was prematurely concluded this alternative was not financially viable, in that adequate resources are not available to fund the initial bridge construction. We offer that based on the difference of \$120-300 million between the two alternatives, a bond referendum or fund-raising campaign spearheaded by a third party would be a viable option(s) to raise the needed funds.

Lastly, please fully consider our comments when preparing your agency's Record of Decision for the Final Environmental Impact Statement (FEIS) for the Bonner Bridge Replacement Project. If you have any questions about our comments or need additional information, please don't hesitate to contact us.

Respectfully,

John Stanton
Wendy D. Stanton
John & Wendy Stanton
1335 Jerry Post Office Road
Columbia, NC 27925

cc: U.S. Congressman Walter B. Jones
N. C. Senator Marc Basnight



DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
Washington Regulatory Field Office
Post Office Box 1000
Washington, North Carolina 27889-1000
October 30, 2008

IN REPLY REFER TO

Regulatory Division

Subject: Action ID. 199303077

Dr. Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Please reference your September 17, 2008, correspondence requesting our review and comments concerning the Federal Final Environmental Impact Statement and Section 4 (f) Evaluation for the NC 12 Replacement of Herbert C. Bonner Bridge, TIP No. 2500, Dare County, North Carolina. In response to your request we have the following comments:

1. Page 4-92, Section 4.7.3.2, **Parallel Bridge Corridor with NC 12 Maintenance**. It appears based on information presented in other sections of the FEIS that dredging for the construction barge channel could have affects to submerged aquatic vegetation (SAV) similar to constructing a haul road to complete the bridge behind (west side) Bodie Island. A statement should be added saying that potential dredging impacts would affect SAV. If these impacts are known they should be identified and quantified similar to how they are identified for the haul road.
2. It appears there still may be unresolved issues pertaining to whether or not the Phased Approach/Rodanthe Bridge Alternative (Preferred) will require a compatibility determination from the Pea Island National Wildlife Refuge. There are numerous references in the FEIS that a compatibility determination is not required because the Preferred Alternative and any storm-related NC maintenance to existing Highway 12 fall within the terms of the easement permit. However on page 4-8, it states, "the USFWS will be responsible for determining whether or not the Phased Approach/Rodanthe Bridge Alternative is consistent with both the Refuge's mission and plans, including the Comprehensive Conservation Plan, as well as the provisions of the National Wildlife Refuge System Act (NWRSA) of 1997." It is unclear whether or not the term "consistent" encompasses the provisions of compatibility under the NWRSA of 1997.

3. In some sections of the FEIS documenting construction techniques it mentions SAV and wetlands will be bridged and in other sections it says there may be temporary impacts to these resources. It is our preference that all wetlands and SAV's be bridged to the maximum extent practicable to reduce impacts to these valuable resources. All impacts both temporary and permanent will need to be identified and included as part of the Section 404 permit application.

4. It should be noted that in addition to the U.S. Coast Guard Permit for the Oregon Inlet bridge (Phase 1) component a Corps Section 10 permit would be required for any utility lines in or affecting navigable waters of the United States. A "utility line" is defined as any cable, line or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. Pipes or pipelines used to transport gaseous, liquid, liquefied, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to Section 9 of the Rivers and Harbors Act of 1899.

5. Issues pertaining to the removal or retention of the terminal groin still exist with the Phased Approach/Rodanthe Bridge Alternative. It appears based on information presented in the FEIS that NCDOT needs the terminal groin to remain in place for its preferred alternative. NCDOT should act accordingly in trying to obtain the necessary special use permit from the U.S. Fish and Wildlife Service (FWS) for the retention of the terminal groin prior to the issuance of the Corps Section 404/10 permit, CAMA permit, and US Coast Guard Permit. A National Park Service (NPS) Special Use Permit would also need to be obtained for the bridge terminus on Bodie Island. Additionally, the Corps navigation section in a letter dated September 18, 2008 expressed concern that delaying the application and issuance of the Special Use Permit may render the constructed Navigation Zone useless and most likely jeopardize the structural integrity of the newly constructed southern bridge abutment.

6. It is recommended to prevent possible permit delays that NCDOT and FHWA coordinate and complete a Memorandum of Agreement with the State Historic Preservation Office and the Advisory Council on Historic Preservation in consultation with other consulting parties, as per the requirement of Section 106 of the Historic Preservation Act of 1966. Additionally, to prevent possible permit delays, coordination needs to be completed with NOAA's National Marine Fisheries Service (NMFS) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) specifically as it relates to Essential Fish Habitat (EFH). To date, we haven't seen any documentation that the NMFS concurs with the Essential Fish Habitat Assessment which was completed for this project nor have we seen any conservation recommendations proposed. Prior to Corps authorization for this project, we will need to ensure that our legal requirements are satisfied and fulfilled under Section 106 of the Historic Preservation Act of 1966 and the Magnuson Stevens Act.

7. Page 4-131, Section 4.7.10.3, **Compensatory Mitigation**. The FEIS states "temporary impacts to wetlands would be mitigated on a 1:1 basis by restoring these areas to their pre-construction condition." As we discussed in our December 14, 2005 comment letter for the


SIDEIS, until these impacts can be more thoroughly assessed we are unable to agree that a 1:1 ratio for temporary impacts is appropriate. Factors such as compaction and changes to adjacent landscapes sometimes limit how these areas can be restored. Mitigation ratios and/or specific mitigation guidelines and conditions for temporary impacts will be assessed during the permit process.

8. Pages 4-132, 4-134, 4-135, and 4-131, Section 4.7.10.3, **Mitigation of Permanent Wetland Impacts**, The mitigation section is a little confusing since temporary impacts are discussed in one context and permanent impacts in another (also Tables 4-25 and 4-26) but then it appears the later narrative sections describing the different types of wetlands includes all impacts. Then the second to last paragraph on page 4-134 then states Section 404 jurisdictional wetlands will total 0.47 acres for the Parallel Bridge Corridor with Phased approach/Rodanthe Bridge Alternative. The total wetland impacts for the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative considering all permanent and temporary impacts far exceed 0.47 acres. The Record of Decision (ROD) should clarify and quantify all impacts described in this section of the FEIS. While we agree that potential compensatory wetland mitigation includes on-site restoration and enhancement of in-kind wetlands as compensation for as much of the permanently affected areas as possible, we are in disagreement at this point in time that the mitigation credit available from the Balance Farm Mitigation could provide for all or a portion of the mitigation required for the Preferred Alternative. Our basis for this is that the wetlands that exist at the Balance Farm Mitigation Site are out-of-kind as compared to the impacts that would take place for the proposed project. More in-depth analysis needs to be completed for the mitigation options that may exist for this project and should be submitted ideally at the time of permit application so they may be assessed accordingly without causing permit delay.

9. We respectively would like to place emphasis on **Section 2.15** on page 2-148, **Section 8.10.3** on page 8-32, and pages **D-12-D-14** in Volume 2 of the FEIS which address key points in selecting the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the LEDPA (preferred alternative) for this project. As this project proceeds forward it should be duly noted that the agreement was that the "remaining phases of work in the Phased Approach/Bridge Alternative indicate work on Pea Island will be done within the existing easement via the construction of short bridge segments, or other alternatives as determined at that time. The agencies concur, based on the information available today, they can not conclusively say that permits or approvals will or will not be granted for these additional phases. The agencies do agree that permits will not be granted for these remaining phases of work until their applicable laws and regulations have been satisfied. The agencies are reaching concurrence on this approach for the purposes of advancing the project to a ROD but are making it clear the remaining phases of work may need further study after the ROD but before any permits or approvals are granted."

We appreciate the opportunity to comment with you prior to the Record of Decision (ROD) for this project. If you have any questions regarding our comments, please do not hesitate to contact me at the Washington Regulatory Field Office, telephone (252) 975-1616, extension 26.

Sincerely,


William J. Biddlecome
Regulatory Project Manager

Copies Furnished:

Renee Gledhill-Larley
North Carolina State Historic Preservation Office
4617 Mail Service Center
Raleigh, North Carolina 27699-4617

Mr. Doug Huggett
Division of Coastal Management
North Carolina Department of Environment,
And Natural Resources
400 Commerce Avenue
Raleigh, North Carolina 28557-3421

Mr. Ron Sechler
National Marine Fisheries Service
101 Pivers Island
Beaufort, North Carolina 28516

Mr. Pete Benjamin
U.S. Fish and Wildlife Service
Fish and Wildlife Enhancement
Post Office Box 33726
Raleigh, North Carolina 27636-3726



Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
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<http://sero.nmfs.noaa.gov/>

October 27, 2008 F/SER4:RS/pw

Beth Smyre
NC Department of Transportation
Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Ms. Smyre:

NOAA's National Marine Fisheries Service (NMFS) reviewed the Final Environmental Impact Statement that describes plans for replacing the Herbert C. Bonner Bridge (No.11) over Oregon Inlet, Dare County, North Carolina (FEIS) (Federal-Aid No. BRS-2358 (15), Department of Transportation (NCDOT) Project Definition: 32635, TIP Project No. B-2500, CESAW Action ID 199303077). A availability of the FEIS was announced in the Federal Register September 26, 2008 (September 26, 2008 (Volume 73, Number 188). As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are provided pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Introduction

The Herbert C. Bonner Bridge across Oregon Inlet in Dare County was constructed in 1962 and is approaching the end of its reasonable service life. The bridge is part of NC 12 and provides a highway connection between Hatteras Island and Bodie Island. Two general replacement bridge corridors are considered in the FEIS: The Pamlico Sound Bridge Corridor and the Parallel Bridge Corridor. Within each of these corridors are specific alternatives:

- Pamlico Sound Bridge Corridor
 - Curved Terminus at Rodanthe
 - Intersection Terminus at Rodanthe
- Parallel Bridge Corridor
 - Nourishment Alternative
 - Road North/Bridge South Alternative
 - All Bridge Alternative
 - Phased Approach/Rodanthe Bridge Alternative
 - Phased Approach/Rodanthe Nourishment Alternative

Mr. Chris Militscher
U.S. Environmental Protection Agency
C/O FHWA, Raleigh Area Office
310 New Bern Avenue, Room 206
Raleigh, North Carolina 27601

Mr. Travis Wilson
Eastern Region Highway Project Coordinator
Habitat Conservation Program
1142 I-85 Service Road
Creedmoor, North Carolina 27522

Mr. Brian Wrenn
Water Quality Section
North Carolina Division of Environment
and Natural Resources
1650 Mail Service Center
Raleigh, North Carolina 27699-1650

Mr. Ronald J. Mikaluk, Chief
Wetlands Section-Region IV
Water Management Division
U.S. Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, Georgia 30303

Mr. Clarence Coleman, PE
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, North Carolina 27601-1418



On April 17, 2007, NMFS provided comments on the Supplement to the Supplemental Draft Environmental Impact Statement (SSEIS) which contained these alternatives. At that time, NMFS supported the Pamlico Sound Bridge Corridor as representing the class of alternatives that would have the least impact on NOAA trust resources over the project's design life. Via the Merger 01 process, on August 27, 2007, NCDOT and the Federal Highway Administration identified the Parallel Bridge Corridor: Phased Approach/Rodanthe Bridge Alternative as the least environmentally damaging practicable alternative (LEDDA). NMFS and other agencies did not concur with this selection. Our previous comment letters and material submitted in conjunction with the Merger 01 process details the essential fish habitat (EFH) and federally managed fishery species that could be adversely affected by the project over its design life. For brevity, that information will not be repeated here.

General Comments

The North Carolina barrier island system is recognized as an important resource providing valuable habitat for fish and wildlife. The 12.5-mile-long section of NC 12 that bisects the Pea Island National Wildlife Refuge fragments the habitat and disrupts natural coastal processes. The Phased Approach/Rodanthe Bridge Alternative would ultimately end up as a bridge in the ocean along the majority of the 12.5-mile segment of NC 12 that passes through the refuge. While no beach nourishment is proposed in the short term, over the long term the beach nourishment needed to protect NC 12 could significantly alter and degrade the value of surf zone habitat to migrating fish and to fish that use the surf zone as nursery habitat.

The FEIS improves upon the SSEIS in discussing the value of and impacts to surf zone EFH in the Pea Island National Wildlife Refuge, however, the FEIS does not fully consider the significant habitat changes associated with bridge supports in the surf zone and ultimately the near shore ocean. As noted in our comments on SSEIS and during the Merger 01 process, NMFS believes habitat impacts associated with the Pamlico Sound Bridge Corridor could be mitigated while the impacts associated with a bridge in the surf zone are largely unknown. Under the phased approach alternatives, the maximum length of bridge over the ocean beach is expected to be 8 miles in 2060 and 3.3 miles in 2020. NMFS notes there is considerable uncertainty in these estimates and the impacts to fishery species and their habitats from the project also are not well known. Accordingly, we continue to support the Pamlico Sound Bridge Corridor as the preferred alternative, and we disagree with the statement in Section 4.7.6, paragraph 1, line 16 that the Parallel Bridge Corridor would have less of an impact on fish and shellfish communities.

Specific Comments

Page xxxiv, 7. Design Coordination
NMFS should be added to the agencies participating in the project design and mitigation strategies.

Page xxxiv, 9. Disposal of Dredged Material
Any dredged material disposal site should be designed as a multi-purpose site in consultation with NMFS.

Page xxxviii, 26. Submerged Aquatic Vegetation Survey
Any survey of SAV in the vicinity of Oregon Inlet should follow protocols endorsed by NMFS.

Page 3-61, 3.6.3.4 Potential for a Breach to Open in the Project Area
This section provides substantial detail regarding the future conditions in the project area; however, it should be noted that the level of concern NMFS has over these conditions would be substantially lessened by the construction of a Pamlico Sound Bridge Alternative.

Page 3-78, 3.7.3.2 Beach

This section should include information on the invertebrates found in the beach intertidal zone or be relabeled as "Dry Beach" and a new section should be added called "Wet/Intertidal Beach."

Page 3-90, Table 3-20

The information on fish harvests is old and should be updated to depict the most recent information from NCDENR Division of Marine Fisheries.

Page 3-91, 3.7.6.3 Essential Fish Habitat

For clarity, we recommend this section be combined with Section 4.7.6.2 EFH Assessment.

Page 3-92, 3.7.6.3, Essential Fish Habitat

Table 3-22 Inshore and Marine Essential Fish Habitats. The surf zone should be included in this table and a corresponding section added to the text associated with this table.

Page 3-98, 3.7.6.4, Benthic Communities

Common surf zone benthic species (such as *Donax* sp. and *Emerita* sp.) that are important food sources for fishery resources should be included in this section.

Page 4-104, 4.7.6.2, Essential Fish Habitat

For clarity, we recommend this section be combined with Section 3.7.6.3 Essential Fish Habitat.

Page 4-107, 4.7.6.2, Parallel Bridge Corridor with NC 12 Maintenance

The title of this section is confusing since it addresses impacts to EFH that are not within the context of bridge maintenance.

Page 4-134, 4.7.10.3, Compensatory Mitigation, Submerged Aquatic Vegetation Beds

This section is out dated and should be rewritten to focus on the substantial improvements in SAV mitigation techniques that have occurred since 1994.

Summary

NMFS remains concerned that bridge replacement alternatives that require long-term beach nourishment and construction and maintenance of bridge structures in the surf zone (i.e., the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge) could result in long-term adverse impacts to NOAA trust resources. We acknowledge that alternative within the Pamlico Sound Bridge Corridor involve direct impacts to SAV and estuarine marsh, but we believe these impacts could be adequately addressed through sequential mitigation. We continue to believe that the Pamlico Sound Bridge Alternative best supports the purpose and need for this project



United States Department of the Interior
NATIONAL PARK SERVICE
OUTER BANKS GROUP



Fort Raleigh National Historic Site
Cape Hatteras National Seashore
Wright Brothers National Memorial
1401 National Park Drive
Manteo, North Carolina 27954

IN REPLY REFER TO:
L7617

November 13, 2008

Ms. Beth Smyre
Project Planning Engineer
NC Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548

Ms. Smyre:

I wanted to thank you for meeting with myself and members of my staff earlier this week concerning the potential impacts of the Bonner Bridge construction project on National Park Service (NPS) lands at Cape Hatteras National Seashore. We believe that the Bonner Bridge is an important safety concern for the residents of and visitors to the Outer Banks.

At the meeting, we became aware that NPS comments concerning the Bonner Bridge Draft Environmental Impact Statement (DEIS) were not forwarded to you or your agency by the Department of Interior as part of their official agency response. We believe that this was an oversight, but want to ensure that we communicate any concerns that we may have early in the process so that they can be addressed and not unnecessarily hinder the construction associated with the Bonner Bridge. I have enclosed a copy of our comments for your use and consideration.

We look forward to working with you, other North Carolina Department of Transportation staff, the potential contractors, and the final company selected for this project. If you need any additional information, please do not hesitate to contact me at (252) 473-2111, extension 151.

Sincerely,

Darrell L. Echols

Darrell L. Echols
Deputy Superintendent
Enclosures



with the least impact to important estuarine and marine resources in the project area. If NCDOT moves forward with the currently selected plan, we recommend early initiation of a long-term study to characterize changes in habitats along Hatteras and Bodie Islands so that adequate information is available for examining applications to the US Army Corps of Engineers for project authorization, including mitigation for unavoidable impacts to EFH.

Thank you for the opportunity to provide these comments. Related questions or comments should be directed to the attention of Mr. Ronald Sechler at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722; he may be reached at (252) 728-5090 or by e-mail at Ron.Sechler@noaa.gov.

Sincerely,

Ron Sechler

/ for

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc: (via electronic mail)

- FHWA, John.Sullivan@fhwa.dot.gov
- CESAW, William.J.Biddlecome@saw02.usace.army.mil
- USFWS, Howard.Hall@fws.gov
- NCDCM, Doug.Huggett@ncmail.net
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United States Department of the Interior

NATIONAL PARK SERVICE
Fort Raleigh National Historic Site Wright Brothers National Memorial
Cape Hatteras National Seashore
1401 National Park Drive
Manteo, NC 27954
252-473-2111



IN REPLY REFER TO:

L34

Electronic Transmission Only

October 10, 2008

Memorandum

To: Anita Barnett, NPS, Southeast Regional Office
From: Michael B. Murray, Superintendent, Outer Banks Group
Subject: Park comments on Final Environmental Impact Statement and Section 4(f) Evaluation, NC 12 Replacement of Herbert C. Bonner Bridge, Bridge No. 11 over Oregon Inlet, Dare County, North Carolina, TIP Project No. B-2500

We have reviewed the comments prepared by Pea Island National Wildlife Refuge currently being finalized and concur with those comments. In addition, Cape Hatteras National Seashore has the following comments/concerns:

1.) We continue to note that the Final Environmental Impact Statement (FEIS) does not adequately examine or address the economic and physical impacts to the Park's largest concessioner, the Oregon Inlet Fishing Center (OIFC) nor does it adequately address impacts on visitor access to the OIFC and other recreational sites in the project area (e.g., NPS Oregon Inlet Campground, Ramp 4 accessing the Bodie Island Spit). The FEIS does not address the environmental and financial consequences of the loss of the "crack" by the fleet of Charter Boat Captains of the OIFC. The loss of the "crack" would result in an increased consumption at an estimated volume of 90,000 gallons of fuel annually, in addition to increasing the travel time for every trip of the Charter Fleet by one hour roundtrip. With respect to impacts on visitor access to other recreational sites in the project area, implementation of the preferred alternative would necessitate the relocation of Ramp 4 and mitigation for damage of the NPS-owned segment of NC 12 on Bodie Island incurred as a result of transporting the projected 100 ton loads for construction of the bridge.

2.) The FEIS discusses the necessity to use barging for the transportation and erection of bridging structures, the possible dredging of NPS submerged lands at Oregon Inlet that may be required to accommodate such barging, and the disposal of dredging spoil. The NPS must be consulted for any barge channel dredging that occurs within Seashore jurisdiction. NPS will not authorize any NPS-owned land within the Seashore to be used as a borrow pit nor will it allow any dredged materials to be permanently deposited on NPS-owned land, with the possible exception of Green Island following appropriate consultation with other Federal and state agencies. NPS suggests NCDOT consult with the NPS, NC, ACOE, WRC and

USFWS on the potential to apply dredge spoils to Green Island, a small naturally occurring island, to improve habitat quality as a nesting site for American oystercatchers and colonial waterbirds. NPS requests that NCDOT confirm that the area referred to as the "Oregon Inlet Shoal" in the FEIS is in fact the submerged lands surrounding Green Island. NPS suggests that NCDOT clarify whether the proposed floating of construction barges and dredging of the Oregon Inlet Shoal would affect Green Island and in fact be performed in accordance with the Terms and Conditions of the Biological and Conference Opinions (USFWS 2008). All of the proposed activities related to replacement of the Bonner Bridge must comply with the Terms and Conditions of the Biological and Conference Opinions (USFWS 2008).

3.) NPS acknowledges that, where possible, proposed actions have been described in detail and corresponding impacts have been identified in this FEIS. However, a number of proposed actions related to the preferred alternative for bridge replacement may require additional environmental analysis and documentation (compliance) prior to the issuance of NPS permits to implement each of these proposed actions within or with the potential for impacting Cape Hatteras National Seashore. NPS reasserts that additional environmental compliance would be required for any proposed action related to the preferred alternative not fully evaluated in the FEIS and will require that NCDOT or its designee plan and prepare the required documents. Among the proposed actions for which separate environmental compliance documents may be required are:

- construction staging;
• construction of a haul road, use of dredge, or construction of work bridge to facilitate construction of the north approach spans;
• relocation of septic fields near the Oregon Inlet Fishing Center;
• relocation of Ramp 4 beach access road on Bodie Island;
• dredging and disposition of dredge spoils;
• subsequent phases relating to other NCI2 construction and maintenance components; and
• the fate of the terminal groin at Pea Island NWR.

Environmental compliance and resultant decision documents would be required prior to the issuance of NPS permits to implement each of these proposed actions within the National Seashore.

We would greatly appreciate receiving a copy of the final departmental statement. Should you have any questions, please contact me at 252-473-2111, ext. 148.

Michael B. Murray



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240



9043 PEP/NRM

ER 07/206

Gregory J. Thorpe, Ph.D.
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

The Department of the Interior (Department) has received the Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation for the **NC-12 Replacement of Herbert C. Bonner Bridge (No. 11) over Oregon Inlet, Dare County, North Carolina**. The FEIS identifies two replacement bridge corridors, the Pamlico Sound Bridge Corridor and the Parallel Bridge Corridor. Within each corridor are various alternatives. The Preferred Alternative (the Phased Approach/Rodanthe Bridge) is among the Parallel Corridor alternatives.

The Department and the Fish and Wildlife Service (FWS) have provided detailed comments on this project throughout the planning process; raising numerous concerns about the effects of Parallel Bridge Corridor alternatives (including the Preferred Alternative) on Pea Island National Wildlife Refuge (Refuge). While the FEIS does a better job of acknowledging our previously submitted comments, concerns still remain about the project and its potential impact to the Refuge. Rather than repeat those concerns here, the purpose of this letter is to succinctly state our views regarding the proposed project. Specific comments related to the Endangered Species Act of 1973 will be provided by the Service under separate cover.

Pea Island National Wildlife Refuge

Pea Island National Wildlife Refuge encompasses 5,834 acres of barrier island beach, dune, scrub, marsh, and open water habitat which support a diverse assemblage of Federal trust fish and wildlife resources. These include federally listed sea turtles and over 300 species of migratory birds. Given its location on a barrier island in the central portion of the Atlantic Flyway, the Refuge is of particular importance as a migratory stop-over and wintering site for numerous species of shorebirds, wading birds, waterfowl, passerines, and raptors. The Refuge is also prized for the wildlife-dependent recreational opportunities it provides to over one hundred thousand visitors per year. The Refuge is extremely important on a local, regional, national, and international basis for both migratory birds as habitat and for humans who value knowing the birds have high quality feeding and breeding habitat.

Currently, with NC-12 passing through the Refuge at grade over its entire 11.8-mile length, the Refuge has a predominantly natural character (in terms of both visual and acoustic qualities). As such, the existing road represents a relatively small intrusion on the quality of the wildlife viewing and photography activities of our many visitors. Similarly, while the existing road does adversely affect the wildlife resources and ecological processes of the Refuge, the current configuration represents the lowest possible level of such effects, while maintaining a paved transportation corridor through the Refuge.

Although an elevated roadway through the Refuge would allow for westward sand migration to proceed unabated, issues such as lighting and disorientation of sea turtle hatchlings, and shading of sea turtle and migratory bird nests that require open, sun-heated sand would increase. We recommend NCDOT fully address measures or plans to off-set these new issues on the Refuge.

Section 4(f) Evaluation

Section 4(f) of the Department of Transportation Act of 1966, as amended (49 U.S.C. 303), states that the U.S. Department of Transportation may not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: there is no feasible and prudent alternative to the use of land from the property; and the action includes all possible planning to minimize harm to the property resulting from such use. Even though the information presented in the FEIS and Section 4(f) Evaluation is proposing a Parallel Bridge Corridor alternative, it still demonstrates that implementation of any of the Parallel Bridge Corridor alternative may violate section 4(f) because the Pamlico Sound alternative would appear to be feasible and prudent and would minimize harm to the Refuge (a section 4(f) property).

Though all alternatives have some form of 4(f) impact, the Preferred Alternative has far greater impacts in quantity and quality on lands protected by section 4(f). Based upon section 4(f) directives, park and refuge lands should not be used whenever there are feasible and prudent alternatives that would avoid or minimize harm to those lands. The NCDOT, in previous planning documents, has clearly demonstrated that the Pamlico Sound Bridge Corridor alternatives present feasible alternatives from an engineering standpoint. This reduces the analysis to the question of prudence, which seems to be only an issue of cost and visitor access. It was our understanding that throughout the planning process NCDOT indicated that although the Pamlico Sound Bridge Corridor alternative was more expensive initially, it would be comparable to the Parallel Bridge Corridor due to the extensive maintenance cost over the life of the project. We recommend an independent economic analysis of the alternatives be conducted because of the significant environmental effects and the fluctuating economics of the project.

There appears to remain a distinct possibility that the Preferred Alternative will require activities to occur outside the existing right-of-way, which would constitute either a permanent or temporary use of 4(f) properties. More importantly, we disagree that

implementation of the Preferred Alternate as proposed in the right-of-way would not constitute a "constructive use" of 4(f) property. The 4(f) evaluation presents NCDOT's and FHWA's conclusions regarding the effects of the Preferred Alternative on the Refuge in terms of noise, visual character, access, and ecology; all section 4(f) constructive uses. In each case, it is our opinion that the analysis understates the magnitude of these effects in order to reach a conclusion (page 5-18) that "...attributes of the Refuge would not be substantially impaired, and thus would not be a constructive use of the Refuge." As stated repeatedly by the Service and the Department of the Interior throughout the planning process, in particular the noise, visual character, and access on the Refuge would be impacted by construction and operation of a bridge alternative through the Refuge. It is our opinion that these impacts rise to the level of substantial impairment as described in section 4(f) regulation 23 CFR 774.15.

Noise: Noise resulting from vehicles traversing the elevated bridges would replace wind and surf as the prevailing sounds experienced by visitors and wildlife. Vehicles travelling on elevated structures such as bridges produce more tire-to-pavement noise than they do on an at-grade roadway. Also, exhaust noise will travel farther into the Refuge from an elevated point of origin. Pea Island National Wildlife Refuge was established in 1938 under an Executive Order to further the purposes of the Migratory Bird Conservation Act, and to serve "... as a breeding ground for migratory birds and other wildlife" Increased noise levels may negatively impact bird breeding adjacent to the new bridge structure.

Visual Character: The large, concrete bridges would replace dunes and water as the predominant visual features of the Refuge. We suggest that the FEIS plainly state that the Preferred Alternative would introduce a large elevated man-made structure (bridge) through the previously open vista on the Refuge landscape, causing negative impacts to the visual characteristics of the Refuge.

Access: The Refuge offers a Visitor's Center that provides access to hiking trails and indoor and outdoor viewing areas. The Preferred Alternative would elevate NC-12 onto a series of bridges. Once completed, these bridges would traverse all but 2.1 miles of the Refuge. The FEIS places considerable emphasis on the ability of the Phased Approach to provide paved-road access to the Refuge. However, the FEIS understates the fact that the Preferred Alternative would not provide any vehicular access to the Visitor's Center or the impoundments, which are two of the major destinations for Refuge visitors. Also overlooked in the FEIS is the quality of the visitor experience that would be provided under the Preferred Alternative and the effect it would have on visitation. While the FEIS notes that respondents to surveys indicated that most would continue to visit the Refuge whether or not paved access were provided, it is unclear if the respondents understood that under the Preferred Alternative the afforded access would be very limited, and the activities they traveled to the Refuge in which to engage (bird watching, nature photography, fishing) would be occurring adjacent to or under a bridge. As a result, even though the Preferred Alternative would nominally afford access to the Refuge, the Visitor's Center would no longer be available, and we anticipate that the quality of the visitor experience would be degraded to the point that

visitation may be reduced. This would represent a substantial loss to the American public.

Ecology: Over the project's life, ocean shoreline erosion predictions will place the complex of bridges next to and over the beach habitat. The shading effect from the bridges will affect nesting, foraging, and roosting habitat quality for some migratory birds – piping plover, American oystercatcher, least tern, black skimmer, and nesting habitat quality for sea turtles.

Section 4.7.6 of the FEIS, beginning on page 4-102, falls short of presenting a comprehensive analysis of project impacts on fish and wildlife resources inhabiting or using the Refuge and project area. Through careful selection and use of literature or general discussion of certain topics relative to impacts on wildlife from the project, there is a deflection of issues and concerns. For example the FEIS selectively cites literature regarding the minor effects of road-kill on wildlife species population demographics, and ignores literature that demonstrates the major effect road-kill has on species population demographics. Another point that should have been addressed is that some shorebirds move back and forth from the ocean beach to overwash fans or mudflats in the sound on a regular basis. The more often these species must fly near a highway, the greater the probability of their becoming a road-kill statistic. Elevating the roadway to a bridge 30-40 feet above grade within these areas of prime habitat will remove the road-kill potential from an at grade road, but it fails to mention that birds perch (sometimes en masse) on bridge abutments, and when they land and take off, they will be doing so directly into bridge traffic. Some forms of mitigation have been shown to reduce avian mortality along bridges but this type of information is not mentioned in the FEIS; we recommend it be added.

Refuge Compatibility and Policy

NCDOT states in the FEIS that the project will be contained within the existing 100-foot wide right-of-way. If all the proposed work (staging areas, construction, and future maintenance of existing NC-12) is performed within the existing right-of-way and is in compliance with any terms and conditions contained within the easement deed, a Refuge compatibility determination will not be required.

However, we want to take this opportunity to re-express that we do not believe it will be possible to maintain the existing NC-12 corridor and construct the new bridges entirely within the existing right-of-way. We expressed this in a September 11, 2007, letter from DOI Acting Assistant Secretary for Fish and Wildlife and Parks Verhey to Governor Easley. "While the intent is to construct these new bridges within the existing road's right-of-way, we believe the [preferred] alternative would require continued maintenance outside of the existing road's right-of-way through the Refuge until each subsequent phase of bridge construction along NC-12 is completed."

The FEIS indicates that significant NC-12 maintenance activities (other than road scraping which occurs 1 to 2 times per month) currently occur 4 to 7 times per year. Based on our records, these activities occur outside the existing right-of-way (requiring

permits from the Refuge) 2 to 4 times per year and have been increasing in frequency. These activities include dune maintenance, dune reconstruction, dune translation (moving sand from the back side of the dune to the seaward side) and sand bagging. Given the scope of these activities and based on our experience in seeing these activities implemented in the past, it is unlikely that it will be possible to conduct these activities completely within the right-of-way, while being as efficient or effective as current practices.

Also, we would like to remind you that by signing a Record of Decision on this FEIS, all previous SUPs for maintenance and repair of the existing at grade NC-12 would be nullified because the FEIS (now the National Environmental Policy Act (NEPA) document of record) clearly states NCDOT's intent to conduct all activities related to this project (including existing NC-12 maintenance and repair) within the existing right-of-way. If any work related to bridge construction, or maintenance, or existing NC-12 maintenance goes outside the existing right-of-way, you would need to re-comply with the Refuge's Appropriate Use Policy and Compatibility Policy. If the requested use is found to be appropriate and compatible, the Refuge is obligated to follow through with NEPA compliance, Section 7 Endangered Species Act compliance, and compliance with several laws relative to cultural and archaeological resources, including Section 106 of the National Historic Preservation Act.

If the NCDOT is faced with an emergency, we have the ability to accelerate everything through the administrative process under emergency declarations. However, since we can reasonably anticipate storms, planning should occur now to avoid emergencies that can be reasonably anticipated. Even if the administrative processes can be suspended for the "emergency within the right-of-way," they can only be suspended by the Refuge Manager for 30 days and all corrective measures must be completed within that time frame. Full compliance with administrative regulations must follow the corrective action.

The Terminal Groin

The Service issued an SUP in 1989 to NCDOT for construction of the terminal groin for the purpose of protecting the existing Bonner Bridge. A new or revised SUP would be required to keep the terminal groin for a different bridge or purpose. In 2003, NCDOT and the Refuge decided to separate terminal groin issues from the Bonner Bridge replacement NEPA document. As you recall, the decision in 2003, was to defer planning on the terminal groin SUP renewal or on the removal of the terminal groin until a later date.

An assumption inserted into the FEIS analysis involves the dependency of the Terminal Groin for the success of the Preferred Alternative. The discussion on page 3-65 is somewhat confusing and appears to be contradictory. First, the new parallel bridge appears to be designed (at least for this stage of planning) to have clearance for a much wider navigation zone. This would allow the Oregon Inlet channel to migrate to some extent without impacting navigation or the new bridge. The third paragraph actually states an assumption that the Corps of Engineers will terminate dredging the channel for the bridge navigation span with the implication being that the channel can move and maintain necessary depths through natural scouring and without impacting navigation.

Further down on the page (next to the last paragraph) there is a statement that removal of the terminal groin would pose new challenges for maintaining the current navigation channel. This discussion leaves us unclear as to what the Preferred Alternative will actually involve. The navigation channel, old bridge, new bridge, and terminal groin are all in such close proximity that dredging in one spot versus another is likely to precipitate changes in an adjacent site including the navigation channel underneath the bridge. Basically, it appears that more analysis with regards to inlet dynamics and coastal processes is critical to further model development. Finally we note that NCDOT has not requested a new SUP to retain the groin. As mentioned above, there are many issues related to the groin that will need to be resolved before a new SUP could be issued. The FEIS does not provide sufficient basis for decision-making regarding those issues, and additional analysis will be needed. This would appear to be an area of considerable unresolved uncertainty.

We appreciate the opportunity to provide these comments. The Department wishes to further coordinate with the NCDOT and FHWA at the earliest possible time in order to reach a solution to our issues and concerns. Coordination can be initiated by contacting Mike Bryant, Refuge Manager, Pea Island National Wildlife Refuge, at (252) 473-1131, extension 222, or Pete Benjamin, Project Leader, Raleigh Ecological Services Field Office, at (919) 856-4520, extension 11.

Sincerely,



Willie R. Taylor
Director, Office of Environmental
Policy and Compliance



United States Department of the Interior

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FISH AND WILDLIFE SERVICE
Raleigh Field Office
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Project Development and
Environmental Analysis Branch

November 5, 2008

John F. Sullivan, III, P.E.
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, NC 27601

Dear Mr. Sullivan:

This letter is in response to your letter of October 24, 2008 regarding the U.S. Fish and Wildlife Service (Service) conference opinion for the effects of the replacement of the Herbert C. Bonner Bridge (Bridge No. 11 over Oregon Inlet, TIP No. B-2500) on proposed critical habitat for the federally threatened piping plover (*Charadrius melodus*). The final rule designating critical habitat for the piping plover will become effective November 20, 2008. You have requested that the Service confirm our conference opinion as the biological opinion for the critical habitat. This response is provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

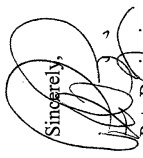
The Service's conference opinion for the proposed critical habitat was included with our July 10, 2008 biological opinion. Since that time, we understand that there have been no significant changes in the action as planned or in the information used during the conference. Therefore, effective November 20, 2008, the Service will officially adopt the conference opinion as the biological opinion for critical habitat affected by the proposed project.

We believe that the requirements of section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service recently reviewed the Final Environmental Impact Statement (FEIS) for this project. We would like to point out that there were a few deficiencies in that document with regard to section 7 of the ESA. While these deficiencies do not alter the analysis or conclusions of the biological opinion, we believe they should be corrected to avoid possible confusion. Specifically, the effects of artificial lighting on sea turtle nesting were not sufficiently covered on pages 4-122 through 4-125, and the information regarding the green sea turtle (*Chelonia mydas*) on page 4-124 is outdated. Green sea turtles have nested within the action area as recently as 2002 and 2008.

Also, on page 5-32, the FEIS states "The FHWA and NCDOT consider the replacement bridge corridors (including the alternatives within the two replacement bridge corridors) to be substantially equal in terms of the remaining harm to protected species in the Refuge after mitigation." We disagree with this statement. The Parallel Bridge Corridor would involve take of the following federally threatened and endangered species: piping plover (*Charadrius melodus*), loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermochelys coriacea*), and green sea turtle (as determined in the Section 7 consultation for the preferred Phased Approach/Rodanthe Bridge Alternative). The Pamlico Bridge Corridor would not involve any take of federally threatened and endangered species. We do not view take versus no take as being "substantially equal." Also, the adverse effects (i.e. take) of the preferred alternative on federally listed species are not "mitigated" by the conservation measures and reasonable and prudent measures described in the biological opinion.

If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

Pete Benjamin
Field Supervisor

cc: Bill Biddlecome, USACE, Washington, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Mihitscher, USEPA, Raleigh, NC
Ken Graham, USFWS, Atlanta, GA
Ann Hecht, USFWS, Sudbury, MA
Dennis Stewart, USFWS, Manteo, NC
Greg Thorpe, NCDOT, Raleigh, NC
Clay Willis, NCDOT, Edenton, NC



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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OCT 30 2008

Project Development and
Environmental Analysis Branch

October 24, 2008

Dr. Gregory J. Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

SUBJECT: Final Environmental Impact Statement and Section 4(f) Evaluation for NC 12
Replacement of Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet, Dare
County, North Carolina, TIP Project No. B-2500; FHWA-E40339-NC; CEQ No.:
20080373

Dear Dr. Thorpe:

The U.S. Environmental Protection Agency Region 4 (EPA) has reviewed the subject document, and is commenting in accordance with Section 309 of the Clean Air Act and Section 102(2)(C) of the National Environmental Policy Act (NEPA). The North Carolina Department of Transportation (NCDOT) and the Federal Highway Administration (FHWA) are proposing to replace the Herbert C. Bonner Bridge across Oregon Inlet in Dare County. Bonner Bridge was built across Oregon Inlet in 1962 and is approaching the end of its reasonable service life. The bridge is part of NC 12 and provides the only highway connection between Hatteras Island and Bodie Island. The project also includes NC 12 between Oregon Inlet and the community of Rodanthe, an area that is at risk because of shoreline erosion.


FHWA and NCDOT issued a Supplement to the 2005 Supplemental DEIS in February of 2007. A Supplemental Draft Environmental Impact Statement (SDEIS) was issued in September of 2005. The Draft Environmental Impact Statement (DEIS) was issued in November, 1993. A preliminary Final EIS (FEIS) was prepared in 1996 but was not formally released. However, the preliminary FEIS was distributed to numerous Federal and state agencies in May 2001 for informal review and comment.

The proposed project has been in the NEPA/Section 404 Merger Process since July 31, 2002, and EPA has been involved with this project as a participating team member. In August of 2007, the Concurrence Point 3, selection of the Least Environmental Damaging Practicable Alternative (LEDPA), was elevated to the Merger 01 NEPA/Section 404 Review Board that consisted of the U.S. Army Corps of Engineers (USACE), North Carolina Department of Environment and Natural Resources (NCDENR), FHWA and NCDOT. The Merger 01 Review Board selected the Parallel Bridge Corridor/Phased Approach Rodanthe Bridge (PBC/PA-RB) Alternative as the LEDPA. EPA prepared and submitted a Merger 01 elevation issue brief on August 22, 2007, for the Review Board's consideration.

EPA continues to have substantial environmental concerns regarding the preferred (selected) PBC/PA-RB Alternative. EPA's specific comments on the FEIS are included in an attachment to this letter (See Attachment). EPA's environmental concerns are based on a number of project impacts and issues including: the project's adverse impacts to jurisdictional waters of the U.S., the long-term effects to water quality from the stormwater runoff from the bridges, the long-term impacts to the Pea Island National Wildlife Refuge including the impact to migratory birds and the potential impacts to threatened and endangered species, the visual impacts to the Cape Hatteras National Seashore, the prolonged impacts to natural resources from phased construction, and the risk of constructing additional bridges and roadway (between "hotspots") along the NC 12 corridor that will be subject to worsening ocean wave and scour conditions.

The vulnerability of maintaining a reliable transportation corridor along an ever-changing coastal barrier island is particularly a concern with the PBC-PA-RB Alternative. After considering all of the issues presented in the 1993 DEIS, the 2005 SDEIS, the 2007 SDEIS, and the FEIS, EPA continues to believe that the transportation agencies should re-evaluate some of the preliminary alternatives that were not carried forward for detailed study, including the rehabilitation of the existing Bonner Bridge combined with continued NC 12 maintenance activities. Based upon the most recent Outer Banks Task Force meeting in July of 2008, current NCDOT Bonner Bridge maintenance contracts and rehabilitation projects appear to be very successful in extending the useful life of the existing bridge and keeping the NC 12 corridor open to traffic. EPA is also concerned with the adequacy of the proposed compensatory mitigation plan for jurisdictional wetland impacts that is being offered by FHWA and NCDOT.

EPA acknowledges the efforts by FHWA and NCDOT to incorporate bicycle/pedestrian lanes into the design of the new bridge and along NC 12. EPA plans to continue to work with FHWA, NCDOT and other Merger team agencies on this proposed project. If there are any questions, please feel free to contact Mr. Christopher A. Mihitscher of my staff, at (919) 856-4206, or Ms. Kathy Matthews of EPA's Wetlands Section at (919) 541-3062.

Sincerely,

Heinz J. Mueller
Chief, NEPA Program Office

Attachment

cc: J. Sullivan, FHWA-NC
P. Benjamin, USFWS-Raleigh
K. Jolly, USACE-Wilmington District

ATTACHMENT
B-2500, NC 12 Replacement of Bommer Bridge
Dare and Hyde Counties

FEIS – Detailed EPA Comments

In general, it appears NCDOT has provided much more additional information and analysis in the FEIS, including a scour analysis, discussion of the shoreline and potential impacts of Sea Level Rise (SLR), information on potential water quality impacts from untreated storm water, potential storm water treatment methods, and wetland impacts. However, most of our comments and environmental concerns from previous letters are still potentially unresolved.

On Page xxi, the FEIS states that a bridge within the replacement bridge corridor (i.e., PBC/PA Alternatives) alternatives would have a negligible effect on inlet migration, profile, and gorge alignment other than the continued effect of the presence of the terminal groin. However, it is the need to retain the terminal groin for these alternatives that has the significant effect on inlet migration, profile, and gorge alignment. On Page xxi, the FEIS states that the Phased Approach alternatives (including the preferred alternative) would directly affect activities on the beach front, from the presence of bridge piles on the beach and in the surf. These alternatives appear to have the most substantial effect on recreational use of the PINWR beaches, whereas the Pamlico Sound Bridge Corridor (i.e., PSBC Alternatives) alternatives would have no effect. On page xxxv in the Green Sheets (i.e., Project Commitments), NCDOT states that they consider the 2060 high erosion shoreline to be reasonable for planning purposes. NCDOT also plans to implement a monitoring program on Hatteras Island in the project area to assist in decision-making for Phases III and IV. These monitoring studies may greatly change the plans and timing for Phases III and IV.

EPA notes the changes in design for bicycle accommodations indicated on Page xxxiii of the FEIS. The design of an 8-foot wide shoulder would be safer for bicycle and pedestrian traffic than the current 2-foot wide shoulders on Bommer Bridge. EPA also acknowledges that a bicycle-safe rail on the bridges would be provided. EPA requests that FHWA and NCDOT consider the use of a 4-foot separated bicycle shoulders with rail sections. This could reduce project construction costs by a total of 8 feet in width and also serve to provide bicycle and pedestrian uses consistent with the new roadway's 4-foot paved shoulders along NC 12. NC 12 south of Oregon Inlet is not a designated bicycle route. EPA supports the Outerbanks Bicycle initiatives and strongly recommends the 4-foot outside shoulders along NC 12 between Bommer Bridge and Hatteras Village.

On Page 1-6, the FEIS discusses the USACE's plan to conduct a feasibility study of Hatteras and Ocracoke islands to determine possible long-term solutions to the transportation problems. This T.I.P. project # R-3116H and its associated feasibility study are currently unfunded.

Section 2.10.1.2 of the FEIS includes a discussion of design criteria for the bridges, to withstand wave energy, storm surge, and scour. However, it appears that AASHTO has not finalized guidance on specifications. Therefore, the FEIS simply states that NCDOT will design the bridges in conformance with requirements (unspecified) and to deal with conditions that are anticipated. It remains unclear whether NCDOT and FHWA have the ability to design structures that will withstand the heavy surf along the shoreline. This issue has been generally discussed for several years during Merger team meetings. EPA believes that these critical design and safety specifications need to be finalized before any Phase II decisions are made (i.e., A bridge at Rodanthe).

A haul road is expected for construction of the northern approach to the Phase I bridge. The FEIS indicates on Page 2-112 that this haul road will be constructed on top of sandy soil. EPA requests that haul roads should not be used over wetlands as compaction may prevent the wetland from being restored.

On Page 2-127, NCDOT commits to implement an island monitoring program in the project area and to conduct breach response-related data gathering to help determine where acceptable sand could be found to close breaches, and options available for bridging a breach. EPA believes that this monitoring program is an essential component of the long-term strategy for addressing unpredictable and dynamic shoreline erosion problems along the NC 12 corridor. On Page 2-133 of the FEIS, the Highway Cost by Expenditure Timeframe for the Phased Approach/Rodanthe Bridge from 2021 to 2060 is believed to be under-estimated, considering the extended construction and bridge maintenance that is expected. Considering that NCDOT and FHWA do not appear to have reliable information on the design specifications for these bridges that will be in the surf zone and out at sea, the costs may be much higher than the amount estimated. Also, the estimates are presented in 2006 dollars, which may also significantly underestimate the future costs for additional bridges. On Page 2-141 of the FEIS it states that the Refuge costs include costs to provide alternate access to the Refuge. These costs are only considered for the two PSBC alternatives. However, the need for alternate access may be applicable for the Phased Alternatives also, if the shoreline is allowed to naturally migrate, and existing paved access roads are lost to the ocean.

The FEIS does not identify potential disposal sites for excavated, dredge, and fill material generated by the bridge construction. On Page 2-146 of the FEIS it simply states that appropriate locations will be determined near the time of construction. EPA requests that FHWA and NCDOT investigate potential environmentally acceptable locations as soon as possible and in concert with the USACE and other regulatory agencies. These disposal locations also need to be identified and detailed for any future Concurrence Point 4A Merger meetings on avoidance and minimization.

EPA recognizes that Sections 3.6.3 and 4.6.6 of the FEIS discuss potential shoreline changes during the life of the project (through 2060), and include a discussion of accelerated Sea Level Rise. The Peer Exchange (a panel of coastal engineering and geology experts) did not recommend revising the 2060 shoreline. The FEIS states that the conditions expected to occur in the shoreline forecasts in the FEIS are those which

"Scenario 2 [20th century rate + 2 millimeters per year] considers 'virtually certain' to occur (overwash, erosion, and inlet formation)." However, the likelihood of "Scenario 3 [20th century rate + 7 millimeters per year]" was not extensively discussed in the FEIS. According to Page 3-59, Scenario 3 "will lead to further loss of island width and 'threshold behavior' leading to island segmentation and disintegration." Based on recent projections, it appears increasingly probable that a greater rate of sea level rise than 2 millimeters per year will occur, and therefore the potential for Scenario 3 should be further considered during planning of future Phases. As the FEIS indicates, the potential for Scenario 3 should be investigated as part of the future monitoring prior to construction of Phases II - IV.

On Page 3-64 of the FEIS it is unclear whether the terminal groin would need to remain after Phase II bridges are constructed. The potential for removing the terminal groin after Phase II should be fully investigated in a future NEPA document.

Section 4.6.8 of the FEIS discusses potential impacts that the bridge piles would have on scour, breakers, waves, 'longshore' sediment transport, beach erosion, and potential for island breaches. However, the FEIS does not discuss the impact of the waves, scour, sediment transport, and other offshore coastal process on the bridge piles. It remains unclear whether a bridge may be practicably maintained on the beach and in the ocean.

Section 4.7.2 of the FEIS discusses water quality impacts from construction and operation of the alternatives. Temporary BMPs must be implemented prior to construction to adequately treat construction storm water from the project. The PSBC alternatives have a slightly larger amount of impervious surface than the preferred alternative (86.6 acres vs. 72.4 acres). The FEIS provides estimated annual pollutant loads for the various alternatives for several pollutants. Also, several potential BMPs are described. It appears that end-of-pipe treatment is feasible at the northern and southern ends of the PSBC alternatives, but may be more difficult to construct on the replacement bridge alternatives due to slope requirements of the bridge, and potential issues with acquiring land for water treatment on the Refuge side of the bridge. The FEIS indicates that it is not possible to provide treatment for the entire bridge length of either the PSBC alternatives or the short bridge alternatives. As future bridge phases of the PBC/PA Alternative pass into the sea, storm water treatment would not be possible on those sections. In Section 4.7.6.5, the FEIS states that runoff from Bonner Bridge is currently not captured and treated, so the proposed project will not change runoff in the vicinity. However, the Bonner Bridge was constructed prior to passage of the Clean Water Act, which prohibits unpermitted discharges of pollutants to waters of the U.S., including Oregon Inlet and the Atlantic Ocean. FHWA and NCDOT have not demonstrated how they will comply with the Clean Water Act requirements for future phases of the project.

Page 4-114 of the FEIS describes the timing of construction for the four phases of bridges in the Phased Approach alternatives. This section describes 7 years of construction for Phases I and II (together), followed by a 7-year gap of no construction, then 10 years of construction for Phase III, a 10-year period of no construction, then 10 years of construction for Phase IV. This totals 27 years of construction over a 44-year

period, although the FEIS states that it is 17 years of construction. Given the unknowns in this project concerning shoreline erosion, breach/inlet formation, and other unpredictable factors, this timeline may change considerably, with phases built sooner than predicted. The FEIS does not investigate the potential impacts of 27 years of construction in a shorter overall timeframe, although it seems likely.

Page 4-134 and 4-135 of the FEIS discuss on-site or other opportunities in close proximity to the project to provide compensatory mitigation for any permitted impacts. The FEIS also recommends that the Ballance Farm Mitigation Site may be used for all compensatory mitigation requirements. However, Ballance Farm is a considerable distance from the project site and it was not intended to provide mitigation for the B-2500 project. It is also in a different 8-digit Hydrologic Unit (HUC). More importantly, the tidal marsh mitigation at Ballance Farm is freshwater marsh, not salt marsh. Therefore, mitigation at Ballance Farm would be out-of-kind and out-of-HUC. EPA prefers that wetland impacts on the Outer Banks be replaced with in-kind wetland mitigation on the Outer Banks. If there are opportunities to restore wetlands on-site or on the Outer Banks, those opportunities should be pursued first. There may be several on-site opportunities for wetland mitigation. Submerged Aquatic Vegetation (SAV) must be mitigated as close to the project as possible and within appropriate areas. We defer to NOAA and DCM on the determination of SAV mitigation.



North Carolina
Department of Administration

RECEIVED
Division of Highways

OCT 27 2008

Reconstruction
Project Development and
Environmental Analysis Branch

Michael F. Easley, Governor

October 23, 2008

Britt Cobb, Secretary

Mr. Gregory Thorpe
N.C. Dept. of Transportation
Program Dev. & Env. Analysis
1548 Mail Service Center
Raleigh, NC 27699-1534

**Re: SCH File # 09-E-4220-0078; FEIS; Proposal to replace the Herbert C. Bonner Bridge
(Bridge No. 11) over Oregon Inlet, NC 12, in Dare County. TIP No. B-2500**

Dear Mr. Thorpe:

The above referenced environmental impact information has been submitted to the State Clearinghouse under the provisions of the National Environmental Policy Act. According to G.S. 113A-10, when a state agency is required to prepare an environmental document under the provisions of federal law, the environmental document meets the provisions of the State Environmental Policy Act. Attached to this letter for your consideration are the comments made by agencies in the course of this review.

If any further environmental review documents are prepared for this project, they should be forwarded to this office for intergovernmental review.

Should you have any questions, please do not hesitate to call.

Sincerely,

Valerie W. McMillan
Valerie W. McMillan, Director
State Environmental Policy Act

Attachments

cc: Region R

Mailing Address:
1301 Mail Service Center
Raleigh, NC 27699-1301

Telephone: (919) 807-2425
Fax (919) 333-9571
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Raleigh, North Carolina

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North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor
Lizabeth C. Ingram, Secretary
Jeffrey J. Gow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brink, Director

October 27, 2008

MEMORANDUM

TO: Gregory Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Peter Sandbeck

Peter Sandbeck

SUBJECT: Final Environmental Impact Statement & Section 4(f) Evaluation for the NC 12
Replacement of the Herbert C. Bonner Bridge, B-2500, Dare County, ER 90-8304

We have reviewed the Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation for the proposed undertaking and offer the following comments.

The FEIS correctly identifies the historic properties within the undertaking's Area of Potential Effects (APE) as the (former) Oregon Inlet Coast Guard Station and Chicanamocico Life Saving Station, both of which are listed in the National Register of Historic Places as having national significance, plus the Pea Island National Wildlife Refuge and Rodanthe Historic District, which have been determined eligible for listing in the National Register. The FEIS also addresses the absence of archaeological resources within the APE and commits to identifying and assessing any unanticipated archaeological discoveries encountered west of Bodie Island during construction.

The determinations of effects, on the historic properties, for the two bridge corridors and the various alternatives within each corridor are also properly noted in the sections dealing with historic properties, including the determination that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge (Preferred) will adversely affect all of the historic properties.

Given the adverse effect determinations, the Federal Highway Administration (FHWA), North Carolina Department of Transportation (NCDOT) and State Historic Preservation Office (HPO) have entered into consultation under Section 106 of the National Preservation Act. Due to the high level of controversy regarding the recommended alternative and its potential to have substantial impacts on important historic properties, the Advisory Council on Historic Preservation (ACHP) is participating in the consultation to develop a Memorandum of Agreement (MOA) to mitigate the adverse effects of the undertaking on the historic properties. To that end the consulting and concurring parties met in Manteo on July 10, 2008 and joined in conference calls on October 10 and 20, 2008 to discuss the parties' concerns and explore mitigative measures. We understand FHWA's goal is to conclude the consultation and have a fully executed MOA to include in the December 15, 2008, Record of Decision.

Location: 109 East Jones Street, Raleigh NC 27601 Mailing Address: 4017 Mail Service Center, Raleigh NC 27699-4017 Telephone/Fax: (919) 807-6570/807-6599

Having carefully reviewed the Final Section 4(f) Evaluation, we do not concur with FHWA's finding that the proposed undertaking will not constructively use historic properties. The document notes that the Preferred Alternative will have a "Sizeable visual intrusion into the landscape of the Refuge and views in Rodanthe will be affected." It also notes that one mile of bridge in Rodanthe would bisect the community and make access more circuitous. (Table S-1, page xii).

In the case of Pea Island Wildlife Refuge, the construction of a ten-mile long bridge, elevated thirty feet above ground level and topped with a nearly five-foot railing (and perhaps with an additional six-foot high, chain-link fence as suggested by the Refuge during the Section 106 consultation), will introduce a substantial visual intrusion that is antithetical to the historic landscape. Determined eligible for listing in the National Register under Criterion A in the areas of conservation and social history, the Refuge is an outstanding example of the national wildlife refuges created in the early 20th and associated with efforts of the Civil Conservation Corps to protect and revitalize natural resources. Retaining its key original elements and integrity of location, setting, materials, feeling and association, the Refuge as a historic landscape will not only be adversely affected, it will be substantially, visually impaired by the presence of a bridge of the height and length proposed with the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge (Preferred). While the bridge may not eliminate the Refuge's ability to function as a wildlife refuge, it will destroy its integrity as a historic landscape.

Similarly, the introduction of a thirty-foot elevated bridge with flanking one-way frontage roads in the Rodanthe Historic District will not only adversely affect the historic district, it will substantially impair the characteristics which make the district eligible for listing in the National Register. The district, which is comprised of one and two-story buildings that are linked by their association with and views to the National Register-listed Chincocomaco Life Saving Station, will be completely dominated by the bridge proposed as part of the Preferred Alternative. Views to the Pamlico Sound, which are part of the historic viewshed from the station's tower and are still an important part of the visitor's experience will be destroyed as will the visual relationships between the district's contributing buildings. In an effort to minimize the degree of impairment caused by the proposed bridge, the Final Section 4(f) Evaluation suggests that modern development adjoining the district has already diminished this connection. However, the photographs in the Finding of Adverse Effect Documentation, prepared by the NCDOT Historic Architecture and Landscapes Section for the undertaking, clearly illustrate that this connection exists today and that a nearly three-story bridge will dwarf the one and two-story buildings that make up the historic district.

In addition to bisecting the historic district and making access more circuitous, the bridge will block the motorist's view of the historic district, especially the life saving station, which depends in large part on tourists' seeing the building from a distance and stopping to visit. While signage to the site will be part of the MOA for the adverse effect of the undertaking on the historic lifesaving station, the value of someone's seeing the iconic building from the road and being able to easily pull over to visit the site cannot be over-estimated. With the new bridge, the building will not be visible from either the north or south approach. Further, if a driver traveling north misses the signed turn, he will have to travel another mile north before being able to make a U-turn so as to travel back another mile to turn left onto the frontage road. Or, traveling south and missing the sign for the station, a driver will have to travel further south, turn around and travel north again to access the frontage road. Having reached the frontage road, the traveler will have to drive along the one-way road with the bridge looming on the west – hardly the setting or feeling that one associates with a lifesaving station that historically had a 360° view of its surroundings. Given the serious access problems and visual impacts caused by the proposed bridge, we believe that the Preferred Alternative substantially impairs the functions, features and attributes of the Rodanthe Historic District and Chincocomaco Life Saving Station and, thereby, constitutes a constructive use of the historic properties.

We would finally note that we understand from discussions with the Merger Team and as outlined in Section 2.15 – Preferred Alternative, that there will be an opportunity to explore possible adjustments in the alignment and specific plans for Phases II-IV in order to address changes that may occur in the project area due to its dynamic and unpredictable nature, especially in the undertaking's APE for the historic properties.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Jeffrey Crow, SHPO
Clarence Coleman, FHWA
Mary Pope Furr, NCDOT
Carol Legard, ACHP
Ken Wenberg, CHA
Rick Kamaski, USFWS
Doug Stover, NPS
David Griffin, NC Aquarium
Bill Biddlecome, USACE
Terry Wheeler, Dare County
State Clearinghouse



North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

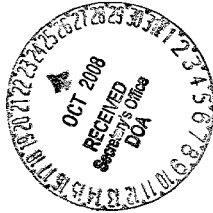
MEMORANDUM

TO: Chrys Baggett
State Clearinghouse

FROM: Melba McGee
Environmental Review Coordinator

RE: 09-0078 FEIS and Draft Section 4(f) Evaluation for the Proposed
Replacement of Herbert C. Bonner Bridge in Dare County

DATE: October 22, 2008



The Department of Environment and Natural Resources has reviewed the proposed information. The applicant is encouraged to consider the attached recommendations to ensure that all of the potential environmental impacts are considered prior to finalizing project plans.

Thank you for the opportunity to review.

Attachments



North Carolina Department of Environment and Natural Resources
Division of Coastal Management

James H. Gregson, Director

Michael F. Easley, Governor

William G. Ross Jr., Secretary

October 14, 2008

Melba McGee
Environmental Coordinator
N.C. Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

RE: SCH NO. 09-0078. Final Environmental Impact Statement, Proposal to replace the Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet, NC 12, Dare County, T.I.P. No. B-2500.

Dear Ms. McGee:

The N.C. Division of Coastal Management (DCM) appreciates the opportunity to comment on the Final Environmental Impact Statement (FEIS) for the above referenced project. The N.C. Department of Transportation (NCDOT) should be commended for doing an excellent job in the preparation of the FEIS.

Please note that the narrative concerning land use planning and the Coastal Area Management Act (CAMA) on pages 4-4 to 4-5 is not completely accurate. Please see the attached memorandum written by the DCM District Planner Charlan Owens dated 10/13/08 for more information. A formal DCM review of the project to determine consistency with the state's Coastal Management Program cannot occur until a CAMA major permit application is received. At that time, the CAMA major permit application will be circulated to the network of state agencies that comprise North Carolina's Coastal Management Program. The statutes, rules and policies of each of these agencies must be considered during the review of the CAMA permit application. This process will also include a consistency review by the DCM District Planner of the CAMA land use plan in effect at the time of permit authorization.

Due to the complexity of the project and the extent of environmental impacts that are proposed, NCDOT is urged to submit the CAMA major permit application for this project to DCM a minimum of one year prior to the anticipated construction let date. During the CAMA major permit application review process, DCM may have additional comments after examining the more detailed environmental information that will be provided with the permit application. DCM may also place conditions on any CAMA permit that is issued to avoid, minimize and/or mitigate environmental impacts. The comments provided in this letter shall not preclude DCM from requesting additional information throughout the CAMA major permit application review process, and following normal permitting procedures. Furthermore, nothing in this letter shall be interpreted as providing an opinion on the ultimate outcome of any CAMA permit decision.

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Such a decision can only be made following a complete multi-agency review of the final permit application. DCM will work closely with NCDOT, the Design-Build contractor, and the relevant state and federal agencies, to ensure that the final project design is consistent with the N.C. Coastal Management Program, including the N.C. Administrative Code [i.e. N.C. Coastal Resources Commission (CRC) rules].

The following are especially pertinent sections of the CRC rules that will need to be carefully considered during the development of a final project design.

- **Permanent Erosion Control Structures in an Ocean Shoreline.** Although the Statutes of North Carolina (G.S. 113A-115.1) require that "no person shall construct a permanent erosion control structure in an ocean shoreline", they also provide an exception, as set out in the North Carolina Administrative Code [15A NCAC 07H .0308 (a)(1)(H)] Specific Use Standards for Ocean Hazard Areas, Ocean Shoreline Erosion Control Activities. This rule states as follows:

"15A NCAC 07H .0308 (a)(1)(H). Erosion control structures that would otherwise be prohibited by these standards may be permitted on finding that:

- (i) the erosion control structure is necessary to protect a bridge which provides the only existing road access on a barrier island, that is vital to public safety, and is imminently threatened by erosion as defined in provision (a)(2)(B) of this subchapter;
- (ii) the erosion response measures of relocation, beach nourishment or temporary stabilization are not adequate to protect public health and safety; and
- (iii) the proposed erosion control structure will have no adverse impacts on adjacent properties in private ownership or on public use of the beach."

- **Erosion Setbacks for Oceanfront Construction [NCAC 15A 07H .0306(a)(4)].** These rules include erosion setbacks for oceanfront construction that are based on average long-term erosion rates that reflect changes in the North Carolina shoreline over nearly half a century.

- **Dune Protection [15A NCAC 07H .0306 (b)].** "In order to avoid weakening the protective nature of ocean beaches and primary and frontal dunes, no development shall be permitted that involves the removal or relocation of primary or frontal dune sand or vegetation thereon which would adversely affect the integrity of the dune. Other dunes within the ocean hazard area shall not be disturbed unless the development of the property is otherwise impracticable, and any disturbance of any other dunes shall be allowed only to the extent allowed by Rule .0308(b) of this Section." 15A 07H .0308(b) provides conditions that must be met when activities to establish dunes are allowed.

- **Access Channels (ex. for bridge related construction) [15A NCAC 07H .0208(b)(1)].** "Navigation channels, canals, and boat basins shall be aligned or located to avoid primary nursery areas, highly productive shellfish beds, beds of submerged aquatic vegetation, or significant areas of regularly or irregularly flooded coastal wetlands."

- **Public Trust Usage of Lands and Waters [15A NCAC 07H .0208(a)(2)(H)].**

"Development shall not impede navigation or create undue interference with access to, or use of, public trust areas or estuarine waters."

- **Avoidance and Minimization of CAMA Areas of Environmental Concern [15A NCAC 07H .0208(a)(2)(B)].** "Before receiving approval for location of a use or development within these AECs, the permit-letting authority shall find that no suitable alternative site or location outside of the AEC exists for the use or development and, further, that the applicant has selected a combination of sites and design that will have a minimum adverse impact upon the productivity and biologic integrity of coastal marshland, shellfish beds, beds of submerged aquatic vegetation, spawning and nursery areas, important nesting and wintering sites for waterfowl and wildlife, and important natural erosion barriers (cypress fringes, marshes, clay soils)."

- **Compensatory Mitigation [15A NCAC 07H .0208(a)(3)].** "When the proposed development is in conflict with the general or specific use standards set forth in this Rule, the CRC may approve the development if the applicant can demonstrate that the activity associated with the proposed project will have public benefits as identified in the findings and goals of the Coastal Area Management Act, that the public benefits clearly outweigh the long range adverse effects of the project, that there is no reasonable and prudent alternate site available for the project, and that all reasonable means and measures to mitigate adverse impacts of the project have been incorporated into the project design and will be implemented at the applicant's expense. These measures taken to mitigate or minimize adverse impacts may include actions that will:

- (A) minimize or avoid adverse impacts by limiting the magnitude or degree of the action;
- (B) restore the affected environment; or
- (C) compensate for the adverse impacts by replacing or providing substitute resources."

- **Disposal of Excavated, Dredge and Fill Material [15A NCAC 07H .0312] on Ocean Beaches.** Sediment used for beach fill in North Carolina must be compatible with the native beach material where it is placed. Beach fill projects include beach nourishment, dredged material disposal, habitat restoration, storm protection, and erosion control. The CRC rules define a methodology for determining sediment compatibility.

- **Disposal of Material Dredged from Navigation Channels within the Active Nearshore, Beach or Inlet Shoal Systems [15A NCAC 07M .1102(a)].** "Clean, beach quality material dredged from navigation channels within the active nearshore, beach, or inlet shoal systems must not be removed permanently from the active nearshore, beach or inlet shoal system unless no practicable alternative exists. Preferably, this dredged material will be disposed of on the ocean beach or shallow active nearshore area where environmentally acceptable and compatible with other uses of the beach."

As stated in previous DCM letters about this project, the transportation link that the Herbert C. Bonner Bridge provides between Hatteras Island and Bodie Island is a critical component in the safety of the residents and visitors of Hatteras Island and Ocracoke Island, and the economic vitality of the Outer Banks. Given the importance of this transportation link and the advancing age of the existing Bonner Bridge, DCM continues to urge DOT to move expeditiously towards the development of a final project design that satisfies the transportation needs of the residents and visitors of Bodie, Hatteras and Ocracoke Islands, while also ensuring that coastal resources are adequately protected. DCM looks forward to working with the NEPA/404 Project Team to move this project forward in an expeditious, yet fiscally, socially and environmentally responsible manner.

Please contact me at (252) 808-2808 or via e-mail at Doug.Huggett@ncmail.net if you have any questions or concerns, or require additional information.

Sincerely,



Doug Huggett

CC: Jim Gregson, DCM
Ted Tyndall, DCM
Frank Jennings, DCM

attachment



North Carolina Department of Environment and Natural Resources
Division of Coastal Management
James H. Gregson, Director

Michael F. Easley, Governor

William G. Ross, Jr., Secretary

MEMORANDUM

TO: Cathy Brittingham, DCM Transportation Project Coordinator

FROM: Charlan Owens, AICP, NE DCM District Planner

SUBJECT: Review of the Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation for the NC 12 replacement of the Herbert C. Bonner Bridge submitted by the US Department of Transportation Federal Highway Administration (FHWA) and the NC Department of Transportation (NCDOT), which addresses seven (7) alternatives within two (2) corridors and identifies a preferred alternative for construction of a bridge, demolition and removal of the Bonner Bridge, and improvements to NC 12 through the Pea Island National Refuge between the community of Rodanthe and Oregon Inlet, in Dare County.

Reference: Federal-Aid No. BRS-2358(15); State Project No. 8.1051205; TIP Project No. B-2500

Date: October 13, 2008

Consistency Determination: The preferred alternative is consistent with/not in conflict with the Dare County 2003 Land Use Plan certified by the Coastal Resources Commission (CRC) on July 24, 2003.

Overview: The proposed project is the construction of a bridge to replace the Herbert C. Bonner Bridge, demolition and removal of Bonner Bridge, and improvements to NC 12 between the community of Rodanthe and Oregon Inlet. The bridge, built in 1962, is part of NC 12 and provides the only highway connection between Hatteras Island and Bodie Island.

Seven (7) alternatives within two (2) corridors (the Pamlico Sound Bridge Corridor and the Parallel Bridge Corridor with NC 12 maintenance) have been described and a preferred alternative is identified.

The Pamlico Sound Bridge Corridor contains a proposed Pamlico Sound bridge that would be approximately 17.5 miles in length with a minimum navigation opening of 200 feet horizontally and 75 feet vertically. The total project length would be 18 miles including the bridge and the approach roads at the northern and southern ends. The southern terminus of the project would be within the community of Rodanthe. The following two (2) alternatives have been identified for the Pamlico Sound Bridge Corridor, specific to the terminus at Rodanthe.

1. Pamlico Sound Bridge Corridor with curved Rodanthe Terminus – the bridge would end in a curve that would connect the bridge directly to NC 12.

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2. Pamlico Sound Bridge Corridor with intersection Rodanthe Terminus – the bridge would end with a signalized intersection at NC 12.

A project in the Pamlico Sound Bridge Corridor would cost approximately \$1.3 to \$1.8 billion (including construction cost, right-of-way cost, operation and maintenance costs until 2060, and other highway-related costs, in 2006 dollars) by 2060, with replacement bridge costs ranging between \$929.1 million and \$1.4 billion of the total cost.

The Parallel Bridge Corridor contains a proposed Oregon Inlet bridge that would be up to 3.2 miles in length, located parallel to and just west of the existing bridge. The bridge would provide two (2) 12 foot travel lanes and two (2) 8 foot shoulders. The bridge would include a series of navigational spans across Oregon Inlet, the largest of which would provide 5,000 feet of horizontal clearance and 75 feet of vertical clearance. The NC 12 maintenance component would keep NC 12 open from the community of Rodanthe to the Oregon Inlet bridge's southern terminus, a distance of approximately 12.5 miles. The following five (5) alternatives have been identified for the Parallel Bridge Corridor, specific to NC 12 maintenance:

3. Parallel Bridge Corridor with Nourishment – NC 12 would remain in its current location and beach nourishment combined with dune enhancement would be used to maintain an adequate beach and dune system. Regular nourishment would occur along 6.3 miles of beach in four (4) locations, likely repeated at four (4) year intervals.
4. Parallel Bridge Corridor with Road North/Bridge South – NC 12 would be placed on a bridge west of Hatteras Island beginning at a new intersection in Rodanthe and continuing to a point approximately 2 miles north of the Refuge's southern boundary where the project would meet NC 12. NC 12 would remain unchanged for 2.6 miles. Beginning at a point approximately 1.3 miles south of the Refuge's ponds, NC 12 would be relocated to a point 230 feet west of the forecast 2060 high erosion shoreline. The relocation would continue 7.1 miles north until the relocated NC 12 would meet the Oregon Inlet bridge. Three (3) 10 foot high by 1,100 foot long dunes would be built adjacent to the relocated road when needed as the shoreline eroded, approximately at year 2030.
5. Parallel Bridge Corridor with All Bridge – the same bridge in Rodanthe would be used as in the alternative above, however in the central and northern part of the refuge, NC 12 would be constructed on a bridge to the west of the existing road. Two (2) road segments would be included in this location, one near Oregon Inlet and one just north of the Refuge's ponds, where access from NC 12 to the refuge would be provided. Access to the Refuge would also be available in a 1.9 mile section of NC 12 that would be left unchanged between the Rodanthe area bridge and the beginning of the next bridge section south of the ponds. The bridges associated with this alternative would span the five (5) potential storm-related island breach locations.
6. Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge – assumes an Oregon Inlet bridge, as well as elevated portions of NC 12 through both the Refuge and northern Rodanthe within the existing NC 12 easement, to be built in four (4) phases, the first

being the bridge across Oregon Inlet. Additional phases would be built as necessitated by coastal conditions. With the Rodanthe Bridge termini, the bridge in the existing NC 12 easement would begin in Rodanthe just north of Sudie Payne Road and extend north to Oregon Inlet except for the 2.1 mile length of NC 12 in the southern half of the Refuge that would not be threatened by erosion prior to 2060. Access to properties adjacent to the bridge at Rodanthe would be provided by a one-lane, one-way frontage road on each side of the NC 12 bridge.

7. Parallel Bridge Corridor with Phased Approach/Rodanthe Nourishment – similar to the alternative above, except that the southern end of the NC 12 bridge would begin .3 mile south of the Refuge/Rodanthe border. Beach nourishment would be used to protect NC 12 in Rodanthe.

A project in the Parallel Bridge Corridor would be estimated in 2006 dollars by 2060 at \$671.8 to \$970.4 million for Alternative 3., \$602.2 to \$740.2 million for Alternative 4., \$1.1 to \$1.4 billion for Alternative 5., and \$1.1 to \$1.5 billion for Alternative 6. and Alternative 7, with replacement bridge costs ranging from \$2.6 and \$3.4 million of the total cost.

Bonner Bridge would be demolished at an estimated cost of about \$4 million in 2006 dollars. Both corridor options would support the use of bicycles along NC 12 and the roadway would be designed with shoulders to support bicycle and pedestrian use.

In 2004, the Dare County Commissioners indicated concerns about the implementation of a Pamlico Sound Bridge Corridor Alternative, preferring a replacement bridge that ends near the south terminus of the Bonner Bridge and connects to existing NC 12. The also requested the consideration of long span bridges.

During its 2005 Session, the North Carolina General Assembly passed legislation (House Bill 747) related to replacement of the Bonner Bridge. The bill calls for expediting and accelerating the efficient, cost-effective completion of the project; indicates a preference for a bridge replacement in proximity to Bonner Bridge; and requests the NCDOT to periodically report project status to the General Assembly.

Alternative 6. Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge is the preferred alternative. This alternative is considered to be financially viable in that it can be built in phases, spreading the cost out over a timeframe adequate for it to be funded with anticipated future tax revenues. It also will remain in the existing NC 12 easement within the Pea Island National Wildlife Refuge and therefore would not use lands from the Refuge.

On August 27, 2007 representatives of NCDOT, FHWHI, the US Army Corps of Engineers (USACE), and the North Carolina Department of Environmental and Natural Resources (NCDENR) identified this alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA) for this project as part of the interagency National Environmental Policy Act (NEPA)/Section 404 Merger Process. This decision was based on: the ability of the alternatives considered to meet the project's purpose and need; environmental consequences;

opportunities available to mitigate impacts; cost; public and agency comment on the findings of the Supplemental Draft Environmental Impact Statement (SDEIS) and the 2007 Supplement to the SDEIS; and other findings presented in the FEIS. This project is included as TIP Project No. B-2500 in the NCDOT's 2009 to 2015 State Transportation Improvement Program (TIP) covering the period from Federal Fiscal Year (FFY) 2009 (October 2008) through FFY 2015 (September 2015).

All waters in the project area are classified as SA waters and as High-Quality Waters (HQW). The most stringent application of Best Management Practices (BMPs) is expected where highway projects affect receiving HQWs.

The NC 12 right-of-way within the project area is located with Floodzones ranging from Floodzone AE (EL 8) to VE (EL 11).

Anticipated impacts: Impacts identified in the FEIS specific to the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge include, but are not limited to, those identified below:

Approximately 2 acre Submerged Aquatic Vegetation (SAV), 47 acre of wetlands, 13.13 acres of Uplands, 2.44 acres of aquatic bottom are anticipated to be impacted under the preferred alternative. Temporary impacts to 12.5 acres of wetlands, including 3.1 acres of Coastal Wetlands, are also anticipated. Approximately 6.3 acres of seashore on Bodie Island, at the bridge's northern terminus, would also be impacted.

Natural shoreline movement would be allowed except where the terminal groin at Oregon Inlet would be retained. Since the preferred alternative is to be constructed in phases, the formation of a breach in Hatteras Island at the southern end of the Refuge is possible. A breach in this location would temporarily cut off access to Hatteras Island, resulting in reduced accessibility and economic losses.

Proposed activities within the Parallel Bridge Corridor "may affect-likely to adversely affect" species including the piping plover, leatherback sea turtle, green sea turtle, and loggerhead sea turtle. Piping plover nesting would likely be disturbed during construction and demolition, with potential nesting, foraging, and roosting habitat lost. Disturbance to turtle nesting on the beach is also anticipated. An incidental take statement for these species and the piping plover critical habitat has been issued by the USFWS. Habitats for sea anemone and Submerged Aquatic Vegetation (SAV) are considered ephemeral and will be identified prior to construction activities. Conservation measures to protect shortnose sturgeon habitat would also be taken.

Recreational fishing opportunities may be reduced. There would be no fishing catwalks on the replacement bridge due to increased heights, though an alternative fishing access is possible. A potential fishing pier to be located at Oregon Inlet is discussed in the FEIS. Also, charter fishing boats operating out of the Seashore's Oregon Inlet Marina and Fishing Center would no longer be able to use the channel known as "the crack" to access the ocean, which will increase travel times for boaters.

Proposed bridging would also reduce access to the Refuge, bypassing the Refuge Visitor Center, the Salt Flats Wildlife Trail, the North Pond Trail, the Refuge headquarters, and the boat ramp. Access to the refuge would be focused on two (2) locations - at the existing parking area at the north end of Hatteras Island and at an access south of the ponds. The preferred alternative would ultimately eliminate access to Refuge hiking trails and reduce beach access in the Refuge.

Proposed bridging would also result in visual impacts within the refuge and within the community of Rodanthe. An elevated linear man-made feature approximately 30 feet high and 7.5 to 10 miles long would intrude into the visual landscape of the refuge. An elevated roadway (and potential fishing pier) would also have a visual impact on views from the former Oregon Inlet US Coast Guard Station. Bridging would extend approximately 1.1 mile into the Rodanthe community, and into the Rodanthe Historic District. Views from the historic Chicamacomico Life Saving Station will be adversely impacted and direct access to the site across NC 12 would be eliminated. In addition to effecting views, the elevated roadway would also bisect the community into distinct Sound and Ocean neighborhoods. The roadway design would consist of one-lane, one-way frontage roads on either side of the elevated bridge accessed by three (3) crossover points. Relocation of three (3) residential structures and (1) business structure, and partial impact to two (2) business structures within Rodanthe would result from the preferred alternative.

Dare County is in the process of updating their Land Use Plan (LUP). A Major Permit Application for project construction would be reviewed based on the LUP in effect at the time of permit authorization.

See ATTACHMENT for policies currently relevant to this request.

cc: John Thayer, AICP, Manager, Planning and Access Programs

ATTACHMENT

Policy Review:

The **Dare County 2003 Land Use Plan** Land Classification Map identifies land area at Rodanthe as "Limited Transition" and area including the Pea Island National Wildlife Refuge and the Cape Hatteras National Seashore Recreation Park as "Conservation."

As of **October 13, 2008**, the following policies from the Dare County 2003 LUP certified by the CRC on July 24, 2003 may be applicable to this request:

Wetlands:

Policy #1, Page 54:

"Dare County advocates the use of existing (2002) State and Federal regulatory programs for protecting and preserving coastal wetland areas of environmental concern. Dare County reserves the right to review, comment, advocate, or oppose any proposed regulations or programs that may affect the regulation of coastal wetland areas of environmental concern."

Policy #2, Page 54:

"Dare County supports the use of mitigation for the loss of wetland areas for public purpose projects... For both public and private mitigation projects, up to 25% of the mitigation should take place on site or in Dare County."

Policy #3, Page 54:

"Dare County supports the U. S. Army Corps of Engineers nationwide permit program as administered in 2002. This support is based on the current scope of permitting limits on the nationwide program and not on any changes that may result in a different policy."

Ocean Shoreline:

Policy #4, Page 55:

"Oceanfront shoreline development should continue to be managed to protect and preserve the natural and recreational resources along the oceanfront. Dare County reserves the right to review, comment, advocate, oppose any proposed regulations

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or programs that may affect the regulation of ocean hazards areas of environmental concern."

Estuarine Waters/Shoreline:

Policy #5, Page 56:

"Estuarine shoreline development should continue to be managed to protect and preserve the natural resources of the estuarine waters and the estuarine shoreline. The appropriate tool for this is the existing CAMA Permit program and Areas of Environmental Concerns (AECs) designated under the CAMA program. Dare County reserves the right to review, comment, advocate, or oppose any proposed regulations or programs that may affect the regulation of estuarine waters and/or the estuarine shoreline."

Public Trust Areas:

Policy #8, Page 58:

"Dare County supports the preservation and protection of the public's right to access and use of the public trust areas and waters."

Shoreline Access:

Policy #14, Page 62:

"Dare County supports North Carolina's shoreline access policies as stated in 15 NCAC 7M, Section .0303. Dare County recognizes shoreline access to both ocean and estuarine shorelines as a key component in the local tourist economy."

Channel Maintenance:

Policy #15, Page 62:

"Dare County advocates the maintenance of all existing navigable channels and will work to secure permit authorization for those non-federal projects that require CAMA permit authorization."

Policy #16, Page 62:

"Dare County advocates and supports the permit authorization and federal funding necessary to construct jetties to stabilize Oregon Inlet."

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Beach Nourishment:

Policy #17, Page 63:

"Beach nourishment is the preferred shoreline management alternative along the ocean beaches of Dare County."

Development Impacts on Resources:

Policy #18, Page 64:

"Development projects shall be designed and constructed to minimize detrimental impacts on surface water quality, groundwater quality and air quality. Structures should be designed to fit the natural topographic conditions and vegetation versus modifications to natural conditions to accommodate structures."

Fisheries Resources:

Policy #20, Page 65:

"The continued productivity of commercial and recreational fishing shall be fostered through restoration and protection of unique coastal ecosystems upon which they depend..."

Policy #21, Page 65:

"... Dare County also recognizes the importance of all areas in our surrounding waters that serve as habitats for the area's abundant fisheries resources..."

Policy #22, Page 65:

"State and federal agencies with the authority to manage fisheries resources should be the responsible parties for the resolution of conflicts involving fisheries resources in Dare County. However, Dare County reserves the right to review, comment, advocate, or oppose any proposed regulations or programs that may affect the fisheries resources or management."

Archaeological/Historic Resources:

Policy #29, Page 67:

"The Dare County Board of Commissioners supports the protection of structures, lands, and artifacts that have been identified by the NC Department of Cultural

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Resources, Division of Archives and History, as archaeologically or historically significant. On a case by case basis, individual protection/management strategies should be implemented to ensure archeological and/or historical resources are not destroyed."

Wildlife Resources:

Policy #30, Page 68:

"Dare County supports the maintenance of preserve areas for wildlife habitat and access to the public to these areas for managed wildlife harvesting and observation."

Topographic Conditions:

Policy #31, Page 68:

"Dare County supports as minimum standards the administration and enforcement of all applicable floodplain management regulations and the National Flood Insurance Program."

Policy #32, Page 69:

"Dare County believes that there is insufficient, reliable data to quantify the rate of sea level rise. The phenomenon needs additional study. Until a more reliable and conclusive database has been established, Dare County will continue to rely on CAMA standards for development in CAMA designated areas of environmental concern or AECs."

Stormwater Management:

Policy #33, Page 70:

"Stormwater runoff should be managed to the greatest degree possible to protect the water quality of the public trust waters surrounding Dare County, particularly Class SA waters."

Transportation:

Policy #46, Page 76:

"Dare County recognizes the vital importance of NC 12 to Hatteras Island and the need to protect this transportation route, including Bonner Bridge. Recommendations by the NC Department of Transportation on NC 12, including beach nourishment, the

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replacement of Bonner Bridge, elevated sections of the highway, or other options that may be identified, will receive the highest level of consideration from Dare County."

Tourism:

Policy #64, Page 84:

"Dare County recognizes the vital importance of tourism to our local economy and supports efforts to maintain our status as a desirable place to visit and vacation. Dare County also recognizes the need to address the infrastructure and service demands of our seasonal populations..."

Policy #65, Page 84:

"Dare County supports the concept of combining natural resources and tourism to promote the area's ecological values, known as eco-tourism."

Policy #66, Page 84:

"The quality of life of Dare County residents should be carefully balanced with the growing tourist-based economy of the Outer Banks. Maintaining a good quality of life for our permanent population and ensuring a safe and enjoyable vacation experience should be a goal of all local, state, and federal agencies responsible for the promotion of tourism in Dare County and North Carolina."

Policy #67, Page 84:

"Dare County supports the development and construction of sidewalks, bike paths, greenways, and other walking/jogging trails to provide a safe setting for these types of outdoor recreation and as alternative transportation routes."

Reconstruction:

Policy #71, Page 90:

"Recovery priority shall be directed to restoring or repairing infrastructure improvements such as transportation routes, utilities and medical and emergency management facilities. Once the infrastructure has been restored, recovery priorities shall then be directed at essential commercial and primary residential structures."

Policy #72 Page 90:

"In the event of extensive hurricane damage to publicly-owned utilities or other improvements requiring replacement or reconstruction, alternative locations that will mitigate the potential for similar repetitive losses will be examined and implemented wherever feasible and practicable."



North Carolina Department of Environment and Natural Resources
Division of Marine Fisheries

Dr. Louis B. Daniel III, Director

Michael F. Easley, Governor
William G. Ross Jr., Secretary

MEMORANDUM:

TO: Melba McGee, Environmental Coordinator
Office of Legislative and Intergovernmental Affairs

THROUGH: Anne Deaton, Chief Habitat Section *AD*

FROM: Sara E. Winslow, Northern District Manager

SUBJECT: Project N. 09-0078 – FEIS and Section 4(f) Evaluation – NC 12 Replacement of Herbert C. Bonner Bridge

DATE: October 13, 2008

The North Carolina Division of Marine Fisheries has reviewed the FEIS document and submits the following comments pursuant to General Statute 113-131.

On August 27, 2007, representatives of NCDOT, the Federal Highway Administration, the USACE and NCDENR identified the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the Least Environmentally Damaging Practical Alternative (LEDPA) for this project as part of the interagency NEPA/Section 404 Merger Process. The LEDPA was adopted as the project's Preferred Alternative. The Phased Approach/Rodanthe Bridge Alternative (Preferred) proposes replacing the Bonner Bridge with a bridge parallel to and west of the existing bridge, as well as maintaining NC12 from the community of Rodanthe to Oregon Inlet by building additional bridges as needed within the existing NC-12 easement.

The Parallel Bridge Corridor would use approximately 6.3 acres of the National Seashore on Bodie Island and within the Refuge on Hatteras Island. The total area of disturbance within the existing easement in the Refuge would be 3.7 acres permanent and 48.5 acres temporary for the Phased Approach (Preferred) Alternative.

The Phased Approach (Preferred) would have the least amount of permanent Section 404 impacts (3.1 ac) and Coastal Wetlands (0.3 ac). The preferred alternative would temporarily impact 12.5 ac of 404 Wetlands and 3.1 ac of Coastal Wetlands.

The Parallel Bridge Corridor would likely require dredging just north of Hatteras Island for approximately 2,000 ft to build the new Oregon Inlet Bridge. No dredging is anticipated in areas where SAV is present. On the Bodie Island side of Oregon Inlet construction of a temporary haul road (~2,400 ft) is likely and would temporarily impact 6.5 ac of biotic communities.

The Division acknowledges the Phases II – IV will present substantial challenges before the various agencies will be satisfied so appropriate permits and approvals are granted. As this agency has indicated in previous memos, concern is expressed with construction of bridges, that will ultimately be in the surf zone. However, at the time of permit application for the other phases, all reasonable, practicable, and feasible alternatives will be considered and evaluated in pursuit of the LEDPA/Preferred Alternative.

This agency continues to recommend that some type of fishing access for the public be maintained at the north end of Hatteras Island. The FEIS indicates that the temporary traffic maintenance bridge could be left in place for a fishing pier. This agency supports this possibility.

In summary, the Division supports the Parallel Bridge (Phase I) and Phases II – IV in the future as needed. In the future when permit applications are submitted for Phase II – IV each phase must be evaluated to include avoidance, minimization and compensatory mitigation. All reasonable, practical and feasible alternatives must be considered and evaluated for each phase.





Michael F. Easley, Governor
William G. Ross Jr., Secretary
North Carolina Department of Environment and Natural Resources
Coleen Sullivan, Director
Division of Water Quality

October 15, 2008

MEMORANDUM

To: Melba McGee, Environmental Coordinator, Office of Legislative and Intergovernmental Affairs

Through: Brian Wrenn, Transportation Permitting Unit, NC DWQ *BW*

From: David Wainwright, Transportation Permitting Unit, NC DWQ *DW*

Subject: Comments on the Final Environmental Impact Statement related to the proposed replacement of the Bonner Bridge and upgrades to NC 12, Dare County, Federal Aid Project No. BRS-2338(15), State Project No. 8.1051205 TIP B-2500, State Clearinghouse Project No. 09-0078

This office has reviewed the referenced document dated September 11, 2008. The Division of Water Quality (DWQ) is responsible for the issuance of the Section 401 Water Quality Certification for activities that impact Waters of the U.S., including wetlands. It is our understanding that the project as presented will result in impacts to jurisdictional wetlands, streams, and other surface waters. The DWQ offers the following comments based on review of the aforementioned document:

Project Specific Comments:

1. This project is being planned as part of the 404/NEPA Merger Process. As a participating team member, the NCDWQ will continue to work with the team.
2. According to the Green Sheet and, as discussed in the text, the NCDOT and the contractor are planning on jettie the piles in place before being seated to their final elevation. The DWQ understands the necessity for completing this project as quickly as possible and jettie is quicker than some other methods. It is also understood that the velocity through Oregon Inlet is high and may negate some potential turbidity and noise problems, which during tourist season may be undesirable. However, the DWQ does not generally prefer this method. Other methods allow for better control of turbidity. If the NCDOT and its contractor(s) plan on pursuing this method, then the NCDOT will need to provide a plan in the 401 Water Quality Certification application that adequately addresses turbidity concerns to the best extent practicable.
3. There is mention on the document of dragging barges into position for use as a temporary work bridge. The DWQ does not approve of dragging barges along the bottom. It is preferred to float the barge into position, and then sink it. The dragging of barges is very destructive to the bottom and subsequently to aquatic life.
4. The DWQ would prefer that temporary dredging during construction be kept to a minimum. The use of temporary work bridges, when possible, is preferred. At the very least, dredging should be kept to a minimum during the spring in order to reduce potential impacts to fisheries resources.



Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
2321 Crabtree Boulevard, Suite 250, Raleigh, North Carolina 27604
Phone: 919-733-1786 / FAX 919-733-3863 / Internet: <http://h2o.enr.state.nc.us/howetlands>

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5. The document indicates that not all stormwater on the bridge may be able to be collected and treated. The DWQ does not allow stormwater to be discharged from bridges directly into stream or wetlands without proper treatment and velocity dissipation. The NCDOT will be required to find a way to properly collect and treat all stormwater from the bridge.

General Comments:

1. NC DOT is respectfully reminded that all impacts, including but not limited to, bridging, fill, excavation and clearing, to jurisdictional wetlands, streams, and riparian buffers need to be included in the final impact calculations. These impacts, in addition to any construction impacts, temporary or otherwise, also need to be included as part of the 401 Water Quality Certification Application.
2. The 401 Water Quality Certification application will need to specifically address the proposed methods for stormwater management. More specifically, stormwater shall not be permitted to discharge directly into streams or surface waters.
3. Bridge deck drains should not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of NC DWQ *Stormwater Best Management Practices*.

The NCDWQ appreciates the opportunity to provide comments on your project. Should you have any questions or require any additional information, please contact David Wainwright at (919) 715-3415.

cc: Bill Biddlecome, US Army Corps of Engineers, Washington Field Office
Clarence Coleman, Federal Highway Administration
Chris Milfischer, Environmental Protection Agency (electronic)
Travis Wilson, NC Wildlife Resources Commission (electronic)
Gary Jordan, US Fish and Wildlife Service (electronic)
Catty Brittingham, Division of Coastal Management
Gary Ward, DWQ Washington Regional Office
File Copy

State of North Carolina Department of Environment and Natural Resources

Reviewing Office: Washington

Project Number: 09-0078 Due Date: 10-15-08

INTERGOVERNMENTAL REVIEW - PROJECT COMMENTS

After review of this proposal it has been determined that the ENR permit(s) and/or approvals indicated may need to be obtained in order for this project to comply with North Carolina Law. Questions regarding these permits should be addressed to the Regional Office indicated on the reverse of the form. All applications, information and guidelines relative to these plans and permits are available from the same Regional Office.

Table with 4 columns: PERMITS, SPECIAL APPLICATION PROCEDURES or REQUIREMENTS, Normal Process Time (summary time limit), and other details. Rows include various permit types like Water Use Permit, Well Construction Permit, etc.

Table with 4 columns: PERMITS, SPECIAL APPLICATION PROCEDURES or REQUIREMENTS, Normal Process Time (summary time limit), and other details. Rows include various permit types like Permit to drill exploratory oil or gas well, etc.

REGIONAL OFFICES

Questions regarding these permits should be addressed to the Regional Office marked below.

- List of regional offices including Asheville, Mooresville, Fayetteville, Raleigh, and Winston-Salem, with their respective addresses and phone numbers.

Bonner Bridge

Page 2

10/16/2008



North Carolina Wildlife Resources Commission

MEMORANDUM

TO: Melba McGee
Office of Legislative and Intergovernmental Affairs, DENR

FROM: Travis Wilson, Highway Project Coordinator
Habitat Conservation Program

DATE: October 16, 2008

SUBJECT: North Carolina Department of Transportation (NCDOT) Final Environmental Impact Statement (FEIS) and Draft Section 4(f) Evaluation for the proposed replacement of Herbert C. Bonner Bridge, in Dare County, North Carolina. TIP No. B-2500 SCH Project No. 09-0078.

E-41

The Indirect and Cumulative Impact (ICI) assessment does not address this topic. It is necessary to understand, to the greatest degree possible, the situation of the roadway to the shoreline with the formation of new inlets. Furthermore the ICI does not fully address the extent of indirect impacts to wildlife associated with the migration of the shoreline toward the elevated structures.

In addition, section 2.10.2.5 states: "...after the issuance of the Record of Decision for this project, NCDOT will confine future NC 12 maintenance to the existing NC 12 easement." Further in this section it is then stated: "Availability of funds recognizes that future funding analyses indicate that funding availability will continue to limit how much can be built at one time and the need for phasing." Both philosophies are not possible. If beach erosion is accelerated or funding continues to be inadequate, the only option will likely be hardening the shoreline and therefore significantly impacting habitat within the project area.

The document adequately address potential impacts and conservation measures for the construction of the preferred alternative, however several question remain from our March 16, 2007 comments on the phased approach alternatives, as well as the FEIS. We anticipate continued participation in the 404/NEPA Merger process for this project. Thank you for the opportunity to comment. If we can be of any further assistance please call me at (919) 528-9886.

cc: Gary Jordan, U.S. Fish and Wildlife Service, Raleigh
 Brian Wrenn, DWQ, Raleigh
 Bill Biddlecome, USACE, Raleigh
 Chris Miltischer, EPA
 Cathy Brittingham, DCM

Staff biologists with the N. C. Wildlife Resources Commission have reviewed the subject FEIS and are familiar with habitat values in the project area. The purpose of this review was to assess project impacts to fish and wildlife resources. Our comments are provided in accordance with certain provisions of the National Environmental Policy Act (42 U.S.C. 4332(2)(c)) and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

NCDOT proposes to replace the Herbert C. Bonner Bridge across Oregon Inlet in conjunction with addressing problematic areas located on NC 12 from the southern terminus of the existing bridge to the community of Rodanthe. The FEIS identifies the preferred alternative as the Phased Approach/Rodanthe Bridge Alternative. The preferred alternative proposes maintaining NC 12 within the existing easement by constructing bridges as needed in multiple phases, as well as replacing the bridge over Oregon Inlet parallel to the existing structure.

The phased approach alternative has been promoted as an alternative that will allow barrier island processes to take place by elevating the roadway and permitting the shoreline to progress inland while "passing" underneath the bridge structure. We remain concerned with the uncertainty of the impacts associated with an elevated roadway located waterward of the dune line. These concerns are outlined in earlier comments dated March 16, 2007. More specifically

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

DEPARTMENT OF ADMINISTRATION
INTERGOVERNMENTAL REVIEW



THE ALBEMARLE COMMISSION
LEAD REGIONAL ORGANIZATION FOR REGION R

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- Nags Head
- Plymouth
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- Southern Shores
- Wintfall

Chairman, Benjamin Hobbs
Executive Director, Bert Banks

October 16, 2008

Reference: Project 09-E-4220-0078 (Bonner Bridge in Dare County, Highway 12)

Dear Ms. McMillan:

The Albemarle RPO greatly appreciates the opportunity to review the environmental assessment for the Bonner Bridge located in Dare County that spans Oregon Inlet and bridges together Bodie and Hatteras Islands.

The Albemarle RPO recommends the short bridge alternative for the new Highway 12 bridge. This option is more financially feasible considering the budget shortfalls we are facing throughout the state and nationally.

Most importantly, the Albemarle RPO requests the expedited construction of a new Highway 12 bridge due to the critical nature of this project. The Herbert C. Bonner Bridge, built in 1963, has outlived its useful life, and is given a sufficiency rating of a 2 out of 100 by NCDOT (www.ncdot.org/projects/bonnerbridgerepairs). This 45-year old bridge is the lifeline for Hatteras Island to the Dare County mainland, and the soil erosion that has occurred over time has resulted in the loss of support for the original pilings, and additional ones have been added to support the structure. Continual repairs to the bridge remain futile, and the construction of a new and much wider bridge is necessary for the traffic volume it carries. If the Bonner Bridge must be taken out of commission without a replacement, motorists will be required to take a 100-mile detour to access Hatteras Island.

If any further delays occur that will prohibit the bridge's projected construction completion date of November 2010, please notify my office immediately. Thank you for the opportunity to review these documents, and if I can be of any assistance, please do not hesitate to contact me at 252-426-5753 ext. 230, or at mjethro@albemarlecommission.org.

Best regards,

Morgan C. Jethro
Regional Planner, Region R
Albemarle RPO Coordinator



512 South Church Street • Post Office Box 646 • Hertford, NC 27944 • Office: (252) 426-5753 • Fax: (252) 426-8482 • Website: albemarlecommission.org
Senior Nutrition Program (252) 426-7093 • Fax: (252) 426-7649
The Albemarle Commission does not discriminate on the basis of age, sex, religion, race, color, or national origin.

STATE NUMBER: 09-E-4220-0078 F02
DATE RECEIVED: 09/18/2008
AGENCY RESPONSE: 10/15/2008
REVIEW CLOSED: 10/20/2008

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DEPT OF CUL RESOURCES
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PROJECT INFORMATION

APPLICANT: N.C. Dept. of Transportation
TYPE: National Environmental Policy Act
END: Final Environmental Impact Statement
DESC: Proposal to replace the Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet, NC 12, in Dare County. TIP No. B-2500
CROSS-REFERENCE NUMBER: 94-E-4220-0426 06-E-4220-0185 07-E-4220-0283

The attached project has been submitted to the N. C. State Clearinghouse for intergovernmental review. Please review and submit your response by the above indicated date to 1301 Mail Service Center, Raleigh NC 27699-1301.

If additional review time is needed, please contact this office at (919) 807-2425.

AS A RESULT OF THIS REVIEW THE FOLLOWING IS SUBMITTED:

NO COMMENT

COMMENTS ATTACHED

SIGNED BY:

DATE:

10/15/08

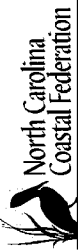
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OCT 28 2008

Preconstruction
Project Development and
Environmental Analysis Branch

October 24, 2008



Greg Thorpe
NCDOT
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

Dear Greg,

I submit these comments on the final Environmental Impact Statement (FEIS) for the replacement of the Bonner Bridge on behalf of the NC Coastal Federation, a private, nonprofit organization with 9,000 members.

In December 2005, NCCF submitted a letter to DOT recommending an alternative route that would build a bridge down the west side of Pea Island, using top-down construction methods (such as that used on the Highway 17 bypass in Chocowinity) to minimize impacts to wetlands, aquatic grass beds, and other sensitive natural communities. A copy of that letter is attached.

While there would still be environmental impacts during construction, the natural communities would quickly recover once Pea Island was allowed to move and shift as a natural barrier island. Building a bridge on the west side of the island would provide better protection for both the transportation corridor and the refuge. Our letter urged that a renewed effort be made to bring together local officials and the public agencies to examine this option and determine if it would be feasible.

Our suggestion was submitted as part of the formal public input process for developing the Final Environmental Impact Statement. We found what may be a brief reference to our alternative on page 2-77, in Section 2.6.4. The passage reads, "Relocating NC 12 west of the freshwater ponds in the Refuge was dropped because meeting participants agreed that it would have the greatest impact on Refuge operations and use."

We believe this option has been dismissed too quickly. With some creative thinking, it may be possible to provide a way for refuge operations to continue as needed; for the public to have access to the most popular parts of the refuge, including North and South ponds; and for a reliable transportation corridor to be built and maintained. Please note that we are proposing a somewhat different alignment than the corridors studied in the 1990s and early 2000s, and that our approach calls for top-down construction of each platform.

If this alternative is seriously studied, it is our feeling that it will provide a practical solution. It will minimize the long-term economic, social and environmental costs of the project by locating the road where it can best be integrated into this dynamic island

system. In contrast, we are very concerned that the Phased Approach, as described in the FEIS, will leave the public without a reliable transportation corridor as storms continue to cover the highway with sand and ocean water.

We believe the Phased Approach represents a good-faith effort to resolve this contentious issue. Nonetheless, conditions have changed so quickly on the north end of Hatteras Island that the approach as presented in the FEIS is no longer a practical option. Even if bridges are built immediately over the hot spots, it will only be a matter of a few years before they are on the beach, sustaining the full impact of the surf.

Please do not hesitate to contact me if you need additional information or details.

Sincerely,

Jan DeBlieu
Cape Hatteras Coastkeeper



"Working Together for a Healthy Coast"

North Carolina Coastal Federation

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Division of Highways

OCT 28 2008

Procurement
Project Development and
Environmental Analysis Branch

Northern Office: P.O. Box 475, Manteo, NC 27954 (252) 473-1607

December 9, 2005

C.B. Goode Jr.
Office of Human Environment
1583 Mail Service Center
Raleigh, NC 27699-1583

Dear Mr. Goode,

On behalf of the North Carolina Coastal Federation (NCCF), I submit these comments on the draft Environmental Impact Statement for the replacement of the Herbert C. Bonner Bridge over Oregon Inlet (DOT Project No. 8.1051205). NCCF is a nonprofit organization charged with safeguarding the health and cleanliness of coastal waters. We have 8,000 members.

Bonner Bridge connects with Highway 12 at the Pea Island National Wildlife Refuge, an undeveloped piece of land set aside by federal law as habitat for wildlife. Pea Island must be allowed to function as a natural system. Because barrier islands migrate, maintaining a highway from Oregon Inlet to Rodanthe poses especially difficult challenges. While beach renourishment and dune building may be acceptable on some barrier islands where human settlement is present, Pea Island is a wild, undeveloped barrier system and must remain so. This is not simply a desire on the part of NCCF, but a requirement under federal law.

In the past two years the question of how to maintain the road to Hatteras Island has dissolved into a bitter controversy. Dare County officials want the road to remain within the refuge, while wildlife advocates want it moved into the sound. Unless some middle ground is struck, and soon, we fear the issue will have to be decided by the courts. By the time a court decision is reached and a replacement built, the Bonner Bridge will likely be out of service, leaving the people of Hatteras Island to rely on ferries. We do not want to see this issue go to court. However, everyone involved must recognize that legal action will be the end result of taking a hard-and-fast position for any alternative. We have approached numerous individuals on both sides of the controversy, with the hopes of working out a compromise. This letter constitutes both our comments on the draft EIS and some recommendations on how a compromise might be reached.

According to the designs set forth in the draft EIS, the only alternative that meets the criteria outlined above is the Pamlico Sound bridge. In addition, the Pamlico Sound bridge would be designed to last a hundred years. This is far beyond the capacity of an on-the-ground road through Pea Island, which will likely be disrupted by erosion after 50 years, at most.

The Parallel Corridor, all road, can only be maintained through a program of beach nourishment and dune building that is unacceptable. Halting barrier island migration is difficult on any shoreline. On Pea Island, it will be impossible without extreme engineering tactics that are

inappropriate for a wildlife refuge. These include the closure of breaches or inlets that open as the island continues to migrate. The flushing of tidal waters through ocean cuts is an important component of water quality. Any cuts that occur on Pea Island before 2060—and scientists agree that they will occur—must be allowed to remain open and function naturally, without hardened structures or fill. In addition, beach renourishment would produce turbidity plumes in ocean waters and would kill millions of tidewater invertebrates on which fish and migrating birds depend for food. Building dunes of 10 and 20 feet, as described in the DEIS, would hasten beach erosion and cause sand to be lost from the system as the ocean washes it out to sea. The west bank of Pea Island is already starved for sediment because of the dune building that has occurred over the past seventy years. This has led to extensive loss of wetlands; in fact, shoreline surveys show that the refuge has decreased in land mass from 5,900 in 1935 to only 5,000 acres today. Dune building within the refuge must be stopped. Such engineering tactics will become increasingly necessary as sea level rises. For these reasons, the Parallel Corridor, all road, is unacceptable.

In reviewing the draft EIS, we were hopeful that the Parallel Corridor, Road North/Bridge South or All Bridge options might provide a viable alternative that would allow public access while enabling the island to behave naturally. However, as described in the draft EIS, all alignments of the Parallel Corridor would involve intensive management of the island, including the immediate closure of any breaches or inlets that open in Pea Island. These alternatives would also continue the current practice of using dune building or beach renourishment on portions of the road that may be threatened as the island migrates, including the Canal Zone on the north end. For these reasons, the Parallel Corridor as described is unacceptable.

According to the options set forth in the DEIS, then, the Pamlico Sound corridor is the only acceptable alternative. It would avoid dune building, beach renourishment, and the closure of ocean breaches. It is also the only alternative that would meet the requirements necessary to receive federal permits under the Clean Water Act. But it would prevent the public from having the easy access to Pea Island it currently enjoys, and on which Dare County officials insist.

It should be noted that the alignment of the bridge and Highway 12 has been the subject of long discussion between the state and federal resource agencies (the Merger Team) charged with protecting public safety and the refuge. The Pamlico Sound corridor was endorsed unanimously by Merger Team members. Other corridors were considered, but problems were found with each. Routings that would have taken the road through the wildlife ponds were deemed unacceptable because of the large amount of wetlands that would be destroyed and the destruction of refuge facilities. Nonetheless, NCCF believes that because of the high degree of public opposition to the long bridge, alternative routes should be placed back on the table.

The Dare County Commissioners are on record as opposing the Pamlico Sound corridor for two reasons. First, the Pamlico Sound route would remove the need for the terminal groin on the south end of Oregon Inlet. The commissioners want the groin to remain in place to help stabilize the channel through the inlet. Second, the commissioners fear the Fish and Wildlife Service (FWS) intends to limit public access to the refuge. They demand that the refuge remain easily open to visitors.

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NCCF believes it may be possible to work out a compromise that would leave the terminal groin in place and align a series of bridges and roads through the refuge designed to let the island migrate naturally. We suggest that consideration be given to building a bridge through the northern part of the refuge, with the understanding that it would be engineered to withstand tidal surge. Any breaches or inlets would be allowed to remain open. No dune building or beach renourishment would be allowed. A public access point could be included for the north end. A problem with this suggestion is that it would likely require the road to be moved west from its present location through the north portion of the refuge, into sensitive wetlands with high wildlife value. If so, it would have to be constructed using the more expensive "top-down" construction method, leapfrogging forward a section at a time, to minimize damage to the wetlands. This is essential. Even with top-down construction, mitigation would be required. While it is highly unusual for us to endorse a proposal that would destroy wetlands, we are convinced that the barrier island system, including wetlands and Submerged Aquatic Vegetation, will quickly recover once DOT stops building dunes and moving sand to protect Highway 12.

In the middle portion of the refuge, engineers could align a bridge to follow the current route of the dikes that now form the west wall of the waterfowl impoundments. In the past refuge management has voiced concern about the potential destruction of the wildlife ponds and the disturbance of having vehicles pass too close to feeding, resting, and nesting birds. County officials have countered that the wildlife ponds are heavily manipulated, and therefore not natural habitat. NCCF believes it may be possible to build a bridge to replace the western dikes, reducing wetlands destruction and leaving the middle part of the island undisturbed for wildlife. At the same time, the wildlife ponds could be reconfigured and opened to tidal flushing, thus more closely mimicking a natural estuarine system. If carefully planned, this compromise could restore components of the natural system while allowing a bridge to remain within the refuge.

FWS management says it does not have the funds for such an extensive reengineering of the refuge ponds. It would fall on the state to design and construct a roadway and the surrounding landscape features to meet both its needs and those of the FWS. While this would be highly unusual, we believe it would be much less expensive than nourishing the beaches of Pea Island and closing breaches for the life of the Parallel Corridor. It would certainly be less damaging to water quality and the barrier island system. And it would increase fisheries habitat.

South of the wildlife ponds, a bridge across New Inlet could be tied into the portion of the road that is not currently threatened by erosion. This would reduce the cost of the project. Public access to beaches could be provided in the New Inlet area and south. A bridge would again be required north of Rodanthe, in the S-curves area.

This suggested corridor is only one of several potential routings that could serve as a compromise. Others include landing a bridge near the northwest corner of North Pond and proceeding south along the dikes. It appears from the maps in the DEIS that such a routing would avoid major beds of Submerged Aquatic Vegetation, but careful surveys would need to be conducted.

Finally, in our conversations with local officials and residents, it has become clear that the favorite public destination point is the north end of the refuge. If another compromise cannot be

reached, the simplest solution would be to build the Pamlico Sound corridor with a spur to the north end. The terminal groin could be left in place. (Refuge management has indicated that it might accept leaving the groin in place, if DOT would agree to occasionally spread sand on its south side to maintain habitat for beach-nesting birds.) A spur for providing access to the north end could be included in other road alignments as well.

As a public document, the draft EIS falls short in not examining ways in which the two opposing camps—those who favor the Parallel corridor and those who favor the Pamlico Sound corridor—might be brought together. We intend this only as a starting point from which discussions can move forward. But it is clear to us that policy makers must examine more alternatives than those presented in the draft EIS, and that they must do so quickly. We urge DOT, the resource agencies, and the officials of Dare County to make a sincere and creative effort to find compromises that will satisfy parties on both sides of the issue.

In closing, everyone involved in this decision should recognize that there is no inexpensive, easy solution to this problem—because there is no cheap, impact-free way to maintain a major transportation corridor down a shifting barrier island. Provisions must be made for the changeable nature of the landscape.

Thank you for this opportunity to comment. If you have questions or would like to discuss our ideas further, please contact me at the above phone number or at hatteraskeeper@nccoast.org.

Sincerely,

Jan DeBlieu
Cape Hatteras COASTKEEPER@

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October 27, 2008

VIA ELECTRONIC MAIL, FACSIMILE AND FIRST CLASS MAIL

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Re: Final Environmental Impact Statement and Section 4(f) Evaluation
NCDOT TIP Project Number B-2500, Bonner Bridge, Dare County, NC

Dear Dr. Thorpe:

The following comments on the above-referenced Final Environmental Impact Statement and Section 4(f) Evaluation ("FEIS") are submitted on behalf of the Southern Environmental Law Center, National Wildlife Refuge Association, Environmental Defense Fund, Defenders of Wildlife, The Wilderness Society, Audubon North Carolina, North Carolina Wildlife Federation, and Pamlico Tar River Foundation. After reviewing the Supplement, the SDEIS, associated scientific research and the FEIS, we continue to support the Pamlico Sound Bridge alternatives and do not agree that any of the alternatives that utilize the Parallel Bridge corridor, including the preferred alternative, the Phased Approach, are viable alternatives. Our comments are focused on our numerous concerns about the adequacy of review of the environmental impacts associated with the Phased Approach and related compliance with the National Wildlife Refuge System Improvement Act, Section 4(f) of the Department of Transportation Act of 1966, and the National Environmental Policy Act ("NEPA").

As discussed in more detail below, the FEIS is inadequate and the project cannot go forward as planned for the following reasons:

1. The Phased Approach fails to comply with the National Wildlife Refuge System Improvement Act. That Act requires NCDOT and FHWA to demonstrate that bridge replacement is compatible with the purposes of Pea Island National Wildlife Refuge. Yet, the Phased Approach cannot comply with that requirement; the Pamlico Sound Bridge alternative is the only compatible alternative.

2. The FEIS's Department of Transportation Act of 1966 section 4(f) analysis is inadequate. First, NCDOT erroneously concludes that the Phased Approach will not "use" Refuge lands because it will operate within the existing NC Highway 12 easement. As a result, NCDOT's erroneous determination that the Phased Approach will not use the Refuge impermissibly skews the evaluation of the factors in the "least overall harm" analysis. In addition, the Section 4(f) Evaluation of the Phased Approach's impacts does not provide the decisionmaker with sufficient information to engage in a meaningful least overall harm analysis required by Section 4(f).
3. The FEIS violates NEPA by failing to adequately assess the environmental impacts from the Phased Approach. To comply with NEPA, the FEIS must thoroughly and objectively analyze the environmental consequences of the alternatives, but the FEIS's analysis of the environmental impacts of the Phased Approach fails to do so. The FEIS also fails to identify a preferred alternative and instead selects a preferred alternative without adequate review of all its foreseeable environmental impacts. The FEIS also fails to evaluate the ecological needs of the Refuge and the manner in which the Phased Approach interferes with the beneficial processes of this dynamic shoreline.
4. The Phased Approach fails to address public access to the Refuge.
5. The Phased Approach may not be able to be funded or comply with state or federal legal requirements.
6. Because the terminal groin is an essential component of the Phased Approach, the effects from its removal or retention must be addressed in the FEIS, and a compatibility determination and 4(f) determination are required. The FEIS fails to do so. Moreover, it is unlikely that retention of the terminal groin could be found to be compatible.

OVERVIEW:

Pea Island National Wildlife Refuge ("Pea Island Refuge") is at the core of the debate about the Bonner Bridge replacement. Established in 1938 by Executive Order, Pea Island Refuge is a "refuge and breeding ground for migratory birds and other wildlife." Exec. Order No. 7862, 3 Fed. Reg. 734 (Apr. 12, 1938). Pea Island Refuge is separated from North Carolina's mainland by marshes and Pamlico Sound and lies on the north end of Hatteras Island. Hatteras Island and Oregon Inlet are part of a dynamic barrier island system and the Pea Island Refuge relies on this dynamic process for ecological viability. Pea Island Refuge is subject to ocean overwash, high shoreline erosion rates, inlet formation, and other impacts associated with large storm events, sea level rise, and general barrier island dynamics. While many of these natural processes are incompatible with transportation corridors, they are beneficial to the abundant wildlife and

are instrumental in creating nesting habitat, feeding grounds, and other natural habitats. Hundreds of thousands of migratory birds, including the greater snow goose and other migratory waterfowl, migrating shorebirds, raptors, wading birds, and migratory songbirds, use Pea Island Refuge. And Pea Island Refuge manages approximately 1,000 acres of waterfowl impoundments for the benefit of migratory birds. Also, Pea Island Refuge has 13 miles of ocean beach that provide nesting habitat for loggerhead sea turtles, green sea turtles, piping plover, and several species of shorebird. These tremendous natural resources draw tourists, anglers, birders, and other outdoor enthusiasts. Many members of our organizations regularly recreate and enjoy the natural resources of Pea Island Refuge.

As the FEIS acknowledges, a long-term solution to the problems posed by locating transportation corridors within this volatile system is necessary to meet the purpose and need of the Bonner Bridge replacement project. The purpose and need as stated in the FEIS is: (1) Provide a new means of access from Bodie Island to Hatteras Island for its residents, businesses, services, and tourists prior to the end of the current Bonner Bridge's service life; (2) Provide a replacement crossing that takes into account natural channel migration expected through the year 2050 and provides flexibility to let the channel move; and (3) Provide a replacement crossing that will not be endangered by shoreline movement through the year 2050. FEIS at 1-6. While the purpose and need has been narrowed from the goals established by the Outer Banks Task Force, the FEIS purpose and need does reflect the dynamic nature of Oregon Inlet and the project area shoreline.¹

The Phased Approach, however, cannot meet the purpose and need or the Outer Banks Task Force objectives because it fails to protect NC 12 from shoreline movement during the project life, fails to take into account channel migration and to let the channel move, and fails to preserve the natural barrier island system. The Phased Approach will have significant effects on Hatteras Island and the transportation corridor cannot be maintained safely and efficiently within this dynamic environment. The Phased Approach attempts to continue to maintain a fixed transportation corridor on a shifting barrier island at the cost of public safety, reliability, and ecological protection. Furthermore, the Phased Approach is not compatible with the purpose of the Pea Island National Wildlife Refuge, pursuant to the National Wildlife Refuge System Improvement Act, nor is it a viable alternative pursuant to Section 4(f) of the Department of Transportation Act of 1966. As discussed in greater detail below, the Pamlico Sound Bridge is the only alternative that will work and can be authorized pursuant to applicable federal laws.

NC 12 and its associated maintenance are steadily degrading the Refuge, and the Phased Approach does not protect against this degradation. As discussed more fully below, the Phased Approach is not a viable, or lawful, alternative. The Phased Approach would keep NC 12 under construction for the life of the project as short bridges are

¹ Through the Outer Banks Task Force, state and federal agencies determined that the long-term goals for this area were (1) to preserve the natural barrier island system; (2) minimize impacts to Hatteras and Ocracoke islands; and (3) maintain access top and on the islands so that the transportation system is safe, efficient, and has minimal impact on the environment. SDEIS at 2-15.

perpetually built through the Refuge north of Rodanthe. Furthermore, the "phased" short bridge locations are estimated based on current shoreline erosion and inlet formation predictions. Shoreline changes, however, are often episodic in nature and are difficult to predict precisely. An inlet could form or the shoreline erode prior to or during a planned construction phase. Also, the effect of climate change has not been adequately evaluated. Any increase in storm intensity and/or sea level rise may cause substantial revisions to the current predictions, further exacerbating the uncertainty associated with predicting inlet/breach locations and timing. The FEIS attempts to respond to this natural uncertainty by proposing a monitoring program and by acknowledging that some of the phases may be different than those evaluated in the FEIS. This proposal, however, amounts to a blank check that cannot pass legal scrutiny.

Even if the Phased Approach could be completed in a manner compatible with the dynamic shoreline, the final project is a long bridge on the beach and in the Atlantic Ocean. As the FEIS acknowledges, the Phased Approach would substantially interfere with fishing, surfing, and other beach activities and will severely limit and reduce access to the Refuge. In contrast, the Pamlico Sound Bridge is safer, more reliable, and more protective of the environment. The Pamlico Sound Bridge would not be subject to ocean overwash, inlet formation, or erosion. It would allow the U.S. Fish and Wildlife Service to preserve and protect the Refuge and the associated wildlife. Furthermore, the Pamlico Sound Bridge is the only alternative that can be authorized pursuant to applicable federal laws.

As explained in more detail below, the Phased Approach rests on faulty legal assumptions, inadequate economic analysis and flawed predictions about engineering around future coastal conditions within the project area.

I. The Phased Approach fails to comply with the National Wildlife Refuge System Improvement Act.

A. NCDOT and FHWA must demonstrate that bridge replacement is compatible with the purposes of Pea Island National Wildlife Refuge.

Congress passed the National Wildlife Refuge System Improvement Act ("NWRISA") in 1997. According to the legislative history, the purpose behind NWRISA is "to establish clearly the conservation mission of the System, provide a Congressional guidance to the Secretary for management of the System, provide a mechanism for unit-specific refuge planning, and give refuge managers clear direction and procedures for making determinations regarding wildlife conservation and public uses of the System and individual refuges." H. Rep. No. 105-106 (May 21, 1997). In enacting NWRISA, Congress stated:

[I]t is the policy of the United States that— (A) each refuge shall be managed to fulfill the mission of the System, as well as the specific purposes for which that refuge was established; . . . (C) compatible wildlife-dependent recreational uses

are the priority general public uses of the System and shall receive priority consideration in refuge planning and management.

16 U.S.C. § 6684d(a)(3). Further, “[T]he Secretary shall – (A) provide for the conservation of fish, wildlife, and plants, and their habitats within the System; (B) ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans.” 16 U.S.C. § 6684d(a)(4) (emphasis added).

“[T]he Secretary shall not initiate or permit a new use of a refuge or expand, renew, or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety.” 16 U.S.C. § 6684d(d)(3)(A)(i). “‘Compatible use’ means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.” 16 U.S.C. § 668ee. “Sound professional judgment” requires “a finding, determination, or decision that is consistent with principles of sound fish and wildlife management and administration, available science and resources, and adherence to the requirements of this Act and other applicable laws.” 16 U.S.C. § 668ee.

In addition to “sound professional judgment,” the other major element of a compatibility decision is assessing whether the proposed use will “materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.” 16 U.S.C. § 668ee. According to the Fish & Wildlife Service’s 2000 Final Compatibility Policy (65 Fed. Reg. 62484), which was announced concurrently with the implementing regulations:

Inherent in fulfilling the System mission is not degrading the ecological integrity of the refuge. Compatibility, therefore, is a threshold issue, and the proponent(s) of any use or combination of uses must demonstrate to the satisfaction of the Refuge Manager that the proposed use(s) pass this threshold test. The burden of proof is on the proponent to show that they pass; not on the Refuge Manager to show that they surpass. Some uses, like a proposed construction project on or across a refuge that affects the flow of water through a refuge, may exceed the threshold immediately, while other uses, such as boat fishing in a small lake with a colonial nesting bird rookery may be of little concern if it involves few boats, but of increasing concern with growing numbers of boats. Likewise, when considered separately, a use may not exceed the compatibility threshold, but when considered cumulatively in conjunction with other existing or planned uses, a use may exceed the compatibility threshold

The Refuge Manager **must consider** not only the direct impacts of a use but also the **indirect impacts** associated with the use and the **cumulative impacts** of the use when conducted in conjunction with other existing or

planned uses of the refuge, and uses of adjacent lands or waters that may exacerbate the effects of a refuge use.

65 Fed. Reg. 62484, 62490 (Oct. 18, 2000) (emphasis added). Of particular significance is the policy’s statement that cumulative, indirect, and direct impacts of the use in conjunction with other existing or planned uses of the refuge and uses of adjacent lands and waters are all to be considered in determining whether the ecological integrity of the refuge is maintained. Thus, in the case of Bonner Bridge, the Refuge Manager’s compatibility determination of replacement of the bridge under any alternative must consider all the impacts related to both NC 12 and the subsequent construction of the Phased Approach.

B. The Phased Approach cannot comply with the National Wildlife Refuge System Improvement Act.

1. Restricting the Phased Approach to the current NC 12 easement does not exempt the Phased Approach from a compatibility determination.

The FEIS rests on the erroneous assumption that any activity can take place within the existing right-of-way and not trigger a compatibility determination. FEIS at xi. The National Wildlife Refuge System Improvement Act, however, directly contradicts this interpretation. As discussed above, the Act requires the Refuge Manager to consider direct, indirect, and cumulative impacts associated with existing or planned uses of the refuge and the impact on adjacent lands and waters. This analysis should include the effect on the Refuge from keeping NC 12 in its current location; the impact on the Refuge from construction spanning the life of the project; the impact on the Refuge from easements taken within the easement to address shoreline erosion or storm events; and impacts on the Refuge from the final Phased Approach—a bridge that sits in the ocean and on the shore of the Refuge.

The following excerpt from agency compatibility regulations addresses maintenance activities within an existing easement:

(c) *Existing right-of-ways.* We will not make a compatibility determination and will deny any request for maintenance of an existing right-of-way which will affect a unit of the National Wildlife Refuge System, unless: the design adopts appropriate measures to avoid resource impacts and includes provisions to ensure no net loss of habitat quantity and quality; restored or replacement areas identified in the design are afforded permanent protection as part of the national wildlife refuge or wetland management district affected by the maintenance; and all restoration work is completed by the applicant prior to any title transfer or recording of the easement, if applicable. Maintenance of an existing right-of-way includes minor expansion or minor realignment to meet safety standards.

50 CFR 26.41 (emphasis added).

maintaining NC 12 in the past, these temporary measures include sand bags, beach nourishment, dune rebuilding, dune sprigging, fencing, and road relocation. As the FEIS admits, NCDOT has never conducted these emergency or maintenance measures within the existing right-of-way. In a letter to Governor Easley, the Department of Interior states:

While the intent is to construct these new bridges within the existing road's right-of-way, we believe this alternative would require **continued maintenance outside of the existing road's right-of-way** through the Refuge until each subsequent phase of bridge construction along NC 12 is completed. Current information also indicates that all 4 phases would require at least 13 years of actual construction during a 28-year timeframe. Based on the information that the Service currently has, **it is unlikely that we could find this alternative to be compatible with the purposes for which the refuge was established**, as required under the Refuge Improvement Act.

Letter to Governor Easley, dated September 11, 2007 (emphasis added) (a copy is attached). Yet the FEIS fails to evaluate the impact on the Refuge from these measures.

Furthermore, all of these measures interfere with the natural barrier island dynamics that are necessary to sustain naturally the Refuge and the associated wildlife. These measures have severe effects on wildlife and habitat and are reasonably foreseeable indirect impacts associated with the Phased Approach. Finally, the final Phased Approach is a bridge in the Atlantic Ocean. This ocean-side bridge will be a new feature on the beach, which the FEIS fails to evaluate adequately. For example, an ocean-side bridge may affect erosion rates, inlet formation, ocean overwash, etc. Once these natural processes are interrupted, the bridge will impact migratory bird and other wildlife habitat. Although the FEIS refers to studies conducted on a pier, it is illogical to assume that a pier would have the same effects on the adjacent shoreline as a bridge that travels parallel to the shore for miles. The FEIS also acknowledges the disastrous impact from storms like Hurricane Katrina on bridges, but fails to analyze the increased impact on a bridge that would bear the brunt of an impact from a hurricane. For these reasons, the Phased Approach is not compatible with the Refuge.

The FEIS incorrectly states that a compatibility determination is only necessary for "alternatives that use Refuge lands outside the existing easement." FEIS at xi. First, as discussed above, the Refuge Act specifically mandates that a compatibility determination consider the direct, indirect, and cumulative impacts on refuge land and any adjacent land or waters that affect the Refuge use. The Phased Approach will have direct and indirect adverse impacts on the Refuge and it is therefore subject to a compatibility determination. Furthermore, the NC 12 easement is not a carte blanche proclamation that allows NCDOT to pursue any action without respect for the Refuge Act. The Refuge Act itself recognizes that easements and right-of-ways may coexist on national wildlife refuges. Work within easements, however, may be limited by the Refuge Manager and may be subject to a

The maintenance of a transportation corridor within the Refuge physically jeopardizes the purposes of the Refuge. It adversely affects habitat and the ability of the Refuge to function as a natural system. The activities anticipated to occur with the Phased Approach are more significant and damaging than routine maintenance and this approach will not meet the National Wildlife Refuge Improvement Act's mandate that "the biological integrity, diversity, and environmental health" of the Refuge be maintained.

2. The Phased Approach cannot be found to be compatible.

In our comment letter on the SDEIS dated December 9, 2005, we reviewed in detail the legislative history and current cases interpreting the National Wildlife Refuge System Improvement Act (Refuge Act). The Refuge Act continues to be pertinent to the discussion of additional alternatives, but for the sake of brevity that discussion is hereby incorporated by reference.

The Phased Approach and any indirect or cumulative impacts associated with it are subject to a compatibility determination pursuant to the Refuge Act. The Refuge Act prevents any new use or expanded, renewed, or extended use of a refuge to be permitted, "unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety." 16 U.S.C. § 668dd(d)(3)(A)(i). To be compatible, uses must preserve a refuge and promote the refuge system's mission. Accordingly, any use of the Refuge must be one that does not degrade the Refuge's ecological integrity nor interfere with its mission to provide a refuge and breeding ground for migratory birds and other wildlife.

All indirect and cumulative impacts that arise from a refuge use must also be considered and determined to be "compatible." The Refuge Compatibility Policy clearly states: "The Refuge Manager must consider not only the direct impacts of a use but also the indirect impacts associated with the use and the cumulative impacts of the use when conducted in conjunction with other existing or planned uses of the refuge, and uses of adjacent lands or waters that may exacerbate the effects of a refuge use." 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). Because the Phased Approach, and the associated direct and indirect impacts, is a use of the Refuge that "materially interfere[s] with" and "detract[s] from the fulfillment of the mission of the System or the purposes of the refuge," it cannot be found to be compatible. 16 U.S.C. § 668ee.

The Phased Approach directly impacts the Refuge. The Phased Approach will maintain a transportation corridor that bisects the Refuge for fifty years (the life of the project). During the life of the project the perpetual construction and associated noise and direct environmental impacts will degrade the Refuge resources, degrade wildlife habitat, and materially interfere with the purpose of the Refuge. The Phased Approach also will have significant indirect impacts. Because of the unpredictable nature of barrier island dynamics—including inlet/breach formation, shoreline erosion rates and locations, and sound side erosion—the Phased Approach will likely require "temporary" or "emergency" actions that will permanently and adversely affect the Refuge. As has been the case for

compatibility determination. For example, maintenance of an existing right-of-way is subject to review and approval by the U.S. Fish and Wildlife Service and is restricted to minor actions such as minor expansions or minor realignments to meet safety standards. See Final Compatibility Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997, 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). The Phased Approach's impacts on the Refuge are far from minor, include significant direct and indirect effects, and cannot be determined to be compatible. Furthermore, the FEIS fails to provide adequate information about how construction and maintenance could be restricted to the easement, which NCDOT has never done within the Refuge. The FEIS adds to this oversight with contradictory statements about activities outside the easement that could be part of future phases and maintaining that no work will occur outside the existing right-of-way. See e.g., FEIS at 2-96, 2-147, and 4-8.

The FEIS is also inadequate because the information is not sufficient to prove that any of the Parallel Bridge alternatives, including the Phased Approach, could be compatible. North Carolina Department of Transportation and Federal Highway Administration have the burden to prove that a use is compatible. "Compatibility, therefore, is a threshold issue, and the proponent(s) of any use or combination of uses must demonstrate to the satisfaction of the Refuge Manager that the proposed use(s) pass this threshold test. The burden of proof is on the proponent to show that they pass; not on the Refuge Manager to show that they surpass." 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). Nothing in the FEIS proves that any Parallel Bridge alternative, including the Phased Approach, could possibly be found to be compatible and the NCDOT and FHWA have not met their burden of proof. The FEIS acknowledges that future phases may not be built; may include different components from a "mix and match" menu; and may not meet federal legal requirements. These difficulties are not adequately addressed within the FEIS and in essence create a *carte blanche* approach that cannot be compatible with the Refuge. And NCDOT cannot rely on the existing easement as a legal shield to a compatibility analysis.

Finally, as discussed in section VI, *infra*, retaining the terminal groin is an essential part of the Parallel Bridge, and the impacts to the Refuge of retaining the groin must be considered in the compatibility analysis. According to the permit under which it was built, if the terminal groin is no longer required to protect the existing Bonner Bridge, it must be removed within two years. As discussed in section VI, though, if the groin is instead determined to be necessary to protect the new Parallel Bridge and it is retained, it will have numerous adverse environmental consequences that are not compatible with the purposes of the Refuge. These consequences must be considered in the compatibility analysis.

C. Only the Pamlico Sound Bridge alternative complies with the National Wildlife Refuge System Improvement Act.

The continued use of NC 12 thru the Refuge is a use that is subject to a compatibility determination. As discussed above, NCDOT and FHWA must demonstrate that a bridge replacement alternative is compatible with the Refuge's purpose or it cannot

be permitted. The proposed construction of a bridge within the existing right-of-way is not a sufficient legal bar to a compatibility determination, despite the FEIS's unsupported statements to the contrary. None of the Parallel Bridge alternatives comply with the National Wildlife Refuge Improvement Act because the associated operation and maintenance of NC 12 and the subsequent construction of the Phased Approach interferes impermissibly with the Refuge's purpose. As explained in more detail below, the only compatible alternative is the Pamlico Sound Bridge.

The key to compatibility is the mission of the National Wildlife Refuge System and the purpose of the Refuge. The NWRIA establishes wildlife conservation as the primary National Wildlife Refuge mission. "Inherent in fulfilling the System mission is not degrading the ecological integrity of the refuge." Final Compatibility Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997, 65 Fed. Reg. 62484, 62489 (Oct. 18, 2000). Recognizing that the ecological integrity of any national park or refuge in the project area is closely tied to the geological dynamic system, the National Park Services policy now requires that the Cape Hatteras National Seashore be managed to "support the natural processes of barrier island dynamics." The Refuge was established by executive order in 1938 as the Pea Island Migratory Waterfowl Refuge and its purpose is to be "a refuge and breeding ground for migratory birds and other wildlife." 3 Fed. Reg. 734 (Apr. 12, 1938). As discussed above, the Refuge supports a vast array of migratory birds, mammals, and threatened and endangered species. The Refuge provides important feeding and nesting grounds for the federally-listed piping plover and is a nesting area for loggerhead and green sea turtles.²

Building any of the Parallel Bridge alternatives will directly, substantially, and adversely affect the continued utilization of the Refuge as a breeding ground for migratory birds and other wildlife and damage the ecological integrity of the refuge. In order to maintain NC 12 through the northern portion of Hatteras Island, which is a dynamic system with dramatic shoreline erosion and potential for new inlet formation, the needs of the wildlife refuge would be subsumed by the need to keep the road within the easement, fill in breaches, and develop an artificial dune system. Currently, the constant beach erosion and severe weather events result in continual maintenance to repair and protect the integrity of NC 12. Even if these activities could be confined to the existing right-of-way—and the FEIS provides no information about how that will be possible—continuing such invasive uses of Refuge land has significant adverse impacts on the Refuge. For example, the maintenance activities currently degrade the quality of habitat available for wildlife by preventing overwash, contributing to a degraded beach profile, and eliminating natural vegetation succession. In sum, the repair and maintenance of NC 12 degrades the ecological integrity of the refuge and harms the habitat of migratory birds and wildlife. These impacts will occur regardless of whether the maintenance occurs in or out of the existing right-of-way.

As the FEIS acknowledges, "Oregon Inlet, Bodie Island, and Hatteras Island are part of a migrating barrier system characteristic of the southeast Atlantic Coast," which

² Additional comments on the endangered species impacts are included in later sections of this comment letter.

are characterized by variable and high erosion rates. FEIS at 3-51. The FEIS predicts that the shoreline will erode well into refuge land over the next 50 years. Although it is important to note that the FEIS relies on average annual shoreline erosion rates to predict future shoreline conditions, the average rate does not take into consideration the high annual variability of erosion and accretion. In other words, within a year a stretch of shoreline could erode 10 feet and accrete 5 feet and would only have an annual shoreline erosion of 5 feet. All Parallel Bridge corridor alternatives will require continual NC 12 maintenance and the FEIS does not adequately evaluate the impacts on the Refuge from conducting these activities within the right-of-way. Furthermore, NCDOT cannot provide adequate assurances that any future activities will indeed take place within the right-of-way. The FEIS does not commit to any particular Parallel Bridge corridor and explicitly states that the Parallel Bridge corridor alternatives can be mixed and matched and that each phase will be re-evaluated prior to construction. This amounts to a blank check and the FEIS fails to evaluate the alternatives adequately. Ultimately, none of these repair, maintenance, or construction methods can occur within the Refuge in a manner that is compatible with the Refuge purpose.

Beyond shoreline erosion, the proposed project area is susceptible to large storm events, which dramatically shape the Refuge. "North Carolina coast is subject to two types of severe windstorms: extra-tropical northeasters and hurricanes. Northeasters, with accompanying high tides and waves, can rapidly erode the shoulders of Oregon Inlet. Northeasters are fairly common in this area, with between 30 and 35 hitting the coast each year. Hurricanes may be responsible for major events, such as inlet openings and closings and gorge shifts . . ." FEIS at 3-55. For the purposes of the compatibility determination, these severe weather events perform important ecological functions and are beneficial to the Refuge. Transportation corridors, however, require protection from severe weather events. In protecting NC 12, the natural processes are stunted and the Refuge cannot fulfill its purpose.

The Pamlico Sound bridge corridor allows the Refuge to manage its lands in such a way as to promote habitat creation and protection for the wildlife in the refuge. None of the Parallel Bridge alternatives allows sufficient flexibility for the Fish and Wildlife Service to manage the Refuge and therefore cannot be compatible.

II. The Department of Transportation Act of 1966 section 4(f) analysis is inadequate.

Section 4(f) of the Department of Transportation Act of 1966 prevents a federal project from using publicly owned land unless "(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use." 49 U.S.C. § 303(c).

When there is no feasible and prudent avoidance alternative, the regulation implementing Section 4(f) states that "the Administration may approve *only* the alternative that . . . [c]auses the least overall harm," using a balancing of seven factors. 23

C.F.R. § 774.3 (c)(1) (emphasis added). The Final Section 4(f) Evaluation contained within the FEIS ("Section 4(f) Evaluation") determined that all project alternatives considered included some use of Section 4(f) property and that no feasible prudent avoidance alternative exists and proceeded to the least overall harm analysis. After purporting to engage in a balancing of the relevant factors, the Section 4(f) Evaluation determined that the Pamlico Sound alternatives would cause fewer impacts to most environmental resources, but that the Phased Approach would cause the "least overall harm." FEIS at 5-44.

The 4(f) Evaluation prepared is insufficient for a number of reasons. First, it erroneously concludes that the Phased Approach will not "use" Refuge lands simply because it will operate within the existing NC 12 easement. Moreover, this erroneous conclusion skews the least overall harm analysis in favor of the Phased Approach, even though the Pamlico Bridge alternative is the sole alternative that bypasses the Refuge. In addition, the analysis of the Phased Approach's impacts on the Refuge is inadequate and does not provide the decision-maker with sufficient information to meaningfully engage in the least overall harm analysis required by Section 4(f).

A. NCDOT erroneously concludes that the Phased Approach will not "use" Refuge lands because it will operate within the existing NC 12 easement.

NCDOT asserts that the Phased Approach "stays completely within the existing easement within the Refuge and, therefore, does not constitute a use of the Refuge under Section 4(f)." FEIS at 5-29. NCDOT also asserts that the construction and maintenance of the Phased Approach will occur completely within the existing right-of-way on the Refuge. "The Phased Approach / Rodanthe Bridge Alternative (Preferred) would not require the use of any property from the Refuge because it would be constructed and maintained entirely within NCDOT's existing easement." FEIS at 5-18. Indeed, NCDOT posits that it will be able to accomplish "all construction activities, such as material/equipment deliveries, excavations, temporary shoring, pile driving, and erection of bridge girders" within the existing right-of-way. FEIS at 2-123. NCDOT fails to explain how it is feasible to construct and maintain an elevated bridge within the existing right-of-way, construct a service road, while maintaining the current NC 12 and cause no further encroachments into the Refuge. While it lists a host of activities that will allegedly occur contemporaneously within the refuge, the Section 4(f) Evaluation falls short of explaining how all construction equipment and activities, including pile driving and shoring, and construction of a temporary road are going to co-exist.

NCDOT's Section 4(f) Evaluation also neglects to address the projected dune building and maintenance activities through 2030 that are integral to the Phased Approach (FEIS at 4-71, 4-72), much less explain how future dune building and maintenance also will stay within the easement and cause no further encroachment onto the Refuge. For example, the FEIS makes reference to smaller dunes of indeterminate size and unquantified impact which will purportedly be built within the easement on the Refuge, but the Section 4(f) Evaluation omits dune maintenance and building from the discussions

of Refuge use and Refuge impacts. Absent credible information to the contrary, it is infeasible that NCDOT will be able to accomplish all of the activities it proposes – new dune construction and maintenance, a temporary road, and constructing a bridge over forty-foot wide – entirely within the its existing easement. Hence, it is foreseeable that the Phased Approach will result in actual use of additional Refuge land.

Assuming NCDOT feasibly could implement the Phased Approach within the bounds of the existing easement, the definition of “use” under 23 C.F.R. § 774.17 is broader than actual use. “Use” is not limited to physical takings and land acquisition, as is suggested by the Section 4(f) Evaluation’s repeated reference to the Phased Alternative staying within the easement and thereby avoiding “use” of the Refuge. Rather, “use” for purposes of Section 4(f) encompasses certain temporary and constructive uses of protected land. See 23 C.F.R. § 774.17. Temporary occupancies are categorically excluded from “use” only if they satisfy all of conditions set forth in the regulation. 23 C.F.R. § 774.13 (d). NCDOT fails to address whether and what kinds of temporary occupancies associated with construction and maintenance under the Phased Approach, particularly those occupancies which may result in permanent adverse impacts on the Refuge, could potentially constitute a temporary occupancy adverse to the statute’s preservation purpose and hence a “use” under Section 4(f) analysis.

Even if NCDOT could carry out the Phased Approach within the existing easement and avoid any actual temporary uses, the Phased Approach’s proximity impacts at a minimum will result in a “constructive use” of the Refuge:

A constructive use occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project’s proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the resource are substantially diminished.

23 C.F.R. § 774.15 (a).

The Section 4(f) Evaluation includes a constructive use section. However, that analysis appears to be an afterthought with a foregone conclusion. Having already concluded that the Preferred Alternative would not “use” Refuge land under the “Use of Section 4(f) Properties” analysis, and having determined the Phased Approach would cause the Least Harm (FEIS at 5-45), the NCDOT then turned to whether the Phased Approach would result in a constructive use of Section 4(f) property. The implementing regulations are clear that any constructive uses should be evaluated in accordance with 23 C.F.R. § 774.03, which encompasses the avoidance alternative / least harm analysis. See 23 C.F.R. § 774.15 (b). Instead, NCDOT divorced the constructive use determination from the broader “use” determination, reaching the conclusion first that its preferred option would not “use” Refuge land and would cause the least overall harm. Not surprisingly, NCDOT determined that the Preferred Alternative would cause “no substantial impairment,” and hence no constructive use of Section 4(f) properties. In so

doing, NCDOT failed to give adequate consideration to the constructive uses of the Refuge caused by the Phased Approach.

More fundamentally, within the constructive use analysis provided, NCDOT consistently reads the constructive use threshold more narrowly than the regulation provides in determining that the various proximity impacts do not amount to 4(f) “uses.” The appropriate guideline for constructive use throughout the regulation is “substantial impairment” of the property. As a literal reading of the phrase “substantial impairment” suggests, “Substantial impairment occurs when the activities, features or attributes of 4(f) property are substantially diminished . . . which means that the value of the resource in terms of its Section 4(f) significance will be *meaningfully reduced* or lost.” Section 4(f) Policy Paper, Office of Planning, Environment and Realty Project Development and Environmental Review, US Department of Transportation – Federal Highway Administration (March 1, 2005) (emphasis added and internal citation omitted). For instance, in discussing potential proximity impacts of the Phased Approach, NCDOT determined that the vibration, visual, access and ecological impacts bridge within the Refuge under the Preferred Alternative will not prevent the Refuge from “continuing to function as a refuge.” FEIS at 5-53. Similarly, in evaluating the impacts on Rodanthe’s Historic District, NCDOT explained that the alteration of access would not detract from its eligibility for inclusion on the National Register of Historic Places. FEIS at 5-57. Proximity impacts need not completely eradicate the functioning of a Refuge or render a historical property ineligible for the listing in order to rise to the level of a constructive use. Total loss of the resource is not required; rather, meaningful reduction of the significance of the resource is sufficient for a proximity impact to amount to a constructive use.

In addition, the Section 4(f)’s Evaluation’s examination of specific proximity impacts as constructive uses fails to adequately assess ecological impacts and access restrictions of the Phased Approach in the Refuge. Ecological intrusion amounts to a constructive use the impact “substantially diminishes the value of wildlife habitat in a wildlife and waterfowl refuge adjacent to the project, substantially interferes with the access to a wildlife and waterfowl refuge when such access is necessary for established wildlife migration or critical life cycle processes, or substantially reduces the wildlife use of a wildlife and waterfowl refuge.” 23 C.F.R. § 774.15 (e)(5). The Section 4(f) Evaluation generally fails to address the long-term ecological proximity impacts from permanently altering the landscape within the Refuge with the introduction of an elevated bridge and hardened piles, which will affect sand and water migration, erosion, and eventually habitat in the ocean hazard zone and offshore currents. Although the Section 4(f) Evaluation acknowledges, for example, the USFWS’s request for additional studies on nighttime lighting effects on sea turtles, the effect on the piping plover as a result of an eventual offshore bridge, and an analysis for impact to habitat as a result of “scour, maintenance, placement of revetment or stabilizing structures and repair of bridge piles,” it fails to assess these potential ecological impacts or anticipate the constructive use of the Refuge likely to result from these types of proximity impacts.

In addition, the Section 4(f) Evaluation completely omits an analysis of ecological impacts on the Refuge stemming from planned “short-term” dune construction and maintenance within the easement during implementation of Phased Approach, which is estimated to be completed by 2030. FEIS at 4-68 to 4-73. In fact, the Section 4(f) Evaluation ignores the dune construction and maintenance planned with the Phased Approach, and submits that the Phased Approach “would allow more natural coastal processes to occur by eliminating artificial dune construction and beach nourishment.” FEIS at 5-52. This conclusion is not only inaccurate but underscores the inadequacy of the ecological impact analysis presented in the Section 4(f) Evaluation. The Section 4(f) Evaluation fails to consider whether and to what degree sand dune construction, maintenance, and the resulting interference with natural coastal processes will impact the Refuge and result in a constructive, if not an actual, use of Refuge lands that about the easement.

The Section 4(f) Evaluation similarly fails to adequately assess as a potential constructive use of the Refuge the impacts from significantly restricting access. The Section 4(f) analysis concedes, for example, that the Phased Approach would “limit access to the Refuge to two locations” (FEIS at 5-51) and would cause loss of access “to the Refuge Visitor Center, headquarters, and North Pond Trail with the Preferred Alternative.” FEIS at 5-30. A restriction in access which substantially diminishes the utility of a significant publicly owned land is a constructive use. However, NCDOT dismissed this proximity impact because the restriction in access “would not eliminate the Refuge’s ability to function.” FEIS at 5-51. NCDOT misstates the applicable standard and fails to adequately assess the potential constructive use caused by the Phased Approach, which will cut off most access to the Refuge.

Thus, NCDOT’s determination that the Phased Approach will not “use” Refuge lands simply because it purportedly will operate within the existing NC 12 easement is based upon an incomplete analysis of actual or constructive uses of the Refuge and misapplication of the relevant standards. NCDOT neglects to explain how it is even feasible to accomplish implementation of a project of this magnitude within the confines of a 100-foot easement, and it essentially overlooks the significant proximity impacts to the adjacent Refuge and the resulting substantial impairment to the Refuge.

Finally, the Section 4(f) Evaluation fails to acknowledge or assess the use of the Refuge that will result from retaining the terminal groin, which does not lie within the existing NC 12 easement. The retention of the terminal groin is an essential part of the Phased Approach that will require NCDOT to secure a new permit to retain it in its existing location on the Refuge, as discussed in section VI, *infra*. Although the Section 4(f) Evaluation mentions the terminal groin as it relates to the Coast Guard Station, concluding that the Pamlico Sound alternatives will adversely affect the Coast Guard Station by reason of removal of the terminal groin (FEIS at 5-20), the Evaluation does not analyze the extent of use and environmental impacts on the Refuge posed by permitting and retaining the terminal groin.

B. NCDOT’s erroneous determination that the Phased Approach will not “use” the Refuge impermissibly skews the evaluation of the factors in the “least overall harm” analysis.

The Least Harm Analysis and balancing of factors³ presented in the Section 4(f) Evaluation analysis relies upon the assumption that the Phased Approach will not result in a use of the Refuge. In evaluating the first two factors, the ability to mitigate adverse impacts and the relative severity of remaining harm, the Section 4(f) Evaluation explicitly relies upon the assumption that the Phased Approach will not use Refuge lands. According to the Section 4(f) Evaluation, “[s]ince the Pamlico Sound Bridge Corridor alternatives and Phased Approach/Rodanthe Bridge Alternative (Preferred) are the only alternatives that avoid permanently incorporating land from the Refuge, the FHWA and NCDOT consider them to be substantially equal as the best options in terms of use of Refuge lands under the requirements of Section 4(f).” FEIS at 5-30. In the conclusion of the discussion of the first two factors, the Section 4(f) Evaluation again reiterates its reliance on the assumption that the Phased Approach will not use Refuge lands, stating: “The Phased Approach/Rodanthe Bridge Alternative (Preferred) would be confined to the existing easement, reducing its potential impact by not using Refuge lands, providing for fishing access, minimizing protected species impacts, minimizing direct impacts to habitat, and allowing for shoreline erosion.” FEIS at 5-35.

In considering the third factor, the relative significance of each Section 4(f) property, the Section 4(f) Evaluation similarly relies upon the assumption that the Phased Approach will not use the Refuge. The Evaluation acknowledges that the Refuge is “the most significant resource in the project area.” (FEIS at 5-44) and then notes that only the Phased Approach and Pamlico Sound alternatives “completely avoid a use of the Refuge.” FEIS at 5-38. While the overall least harm analysis eventually concludes that as between these alternatives, the Pamlico Sound alternatives “would cause fewer impacts to most environmental resources, including the Refuge which it avoids completely,” (FEIS at 5-44), the entire least harm analysis is colored by the incorrect assumption that the Phased Approach will not “use” the Refuge and is somehow on relative near or equal footing in with the only options that truly avoid the Refuge, the Pamlico Sound alternatives.

³ The least overall harm determination requires a balance of the following factors:

- (i) The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- (ii) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- (iii) The relative significance of each Section 4(f) property;
- (iv) The views of the official(s) with jurisdiction over each Section 4(f) property;
- (v) The degree to which each alternative meets the purpose and need for the project;
- (vi) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- (vii) Substantial differences in costs among the alternatives.

23 C.F.R. § 774.13 (c)(1).

C. Section 4(f) Evaluation of the Phased Approach's impacts does not provide the decisionmaker with sufficient information to engage in a meaningful "least overall harm" analysis required by Section 4(f).

The least overall harm analysis suffers from the same deficiencies in the evaluation of ecological impacts already noted in use analysis. In the absence of information to accurately gauge the severity of the harm caused by the Phased Approach and the ability to mitigate those impacts, NCDOT cannot meaningfully evaluate the Phased Approach alongside the other alternatives.

The Section 4(f) Evaluation fails to adequately assess the long-term ecological impacts which will result from permanently altering the landscape within the Refuge with the introduction of an elevated bridge and supporting structures. The Section 4(f) Evaluation does not provide a complete analysis of impacts on wildlife habitat caused by erosion, scour, sand migration, and maintenance and repair of the bridge. Furthermore, the Section 4(f) Evaluation and the least overall harm analysis omits any discussion of the potential environmental impacts from dune construction and maintenance planned over the course of the next two decades as part of the implementation of the Phased Approach. Having omitted this information, the least overall harm analysis reaches the untenable conclusion that the Phased Approach is among alternatives that allows for natural shoreline movement which also "would contribute to naturalizing this area of the Outer Banks, and benefiting wildlife in the Refuge." This conclusion highlights the hazard of undertaking an analysis with incomplete information. In addition there is no certainty in the Phased Approach with regard to the implementation of Phases II, III, and IV, including when and whether these phases will be implemented. The Section 4(f) Evaluation fails to address the impact of incomplete implementation of the Phased Approach on the Refuge and the potential impact of ongoing sand dune maintenance, potentially into perpetuity.

For all of these reasons, the Section 4(f) Evaluation submitted within the FEIS is inadequate and the conclusion reached therein is unfounded.

III. The FEIS does not adequately assess the environmental impacts from the Phased Approach.

A. To comply with NEPA, the FEIS must thoroughly and objectively analyze the environmental consequences of the alternatives.

Under federal law, environmental impact statements serve two key purposes. The first is to require federal agencies thoroughly and objectively to investigate, evaluate and disclose environmental consequences associated with any major federal action in sufficient detail to assist the agencies in determining whether and how to proceed with a proposed action. See *Nar'l Audubon Soc'y v. Dep't of the Navy*, 422 F.3d 174, 184 (4th Cir. 2005). The second is to provide the public with a full and accurate disclosure of the likely environmental impacts of a proposed action. In order to fulfill these purposes, the FEIS must describe the purpose and need for the proposed action, analyze the direct and

secondary environmental and economic impacts of a range of alternative means to fulfilling that purpose, and, if mitigation is proposed, analyze the effectiveness of the proposed mitigation. See 40 C.F.R. § 1502.1 (2005).

B. The Phased Approach environmental impacts analysis is inadequate.

Pursuant to NEPA, an Environmental Impact Statement ("EIS") is required to satisfy a number of statutory and regulatory requirements. It must consider all reasonably foreseeable significant adverse impacts of the proposed action and all reasonable alternatives to the proposed action. See 40 C.F.R. § 1502.22; 42 U.S.C. § 4332(C)(iii), (E); 40 C.F.R. § 1502.1. It must consider the cumulative, indirect and secondary impacts of the proposed action, including reasonably foreseeable expansions in the scope of the proposed action. 40 C.F.R. § 1502.16. All cooperating agencies have a mandatory duty to consider the environmental impacts of other "past, present, and reasonably foreseeable future actions." 40 C.F.R. § 1508.7. These regulations ensure that indirect, connected, cumulative and similar actions are properly considered in an EIS.

The Phased Approach will have significant adverse impacts on the Refuge that the FEIS fails to evaluate adequately. All Parallel Bridge alternatives, including the Phased Approach, will be affected by shoreline erosion, inlet formation, and ocean overwash. The shoreline erosion and inlet formation evaluation is particularly pertinent in evaluating the Phased Approach. Because these events are episodic by nature, it is impossible to predict precisely when and where an inlet might form or erosion imminently threaten NC 12. Although it is impossible to predict dates and times, past experience and current modeling predict that NC 12 is subject to perpetual threats. The schedule for the "phased" bridges may or may not coincide with the natural movement of Hatteras Island or with predicted inlet formations. A bridge might be under construction when an inlet forms underneath it or an inlet may form prior to construction even beginning.

The FEIS fails to analyze the reasonably foreseeable impacts to the Refuge from temporary or "emergency" measures taken to protect a phased bridge under construction or an area that is not slated for construction until decades after the threat. These temporary or emergency measures including, for example, sand bags, road relocation, beach nourishment, dune building (and rebuilding), all have permanent and adverse ecological impacts that severely affect biota, geology, and overall ecology of the Refuge. The FEIS without support states that these activities will take place within the existing right-of-way, but fails to recognize that these actions will still have an impact on the Refuge. The FEIS fails to provide adequate analysis of these environmental impacts of these activities.

Finally, the final outcome of the Phased Approach is a bridge in the Atlantic Ocean. The placement of a bridge of this length and size on a dynamic shoreline raises many concerns. How will the bridge withstand the natural forces, including increased impacts from wind, in a manner that provides a safe and reliable transportation corridor? How will the presence of a bridge parallel to the shore impact long shore sediment transport, erosion rates, and inlet formation? The FEIS acknowledges that the bridge and

pile placement could have detrimental effects “including changes to water flow[,] sediment grain size[,] and topography.” FEIS at 4-107. The bridge and piles may increase shoreline erosion and create hot spots in addition to the five currently identified. The bridge and piles will affect waves and longshore sediment transport. All of these effects will prevent Hatteras Island from functioning as a natural barrier island system and will adversely impact wildlife and wildlife habitat on the Refuge. The FEIS relies on a single study of a pier and analogizes to the ocean-side bridge that is parallel to the shore. This analysis lacks substance and is inadequate. Furthermore, the FEIS erroneously asserts without analysis that the final Phased Approach corridor “would allow long-term natural shoreline movement.” FEIS at xxv. Contradicting itself, the FEIS then states that a bridge in the ocean “would adversely impact the shoreline. . . . the outcome of coastal processes along the beach and wildlife, including protected species that use beach habitat.” FEIS at xxviii. The FEIS fails to take a “hard look” at the adverse impacts from placing a transportation corridor within such a dynamic system. The Phased Approach instead avoids a hard look by proposing a monitoring program and by stating without evaluating that the future phases of the Phased Approach may incorporate any portion of any of the Parallel Bridge alternatives.

C. The FEIS fails to identify a preferred alternative and instead writes a blank check without adequate review of all the foreseeable environmental impacts.

The FEIS’s proposed “mix and match” approach cannot be supported by the NEPA analysis. The “mix and match” approach assumes that any and every combination of impacts has been adequately analyzed. Unfortunately, this approach fails to recognize that each alternative—bridges, nourishment, and dune building—will have different environmental impacts (direct, indirect, and cumulative) depending on the magnitude of the alternative (e.g. the total miles and location of nourishment), the sequence of chosen alternatives, the timing relative to shoreline changing events, and the scope and location of the initiating event (e.g. location and size of a breach or punctuated shoreline erosion). The FEIS inadequately evaluate the reasonably foreseeable environmental impacts and cannot support a “mix and match” approach. The FEIS cannot avoid the analysis by simply stating that these actions will be conducted within the existing right-of-way.

D. The FEIS fails to evaluate the ecological needs of the Refuge and the manner in which the Phased Approach interferes with the beneficial processes of this dynamic shoreline.

The FEIS inadequately analyzes the environmental impacts related to shoreline erosion and new inlet formation; endangered and threatened species; and impacts to wetlands. NCDOT mistakenly assumes in its analysis that natural shoreline movement is the equivalent of natural barrier island movement. Rather than allow the barrier island to move in a natural manner that promotes ecological sustainability of the system, wildlife habitat, and natural coastal processes, the Phased Approach will eliminate natural barrier island processes for both the short and long-term. The Phased Approach will not preserve the natural barrier island system or minimize impacts to Hatteras Island or maintain access

in a manner that has minimal impacts on the environment. FEIS at 4-167. Because it fails to analyze these beneficial processes of the environment within the project area, the Phased Approach analysis is inadequate.

1. Shoreline erosion, inlet formation, and ocean overwash

The proposed project is located in an extremely dynamic coastal area, which includes an active tidal inlet (Oregon Inlet) and a coast subject to significant shoreline erosion and ocean overwash. Within the project area, NC 12 is subject to perpetual threats from the shoreline erosion and ocean overwash and because of the dynamic nature of the system is subject to regular maintenance. The FEIS does not adequately analyze the effects of shoreline erosion, inlet creation, and ocean overwash on the proposed project area. Rather, the FEIS neglects the beneficial impacts to the environment, as well as the ways in which these processes make the Phased Approach an inappropriate solution.

We have attached a paper entitled, “North Carolina’s Coasts in Crisis: A Vision for the Future,” by S.R. Riggs, et al., which addresses the processes of barrier island formation, shoreline erosion, inlet creation, ocean overwash, climate change, and sea level rise, their beneficial effects on the environment, and their detrimental effects on infrastructure constructed on dynamic barrier islands. The paper is also available at: <http://www.coastal.geology.ecu.edu/NCCOHAZ/downloads/Coasts%20in%20Crisis%20Booklet.pdf>.

The authors have also penned a more detailed report entitled “NC Coasts in Crisis: A Case Study,” which is scheduled for publication by the U.S. Geological Survey. One of the authors, Dr. Stan Riggs, has written a third paper entitled, “Eye of a Human Hurricane: Pea Island, Oregon Inlet, and Bodie Island, Northern Outer Banks, NC,” which is scheduled to be published as part of a book by the Geological Society of America. Both papers offer greater technical and scientific detail on the inappropriateness of the Phased Approach in light of dynamic barrier island geography, climate change, and the predicted associated sea level rise. These two papers are scheduled for publication in 2009, and we ask that you refrain from issuing any Record of Decision until you have had a chance to receive and review them.

a. Shoreline erosion

The FEIS, by utilizing historic annual average erosion rates, may underestimate the amount of erosion that will occur and the projected shoreline movement through 2060 may be substantially conservative. In addition, sea level rise is also predicted to increase erosion rates. Finally, by utilizing an average erosion rate as a prediction tool for the shoreline, the FEIS fails to analyze adequately the importance of large or severe storm events in shaping the proposed project area. Although the effect of Hurricane Katrina and Hurricane Gustave on Gulf of Mexico barrier islands is still being evaluated, there is no doubt that major weather events shape the barrier islands. Historically, major storm events have a dramatic effect on the project area—creating inlets, increasing erosion. By failing to account for the impact from severe weather events, the FEIS arbitrarily

discounts the impacts of severe weather. Federal regulations require, however, that environmental impact statements analyze reasonably foreseeable catastrophic events, "even if their probability of occurrence is low." 40 C.F.R. § 1502.22 (2005).

b. Inlet formation

Inlets are very high energy and difficult to predict. As the FEIS accurately summarizes, experts have identified five potential inlet locations along Pea Island. The FEIS ignores, however, the beneficial impacts to the environment of natural inlet creation, migration, and closure. For example, during severe weather events, inlets act as release valves, allowing storm surge that has entered the sound to exit. Inlets also help to protect shallow sand shoals.

c. Ocean overwash

Ocean overwash is a natural and essential part of barrier island dynamics. Overwash moves sand to the sound side of barrier islands. Over long time scales, these processes enable barrier islands to respond to sea level rise by moving the island landward. On shorter, multi-year time scales, overwash processes deposit sand and cause landform changes, both of which are needed to maintain a healthy ecosystem for coastal plant and animal species. Because ocean overwash is detrimental to the transportation corridor, engineering practices such as artificial dune building, sand bags, and road scraping are used to prevent or respond to ocean overwash. This deprives barrier islands of the necessary resilience to respond to sea level rise and prevents habitat creation. The FEIS does not analyze the environmental benefits from removing the transportation corridor and allowing ocean overwash.

2. Endangered and threatened species

The FEIS states that a parallel bridge corridor is likely to adversely affect the endangered leatherback sea turtle and piping plover and the threatened green sea turtle and loggerhead sea turtle. FEIS at 4-120, 4-122 to 123, 4-124, 4-125.

To address the impacts on these species, NCDOT has agreed to take reasonable and prudent measures as authorized in the *Biological and Conference Opinions* (USFWS 2008). While the FEIS states that a parallel bridge corridor is likely to adversely affect these species, the Pamlico Sound Bridge alternative is not likely to adversely affect any federally protected species. FEIS at 4-138.

The reasonable and prudent measures are not adequate to prevent impacts of a long-term construction schedule, as is proposed in the Phased Approach, required long-term nourishment, or any combination thereof. Furthermore, as discussed elsewhere, the Phased Approach impermissibly interferes with the Fish and Wildlife Service's ability to manage the Refuge for the benefit of these species. These measures are designed to offset immediate impacts and are wholly inadequate to address the substantive impacts from the Phased Approach. It is of particular concern that the FEIS proposes any mix and match of

short bridge construction, beach renourishment, and dune building. Each of these will have specific impacts on protected species, such as the piping plover and sea turtles, as well as impacts to the natural biota. Moreover, overwash is part of ecologically important inlet creation, migration and closure and over time, helps to create new moist sand intertidal feeding areas on the sound side. Without overwash, erosion continues to threaten sound side wetlands. Limited overwash leads to loss of piping plover sound side feeding habitat and nesting habitat and prevents natural maintenance of existing habitat by increasing vegetative succession. Furthermore, the Phased Approach may result in a steeper beach profile, reducing the available intertidal area.

3. Wetlands

The various bridge alternatives assessed in the FEIS all impact wetlands and will require authorization under Section 404 of the Clean Water Act. The Pamlico Sound wetlands (depending on the terminus) including only .01 acres of CAMA wetlands. FEIS at 4-94. Of the alternatives assessed, the Parallel bridge/road north/bridge south alternative impacts by far the largest amount of wetlands: 78.2 acres of wetlands including 11.8 acres of CAMA wetlands. FEIS at 4-96. The parallel bridge/all bridge alternative impacts the second largest amount of wetlands: 12.3 acres of wetlands including 2.2 acres of CAMA wetlands. Id. The parallel bridge/nourishment alternative would impact an extensive but unquantified amount of wetlands and waters. While the FEIS states that this alternative would impact 4.3 acres of wetlands including .3 acres of CAMA wetlands, this estimate does not include extensive filling of near-shore waters associated with the required nourishment. Id. The FEIS states that 6.3 miles of beach will be nourished every four years. FEIS at 2-69.

The Phased Approach would impact 3.1 acres of wetlands, including 0.3 acres of CAMA coastal wetlands. FEIS at 4-96. This lower wetland impact appears to be based on the assumption that sand movement will naturally fill wetlands prior to implementing "phases" that include wetlands that currently exist. FEIS at 4-97. This assumption fails to consider the impacts from construction of the phases and the timing of the phases. Construction impacts from the Phased Approach include constructing a service road that will be in service for decades. Also, when and where wetlands are naturally filled may or may not be within the same time frame as construction of the Phased Approach. Therefore, the FEIS may underestimate the wetland impacts by assuming that the Phased Approach will occur in coordination with the natural erosion and overwash cycle. Furthermore, if overwash occurs before a planned construction phase, the NC DOT will push back any sand to recreate dunes and to stabilize NC 12. This action prevents the natural filling of wetlands in the right of way, making it more likely that the actual construction of the Phased Approach will require the fill of jurisdictional wetlands. Again, these assumptions may underestimate the actual impact to wetlands from the Phased Approach.

These impacts must be assessed and considered in the 404 permit review as a part of the Phased Approach per 33 C.F.R. § 325.1 (d)(2):

that serve the basic project purpose. If such an alternative exists . . . the CWA compels that the alternative be considered and selected unless proven impracticable.” *Utahns for Better Transp. v. U.S. Dept. of Transp.*, 305 F.3d 1152, 1188-1189 (10th Cir. 2002). Furthermore, the total temporary and permanent biotic impacts (which include wetland impacts) from construction of either of the phased approaches are not insignificant (48.5 acres temporary biotic impact, FEIS at 4-91). The Pamlico Sound Bridge is a practicable alternative with the least impact on aquatic ecosystems and wetlands, and is the only alternative assessed in the FEIS that may be fully permitted under Section 404.

IV. The Phased Approach fails to address public access to the Refuge.

The FEIS identifies continued access to the Refuge as an area of concern. We support continued public access to the Refuge, as long as access is compatible with Refuge’s mission. Access is not contingent upon maintenance of NC 12 and many public lands provide for public access in ways that are compatible with the nature of the public lands and associated resources. We strongly recommend that access be accommodated within a reasonable refuge management plan.

The Phased Approach, however, will not provide compatible access and will severely limit or eliminate fishing, surfing, birding, and other resource dependent activities. Because the Phased Approach eliminates Refuge resources that create the need for adequate access, it is not a viable alternative.

V. The Phased Approach may not be able to be funded or comply with state or federal legal requirements.

The FEIS fails to identify a preferred alternative. Instead, NCDOT proposes to move forward with an initial phase—build a bridge substantially similar to the existing Bonner Bridge—and then monitor, evaluate, and implement additional phases on an indeterminate timeline. The initial phase standing alone cannot be legally permitted because it violates federal and state laws including NEPA and the National Wildlife Refuge Improvement Act. NCDOT and FHWA attempt to evade this legal hurdle by proposing additional phases, but fail to provide adequate specificity to analyze the alternatives or adequate legal assurances that any additional phases could be built. The FEIS explicitly states that the construction of future phases is dependent on funding, results of a shoreline monitoring program (currently undeveloped), and whether future phases can be permitted pursuant to federal and state law. Thus, future phases could be dramatically different or may not occur at all. Because this is a *carte blanche* approach, the NEPA analysis is inadequate and the Phased Approach does not meet legal requirements.

The FEIS and the merger process acknowledge the legal uncertainties surrounding future phases. NCDOT’s summary of the merger process which identified phase I of the Phased Approach as the least environmentally damaging practical alternative state, “[t]he agencies concur, based on information available today, they cannot conclusively say that permits or approvals will or will not be granted for these additional phases.” The FEIS

All activities which the applicant plans to undertake which are reasonably related to the same project and for which a DA permit would be required should be included in the same permit application. District engineers should reject, as incomplete, any permit application which fails to comply with this requirement. For example, a permit application for a marina will include dredging required for access as well as any fill associate with construction of the marina. 33 C.F.R. § 325.1 (d)(2).

The FEIS summarily dismisses these impacts and fails to evaluate the total wetland impacts from the Phased Approach.

Section 404(a) of the CWA, 33 U.S.C. § 1344(a), authorizes the Secretary of the Army, acting through the USACE, to issue permits for the discharge of dredged or fill materials into wetlands or other waters. Section 404(b)(1) of the CWA, 33 U.S.C. § 1344(b)(1), directs the Environmental Protection Agency to issue guidelines (“404(b)(1) Guidelines”) defining the circumstances in which dredged or fill material may be discharged into wetlands or other waters. The USACE must deny applications for section 404 permits if the discharge that would be authorized by the permit would not comply with EPA’s 404(b)(1) Guidelines. 33 C.F.R. § 320.4(a). The 404(b)(1) Guidelines prohibit issuance of a permit where:

- (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences; or
- (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem . . . ; or
- (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem; or
- (iv) There does not exist sufficient information to make a reasonable judgment as to whether the proposed discharge will comply with these Guidelines.

40 C.F.R. §230.12(a)(3). An alternative to discharge to a wetland “is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.” 40 C.F.R. § 230.10(a)(2). Where a discharge is proposed for a wetland or other special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge to the wetland “are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.” 40 C.F.R. § 230.10(a)(3). “[T]he applicant and the [Corps] are obligated to determine the feasibility of the least environmentally damaging alternatives

also admits the permitting difficulties for additional phases (“Phases II to IV present **substantial** challenges to obtaining permit approvals.”). By choosing the Phased Approach, NCDOT and FHWA have locked in place a transportation corridor that will need significant management for the life of the project and this management may not be permitted pursuant to federal or state law. To evade this legal box, NCDOT simply states that additional phases may or may not be built. This approach, however, ignores the natural environment of Hatteras Island—once phase I is built, NCDOT must continue the expensive and uncertain maintenance of NC 12. Whatever future measures are selected, NCDOT will be left with only options that either cannot meet applicable legal requirements or those that systematically destroy the Refuge.

VI. Because the terminal groin is an essential component of the Phased Approach, the effects from its removal or retention must be addressed in the FEIS and a compatibility determination is required.

The current permit for the terminal groin is explicit that it is only valid for the protection of the “existing Herbert C. Bonner bridge” and the permit terminates once the groin is no longer used for that purpose. In anticipation of replacing Bonner Bridge, NCDOT has two options: (1) comply with paragraph (17) of the permit, which requires the removal of the terminal groin and restore the land to its original condition (2) or apply for a new permit to maintain the terminal groin in its existing location. In order to comply with federal law, a full NEPA analysis and a compatibility determination are required for either option. The FEIS states the terminal groin is an essential part of the Phased Approach and the Parallel Bridge but fails completely to assess the environmental impacts of retaining the groin.

A. The FEIS is inadequate because the terminal groin is an essential part of the Phased Approach and the effects from either retaining it or removing it must be analyzed.

The FEIS states that the terminal groin will be required to be retained as part of the Phased Approach. FEIS at 2-147. Because the terminal groin is an essential component of the Phased Approach, the FEIS must analyze the impacts from either retention or removal of the terminal groin. The CEQ Guidelines are clear: “proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.” 40 C.F.R. § 1502.4(a). Circumstances in which actions should be considered and evaluated together include:

- the situation in which one action “automatically trigger[s]” another action,
- the situation in which one action “cannot or will not proceed unless” another action is “taken previously or simultaneously,”
- the situation in which two actions “are interdependent parts of a large action,” and

- the situation in which two actions have “cumulatively significant impacts.”⁴

40 C.F.R. § 1508.25(a).

Breaking such actions “into small component parts” to avoid reviewing them together “is to engage in illegal ‘segmentation.’” *New River Valley Greens v. U.S.D.O.T.*, No. 97-1978, 1998 U.S. App. LEXIS 22127, **8-9 (4th Cir. Sep. 10, 1998) (quoting 40 C.F.R. 1508.27(b)(7)). A hallmark of segmentation is an initial proposed action involving “such a large and irrevocable commitment of resources that it may virtually force a larger or related project to go forward notwithstanding the environmental consequences.”

Id. Building the Parallel Bridge is one such “irretrievable commitment of resources” that will inevitably force later projects, even though their environmental effects are not analyzed in the FEIS. These later projects include the re-permitting of the terminal groin, as well as beach nourishment and relocation of NC 12 outside of the easement in response to storm events, if later phases are not funded and cannot be implemented, as appears to be likely.

Each of the four bullet-pointed criteria above aptly describes the relationship of the construction of the replacement bridge (Phase I) to subsequent phases (the re-permitting of the groin as well as either Phases II through IV or, if the state fails to be able to fund them, then beach nourishment and relocation of sections of NC 12 as necessary in response to storm events and erosion). Accordingly, the failure to consider the effects of all the phases or projects together in one impact statement amounts to improper segmentation.

The retention or removal of the groin will “significantly affect” the Refuge and the FEIS must address those effects. “Significantly” includes an evaluation of the context of the impact and the intensity of the impact. The intensity of the impact includes an analysis of such criteria as the unique geography of the site, the level of controversy surrounding the impacts, the uncertainty of the risks associated with the impact, whether the impact is related to other actions, and adverse effects on endangered or threatened species and associated habitat. See 40 C.F.R. §1508.27. The terminal groin significantly impacts the Refuge in many ways, including stopping the southward migration of the northern portion of Pea Island, producing sand accretion at the north end, and affecting down drift erosion along the Refuge. Not only are there important issues relating to groin induced erosion and whether the existing monitoring and mitigation requirements adequately address sand quantity issues, but there also are important questions regarding the quality and compatibility of sand that is placed on refuge beaches as part of a replenishment project. These direct effects impact the quantity and quality of habitat

⁴ An action will have a “cumulatively significant impact” if, although its individual effect is minor, its effect is “collectively significant” when considered together with “*other past, present, and reasonably foreseeable future actions* regardless of what agency or person undertakes such action.” *Western N.C. Alliance v. N.C. D.O.T.*, 312 F. Supp. 2d 765, 771 (E.D.N.C. 2003) (emphasis in original).

available within the Refuge. Any action, either removing the terminal groin or issuing a new permit, will require an analysis of the impacts to the quantity and quality of the habitat for the migratory birds, sea turtles, and other wildlife for which the Refuge was established.

Furthermore, the NCDOT must address the impacts from the connected project of replacing Bonner Bridge. NEPA requires considering the continued impacts from the terminal groin and any action that "cannot or will not proceed unless other actions are taken previously or simultaneously . . . [or] are interdependent parts of a larger action and depend on the larger action for their justification." 40 C.F.R. § 1508.25 (a)(1). Likewise, an impact of the Phased Approach is the artificial dune that runs the length of Pea Island, with its adverse environmental impacts, will continue to exist until the roadway is replaced in phases by a bridge on pilings as discussed in the FEIS. The terminal groin is an essential component in the replacement of Bonner Bridge and impacts from the terminal groin are intertwined with impacts related to the Phased Approach or other Parallel approach alternatives.

Indeed, we understand that the FHWA agrees that the terminal groin is an essential part of the Phased Approach Parallel Bridge and will not let federal funding for any part of the project until a new permit is issued to retain the groin. If this is true, however, FHWA has apparently been persuaded by NCDOT to segment the NEPA analysis for the groin retention. If so, FHWA should reconsider this position as it constitutes an acknowledged and unlawful segmentation of the NEPA analysis.

B. The Section 4(f) Evaluation is incomplete because it fails to analyze the Refuge use and impacts resulting from retention of the terminal groin under the Phased Approach alternative.

As discussed in section II(A), *supra*, the Section 4(f) Evaluation does not address the inevitable use of the Refuge that will result from retaining the terminal groin, which does not lie within the existing NC 12 easement. The encroachment and adverse impacts to the Refuge from the perpetual existence and maintenance of the terminal groin cannot simply be ignored in the Section 4(f) analysis. Failure to address the use of the Refuge resulting from retention of the terminal groin, which is integral to the Phased Approach, further underscores the inadequacy of the Section 4(f) Evaluation and the indefensibility of the conclusion reached therein, namely, that the Phased Approach is the least overall harm alternative.

C. FWS must complete a compatibility determination for either retaining or removing the terminal groin and it is unlikely that retaining the terminal groin could be found to be compatible.

As discussed in more detail above, federal regulations related to wildlife refuges have changed since the terminal groin was initially permitted. Congress passed the National Wildlife Refuge Improvement Act (Act) in 1997. The Act prohibits permitting a "new use of a refuge or expanding, renew[ing], or extend[ing] an existing use of a refuge," without a compatibility determination. 16 U.S.C. § 668ec. Because permitting

the terminal groin is a part of the proposed use of the Refuge for a bridge built in phases to eventually replace most of NC 12 through the Refuge, the compatibility determination must assess both the permitting of the terminal groin and the phased bridge construction through the Refuge. In order for the terminal groin to be retained, the compatibility determination must conclude that the long-term impacts associated with the terminal groin and the connected replacement of the Bonner Bridge "will not materially interfere with or detract from the fulfillment of the mission of the System or the purpose of the refuge." 16 U.S.C. § 668ec. The compatibility determination must be issued before a new permit and must fully consider the impact on wildlife habitat, including the recently designated piping plover critical habitat.

Retention of the terminal groin will also result in adverse modification of designated piping plover critical habitat. The existing terminal groin occupies intertidal habitat that is important to wintering piping plovers. Removal of the groin as required by the permit if no longer necessary to protect the existing Bonner Bridge will make this habitat available. Retention of the groin to protect a new Parallel Bridge will result in adverse modification of critical habitat. In addition, retention of the terminal groin will interfere with natural inlet processes that create habitat conditions that are beneficial to piping plovers.

We recognize the need to replace Bonner Bridge and support construction of a new bridge that provides dependable transportation to Hatteras Island, is environmentally sound, and is economically reasonable. We support the Pamlico Sound Bridge corridor alternative and believe that it satisfies these objectives.

Thank you for your consideration of our comments.


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NORTH CAROLINA'S COASTS IN CRISIS: A VISION FOR THE FUTURE



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NORTH CAROLINA'S COASTS IN CRISIS: A VISION FOR THE FUTURE

A White Paper by

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TABLE OF CONTENTS

Executive Summary	1
The Coastal Dilemma	2
North Carolina's Coastal System	3
Regional Setting	3
Estuaries and Barrier Islands	4
How The Coastal System Works	5
Formation of the Modern Coastal System	5
Nature of the Modern Coastal System	7
Sediment Supply for Coastal Barriers	7
Complex Barrier Islands—Welding Pieces Together	8
Simple Barrier Islands—Inlet and Overwash Dynamics	8
History and Role of Storms	10
Why Are North Carolina's Coasts In Crisis?	11
What Is At Risk?	13
Human Responses To Changing Coastal Systems	14
Infrastructure Construction	14
Roads and Bridges	14
Constructed Barrier Dune Ridges	15
Beach and Inlet Management	16
Shoreline Hardening	16
Sand Bag Hardening	17
Beach Nourishment	17
Inlet Openings and Closings	18
Relocation	20
Adaptation Alternatives	21
A Vision for the Future	21
Northeastern North Carolina: "A String of Pearls"	21
Southeastern North Carolina: "Islands of Opportunity"	23
A Concluding Thought	24
Acknowledgements	24
References Cited	25
Further Reading	26

EXECUTIVE SUMMARY

The coastal zone of North Carolina that we know today is not permanent. It has evolved throughout its history. These changes, which can be both imperceptibly gradual or sudden and violent, continue today and will do so into the future. Humans are moving into this environment in ever-increasing numbers accompanied by towns, industry, tourism, and the supporting infrastructure of services such as roads, bridges, water, power, and waste disposal. The changing coastal system is not fragile. It is the fixed human infrastructure that can easily be destroyed by natural processes. This is the coastal conflict that we must examine closely and then manage. The climate is changing; tropical storms and hurricanes will continue to strike our coast as will nor'easters, and sea level is rising at an increasingly rapid rate. We must accept these changes as inevitable but we seem reluctant to do so. This is why our coasts are in crisis.

The coastal system of North Carolina is incredibly varied, with rivers, swamps, estuaries, marshes, barrier islands, inlets, beaches and offshore shoals and rock. In the south, barrier islands are short, with many inlets, and are close to the mainland. In the north, the barrier islands are long and narrow, with few inlets, and they extend out into the Atlantic Ocean leaving an immense estuarine system of sounds behind them. This spatial variety of our coasts means that coastal management issues vary considerably from place to place.

Tide gauge and historical data demonstrate that relative sea level is currently rising in northeastern North Carolina at a rate of 16 to 18 inches per century. One hundred years ago, the rate was 7 inches per century and 200 years ago it was only 3 inches per century. The rate will likely continue to increase into the future as climate continues to warm. The warming climate might also spawn more frequent and intense hurricanes. When so much of down-east North Carolina is just a foot or two above current sea level, we must take note. The future will likely see accelerated rates of coastal erosion and associated loss of urban infrastructure, agricultural land, wetlands, and segments of barrier islands. In addition, there will likely be increased economic losses due to floods, droughts and storms with a potentially serious impact on the state's coastal tourism and recreation

economy— unless we accept and plan for environmental change, and adapt.

We know that rising sea level, resulting from melting of the last Ice Age's glaciers and ice sheets, began to affect the area of our modern coastal zone about 12,000 years ago when rising ocean level flooded into the Roanoke River valley and gave birth to Albemarle Sound. The Neuse and Tar rivers to the south and their tributary, Pamlico Creek, began the transition to estuaries approximately 7,000 years ago. The barrier island system began to form about 3,500 years ago in a position very close to its current location. Since that time, development of barriers has been influenced by opening and closing of inlets and collapse and reformation of portions of the Outer Banks, occasionally exposing southern Pamlico Sound to oceanic influences. In the one hundred years or so before the first Europeans arrived in 1584, the barrier islands took a form similar to that of today.

During the 20th century, human development and engineering have become a dominant force in disrupting natural coastal processes and modifying coastal evolution. Roads and bridges have been built on mobile barrier islands. Barrier dune-ridges were constructed to protect the roads but, in doing so, have curtailed the natural processes of barrier island growth and migration. Jetties have been built to stabilize the location of inlets but, in doing so, have disrupted the natural process of along-shore sediment transport. Resulting coastal erosion has been addressed by expensive beach nourishment programs, but they have not been particularly successful; they must be repeated indefinitely, and suitable sand is hard to find. Sand dredged from navigation channels is often dumped too far offshore for natural beach renourishment to occur. Stabilization structures, such as jetties, groins, bulkheads, and sandbags demonstrably cause erosion problems. Inlets open naturally, and we close them almost immediately before they can do their work of building island width by adding sand to the barrier island system. Wetlands are filled, bulkheads are constructed, and ecosystems disrupted. Storm-water is increasingly hard to manage as we pave more of the land's surface, compromising water quality in the rivers and sounds.

THE COASTAL DILEMMA

What are our alternatives? We must understand how the natural coastal system works and accept that reality. We must consider building temporary bridges across new inlets or wash of closing them. We must consider letting oceanic overwash build barrier island elevation and width, and install temporary roads to allow access. We must consider the challenges of coastal change to be opportunities. We can then determine the best ways to sustain and grow our coastal economy, and new ways to make our living at the coast. We must embrace relocation as a means of adaptation to an ever-changing environment. We should embrace the historic culture and the wild, remoteness of the Outer Banks and parlay that attribute into economic advantage. Ocracoke Village and Ocracoke Island are desirable tourist destinations in large part because of their remoteness. Perhaps the other villages along the Outer Banks can be part of a "string of pearls" of vacation destinations. Perhaps personal cars can be replaced by other means of transport (rented golf carts, trolleys, bicycles) along some portions of the barrier islands. Perhaps fast high-tech ferry systems can transport vacationers to their destinations. Perhaps rural mainland towns can become ferry hubs with motels, restaurants, service stations, parking lots, and other industry in support of this new coastal economy. Perhaps these towns can themselves become the centers of coastal tourism with estuarine cruises, wildlife tours, historic and cultural programs, hunting and fishing tours, natural history aerial field trips, black-water paddle and camping trips, etc. Adaptation strategies can be similarly developed for the southern part of our coast where the barriers can be considered to be "islands of opportunity".

This vision for a new and economically viable and advantageous coastal North Carolina is preliminary and unrefined. But no matter how this vision evolves, planning for future coastal development must take place within the framework of known natural processes of change. Our coastal economy can then experience a renaissance that has more potential pay-offs than the current approach to coastal management can provide in a changing climatic regime.

Change is the only constant within the North Carolina coastal system. It can occur as an almost imperceptibly gradual process in response to shifts in climate and sea level, or suddenly during high-energy events such as winter nor'easters and summer hurricanes. Barrier islands are built by storms and are dependent upon storm events to maintain their short-term health and long-term evolution.

Some of the greatest population growth rates in North Carolina, together with unprecedented urban expansion, are presently occurring within this coastal zone. New four-lane roads and bridges are being constructed, new water supplies are being developed, and pressures upon severely overloaded sewage disposal systems are increasing. This growth, intimately intertwined with a booming tourist industry, has substantial environmental impacts. Maritime forests are cleared, shorelines are hardened with bulkheads, shallow-waters are dredged, wetlands are channelized and filled, dune fields are bulldozed, and the surface is paved for parking lots. All of these activities modify the land surface, alter the drainage, and result in increased contaminants moving into the adjacent coastal waters.

The natural coastal system is not fragile. It is a high-energy, storm-dependent system characterized by environmental extremes. It is the fixed anthropogenic structures superimposed upon this dynamic system that are fragile. No guaranteed permanency exists for any ecosystem, landform, or built structure at the coast. Our attempts to transform our coasts into a stable, engineered system conflict with the dynamic nature of the natural environment. Our coasts are eroding, roads and bridges are threatened, water quality is compromised, and the tourist economy is at risk. This is why North Carolina's coasts are in crisis.

This White Paper is produced for coastal managers, agencies, business owners, politicians, residents of and visitors to the coast – anyone who has an interest in maintaining the unique character of our coast that draws so many tourists to it every year. The global climate is warming, the intensity of tropical storms might increase, and the rate of sea-level rise is increasing. Can we deal wisely with these issues so that we can adapt to the coming changes rather than be overwhelmed by them?

NORTH CAROLINA'S COASTAL SYSTEM

Regional Setting

The North Carolina coastal system (Fig. 1) consists of about 325 miles of ocean shoreline, 23 inlets, over 5,000 miles of estuarine shoreline, and over 3,000 square miles of brackish-water estuaries. It has two distinct zones that are very different in both their geometry and processes (Fig. 1, Table 1). The Southern Coastal Zone is characterized by a relatively steep land slope compared to the gentler slope of the Northern Zone. Rising sea level has flooded the disparate slopes producing different kinds of barrier islands, inlets, and associated estuaries (Fig. 1). The steeper slope of the Southern Zone produces short, stubby barrier islands that hug the mainland shoreline, resulting in narrow back-barrier estuaries connected to the ocean by 18 inlets. The gentler slope of the Northern Zone produces long barrier islands and a broad expanse of drowned-river estuaries, the vast Albemarle-Pamlico estuarine system. The northern barrier islands are broken by five inlets and project seaward to form the famous Cape Hatteras and associated Outer Banks.

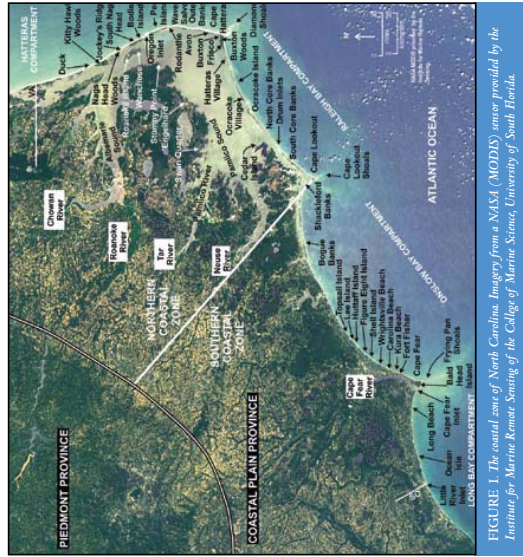


FIGURE 1. The coastal zone of North Carolina. Imagery from a NASA (MODIS) sensor provided by the Institute for Marine Remote Sensing of the College of Marine Science, University of South Florida.

TABLE 1. Coastal Characteristics of the Southern and Northern Coastal Zones of North Carolina result from differences in the underlying geologic framework. Figure 1 shows the location of the two zones.	
SOUTHERN COASTAL ZONE	NORTHERN COASTAL ZONE
Cretaceous-Miocene Geologic Framework Dominantly Rock Control	Pliocene-Quaternary Geologic Framework Dominantly Sediment Control
Steep Sub-Aerial Slope (ave. = 3 feet/mile)	Gentle Sub-Aerial Slope (ave. = 0.02 feet/mile)
Coastal Plain-Draining Rivers (Many) Black-Water Rivers Low Sediment Input Low Fresh-Water Input	Piedmont-Draining Rivers (4) Brown-Water Rivers High Sediment Input High Fresh-Water Input
Short Barrier Islands—Many Inlets (18) Maximum Astronomical Tides/Currents Maximum Salt-Water Exchange	Long Barrier Islands—Few Inlets (5) Minimal Astronomical Tides Minimal Salt-Water Exchange
Results: Narrow Back-Barrier Estuaries Regularly Flooded Astronomical Tide-Dominated High Brackish Salinities	Results: Deeply Embayed Estuaries Irregularly Flooded Wind Tide and Wave Dominated Highly Variable Salinities

The coastal system can be further divided into four geomorphic compartments (Fig. 1). These compartments, defined by capes and associated cape shoals, are known as cusped embayments. Cape shoals are shore-perpendicular, shallow sand bodies that extend seaward for about 10 miles (Diamond Shoals off Cape Hatteras), 15 miles (Lookout Shoals off Cape Lookout), and 30 miles (Frying Pan Shoals off Cape Fear). These vast shoal systems have led many mariners to their demise and the North Carolina coast to the dubious honor of being called the "Graveyard of the Atlantic".

The orientation of each compartment and continental shelf geometry determine wave and current dynamics, astronomical

and storm-tide characteristics, and the nature of the coast's response to specific storm systems. The Hatteras compartment faces northeast to east and receives the head-on impact of frequent nor'easters. In contrast, the Raleigh Bay compartment is generally southeast-facing and only receives glancing blows from powerful nor'easters. The Onslow Bay compartment faces south to southeast and the Long Bay compartment faces south. These orientations result in offshore winds and waves during nor'easters, but onshore seas from the dominant southwesterly winds during the summer and a high proportion of direct hits from less frequent, but higher energy tropical storms and hurricanes.

Estuaries and Barrier Islands

The drainage basins of North Carolina form a vast and complex network of creeks, streams, and rivers that move surface water off the uplands of the Blue Ridge, Piedmont, and Coastal Plain provinces to the Atlantic Ocean. The estuaries formed when rising sea level flooded up the valleys of these drainage systems, while the higher inter-stream divides formed low upland regions (Riggs and Ames, 2003).

Estuaries act as great mixing basins where the interplay between fresh and saline water, together with the regularity of astronomical tides and irregularity of wind tides, largely determines the coastal plant communities within the estuarine system. These, in turn, determine the type and distribution of shorelines (Riggs and Ames, 2003). As barrier-island inlets open, migrate, and close through time, chemical and physical conditions in the estuaries also change, resulting in major shifts in estuarine ecosystems.

Fronting the estuarine zone is a narrow strip of barrier islands that acts as a dam between the estuaries and ocean (Fig. 1). The sand islands, produced at sea level by the interaction of high-energy ocean storms with the topography of the gently sloping Coastal Plain, are broken by a series of small openings called "inlets" that allow the mixing of ocean water with riverine water (Fig. 1). Only a small portion of the barrier islands rises above the sea surface; the greater portion lies hidden below sea level. The sub-aerial portion of barrier islands is perched at the top of the shoreface, which slopes steeply to between 25 to 75 feet below sea level, where it flattens out onto the inner continental shelf. The shoreface ramp is the portion of a barrier island that functions as an important energy-absorbing surface for wave, tide, and current energy.

Barrier islands form and persist at the energetic interface between the land, sea, and air in response to four physical criteria: the presence of a gently sloping coastal plain-continental shelf, availability of adequate sediment, sea level, and the occurrence of high energy oceanic storms that build the islands and maintain them through time. Consequently, barrier islands are not only built by storm-dominated processes of inlet and overwash dynamics, but also act as critical energy-absorbing buffers at the land-sea-air interface. During times of rising sea level, storm dynamics constitute the process by which landward barrier island migration occurs.

HOW THE COASTAL SYSTEM WORKS

Formation of the Modern Coastal System

Our understanding of the evolution of the coastal zone is more complete for northeastern North Carolina (e.g., Riggs et al., 2000; Mallinson et al., 2005, 2008; Culver et al., 2007, 2008). However, the dynamic processes that drive our coastal system, and responses to those processes, are similar from the north to the south of North Carolina. Figure 2 shows the paleogeographic reconstruction of

the southern Pamlico Sound region over the last 7,000 years (Culver et al., 2007). Rising sea level flooded up the drainages incised into the paleo-landscape thus leading to estuarine conditions around 7,000 years ago (Fig. 2A). A generally northeast to southwest-draining tributary of the Tar River drainage, Pamlico Creek, was separated from a similarly oriented tributary drainage to the east by

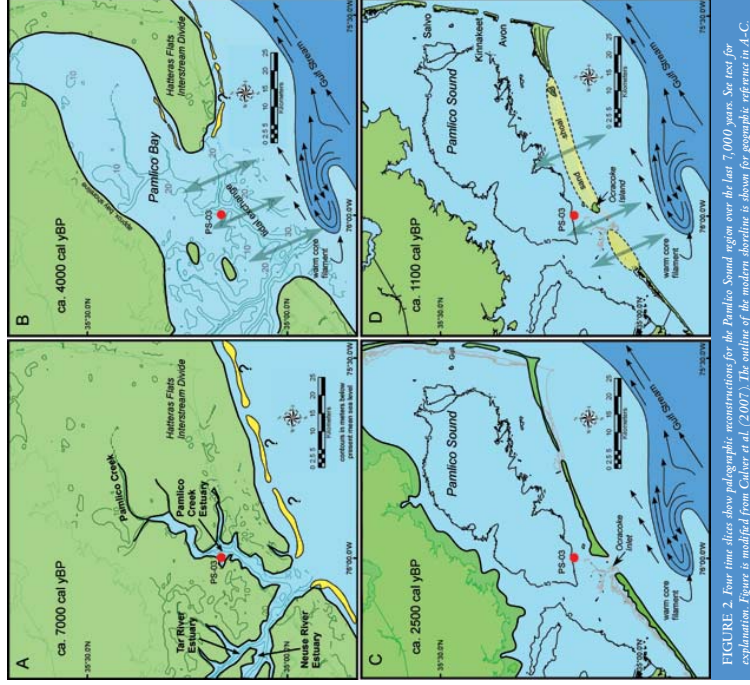


FIGURE 2. Four time slices show paleogeographic reconstructions for the Pamlico Sound region over the last 7,000 years. See text for explanation. Figure is modified from Culver et al. (2007). The outline of the modern shoreline is shown for geographic reference in A-C.

higher, land named the Hatteras Flats Interstream Divide. An ocean shoreline, and possibly barrier islands, would have existed on the southeast side of Hatteras Flats at this time (Fig. 2A). By approximately 4,000 years before present (BP), flooding began to occur across the low, southwestern end of the Hatteras Flats Interstream Divide, in the region that is now Ocracoke Island. The flooding of portions of the Neuse and Tar rivers and Pamlico Creek allowed tidal exchange to occur and normal salinity oceanic waters to extend into the southern part of the Pamlico basin (Fig. 2B). Barrier islands formed along the crest of the Hatteras Flats Interstream Divide as it was increasingly drowned by rising sea level. By 2,500 years BP the barrier islands probably resembled those of today (Fig. 2C).

The southern portion of the Pamlico Sound estuary underwent a rapid and fundamental environmental change during a warm climatic interval known as the Medieval Warm Period. One or more large storms, or a series of smaller storms, struck the southern Outer Banks around 1,100 years BP causing the collapse of a large segment of the barrier. Sand was eroded from the islands and redeposited as a broad, shallow submarine shoal (Fig. 2D). Microfossil data indicate that Gulf Stream waters were transported into the southern Pamlico basin resulting in normal oceanic salinity. Radiocarbon age estimates indicate that the barrier islands were not re-established for approximately 600 years. Indeed, the earliest map drawn by the first English visitors to North Carolina (1590 AD) shows a series of short barrier islands separated by numerous inlets. The majority of these inlets closed during the 17th and 18th centuries leaving a few long, thin barrier islands separating the once more estuarine Pamlico Sound from the Atlantic Ocean (Fig. 1).

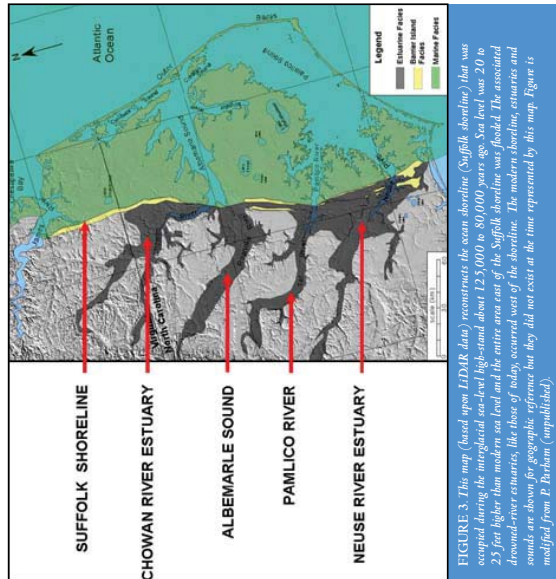


FIGURE 3. This map (based upon IEDAR data) reconstructs the ocean shoreline (Suffolk shoreline) that was occupied during the interglacial sea-level highstand about 125,000 to 80,000 years ago. Sea level was 20 to 25 feet higher than modern sea level and the entire area east of the Suffolk shoreline was flooded. The associated drowned-river estuaries, like those of today, occurred west of the shoreline. The modern shoreline estuaries and sounds are shown for geographic reference but they did not exist at the time represented by this map. Figure is modified from P. Barham (unpublished).

We are presently in an interglacial episode characterized by rising sea level. If global warming continues and substantial portions of the Greenland and/or Antarctic ice sheets were to collapse, the ocean shoreline of North Carolina would move significantly inland of the present coast. This occurred during the last interglacial sea-level highstand, 125,000 to 80,000 years ago, when the ocean was 20 to 25 feet above today's sea level and it occupied the Suffolk Shoreline some tens of miles west of the present shore (Fig. 3).

Nature of the Modern Coastal System

Sediment Supply for Coastal Barriers

Barrier islands are not created equal. Many barrier island segments are sediment poor while some have adequate supplies to maintain a healthy island system. The North Carolina coast is characterized by two basic types of barrier islands (Fig. 4). Complex barrier segments are sediment-rich and consequently are generally wide and high islands. They consist of multiple beach ridges and swales and extensive dune fields. Simple barrier segments are sediment-poor, low and narrow, are dominated by inlet and overwash dynamics, and tend to be relatively young.

In addition to the sand that is already on any given barrier island, there are four major potential sources of sand that play variable roles in the sediment budget of the North Carolina barrier island system.

1. Inlets (Fig. 5) between barrier segments contain several types of sand deposits within the various channel systems, the flood-tide delta on the estuarine side, and the ebb-tide delta on the oceanic side.
2. Deposits of sand and gravelly sand occur in paleo-riverine channels and paleo-deltaic sediments deposited by the larger trunk rivers on the continental shelf during previous glacial intervals characterized by sea-level lowstands (Mallinson et al., 2005).
3. Tremendous volumes of sand are potentially available in cape-shoal structures (Fig. 1); Diamond Shoals off Cape Hatteras (Boss and Hoffman, 2000), Lookout Shoals off Cape Lookout, and Frying Pan Shoals off Cape Fear (Riggs and Cleary, 1997).

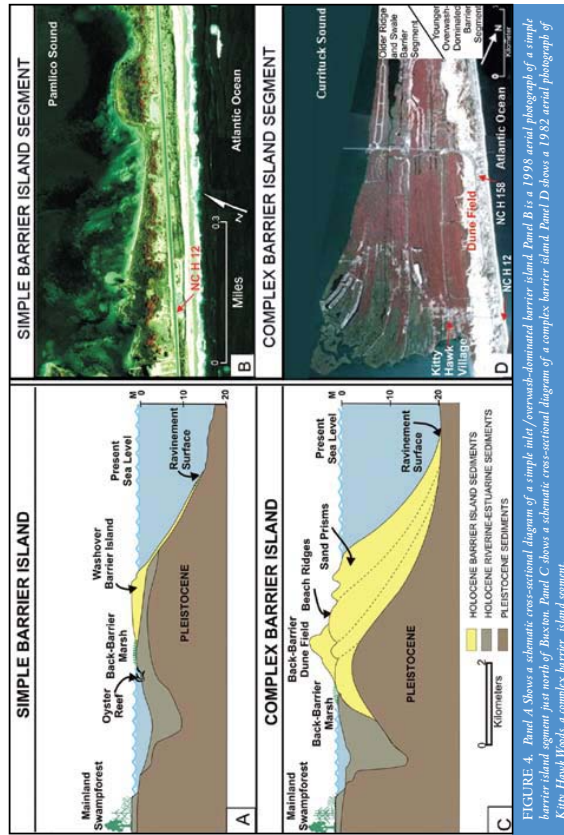


FIGURE 4. Panel A shows a schematic cross-sectional diagram of a simple inlet/overwash-dominated barrier island. Panel B is a 1998 aerial photograph of a simple barrier island segment just north of Beaufort. Panel C shows a schematic cross-sectional diagram of a complex barrier island. Panel D shows a 1982 aerial photograph of Kitty Hawk Woods, a complex barrier island segment.

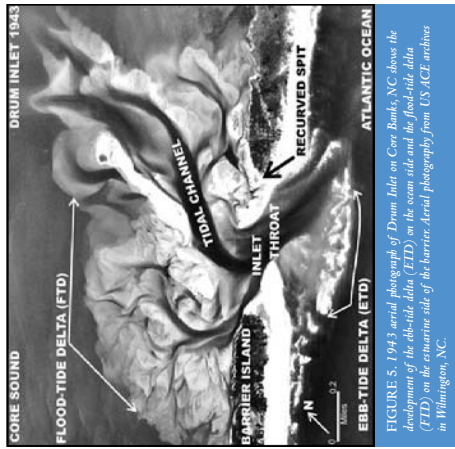


FIGURE 5. 1943 aerial photograph of Drum Inlet on Core Banks, NC shows the development of the flood-tide delta (FTD) on the ocean side and the ebb-tide delta (ETD) on the estuarine side of the barrier. Aerial photography from USACE archives in Wilmington, NC.

4. Locally, sand-rich geologic units are exposed on the shoreline and inner continental shelf (Riggs and Cleary, 1997, 1998; Boss and Hoffman, 2000; Thieler et al., 2006).

Complex Barrier Islands – Welding Pieces Together

Nags Head Woods, Jockeys Ridge, and Shackleford Banks are characterized by extensive back-barrier dune fields, whereas Buxton Woods, Kitty Hawk Woods, and Bogue Banks are characterized by a series of beach-ridge and swale structures (Fig. 6).

Kitty Hawk Woods are fronted by a dune field that was still active in 1932. The source of the dune sand was overwash occurring east of N.C. Highway 158. Construction of Highway 12 in 1932, and a barrier dune ridge in the late 1930s, in concert with subsequent development, has led to stabilization of the dune field, termination of modern overwash processes, and elimination of the sand source from the beach that fed the dune field (Fig. 7). Coastal development at Kitty Hawk is threatened, as indicated by the reduced distance from the shoreline to NC Highway 12 in the 1932 and 1999 aerial photographs (Fig. 7).

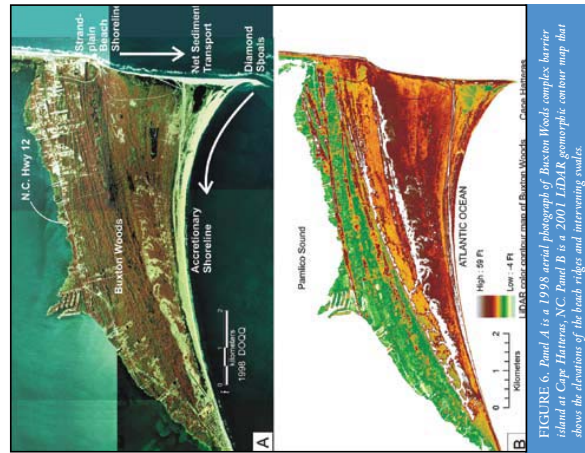


FIGURE 6. Panel A is a 1998 aerial photograph of Buxton Woods complex barrier island at Cape Hatteras, NC. Panel B is a 2001 I.D.R. geomorphic contour map that shows the elevations of the beach ridge and intervening swales.

Simple Barrier Islands – Inlet and Overwash Dynamics
Storm surges are critical processes on low and narrow simple barrier islands (Fig. 4). They may open shallow inlets that build back-barrier flood-tide deltas or they may overtop the barrier depositing overwash fans on top of the barrier and as back-barrier shoals. These processes build both island width and island elevation and are critical for barrier island health and migration as sea level rises.

Recent research from Oregon Inlet to Cape Hatteras (Smith et al., 2006) suggests that between 50 and 70% of this area have had one or more inlets during the past several hundred years. Up to 70% of the sand-poor islands in the Onslow Bay compartment have had one or more inlets during the past several hundred years (Riggs et al., 1995). Inlets are high energy, self-adjusting safety valves in the barrier island sand dam that open during storms to let the increased water volume (from increased river flow due to heavy rainfall or from increased storm surge) to flow either in or out. When storm and river floods abate, inlets close back



FIGURE 7. The figure compares a 1999 aerial photograph of the complex barrier island in the Kitty Hawk area of North Carolina (Panel A) with a 1932 aerial photograph of the same region (Panel B). The photographs show 1) the younger overwash-dominated part of the island being welded onto the ocean side of the older ridge and swale part of the barrier, 2) the complete urbanization of the younger overwash portion of the island by 1999, and 3) rapid ocean shoreline recession as indicated by the reduced distance of Highway 12 from the ocean over time. In 1999, a section of Highway 12 is covered by overwash sand. Figure is modified from Riggs and Ames (2003).

to an equilibrium point that is dictated by the normal hydrodynamics of the estuarine-oceanic system.

Inlets are essential for barrier island evolution by building extensive shallow sand shoals known as flood-tide deltas (FTDs) within the estuary behind the barrier islands and ebb-tide deltas (ETDs) on the ocean side of an inlet (Fig. 5). The FTD sand shoals form the foundation that the barrier island migrates onto in response to sea-level rise. Once an inlet closes, the FTD develops into marsh and adds width to the island (Fig. 8A-C). FTDs and ETDs store sand and are critical components of the coastal sediment budget. During storm events they bypass sand up and down the ocean shoreline, as well as in and out through the inlet.

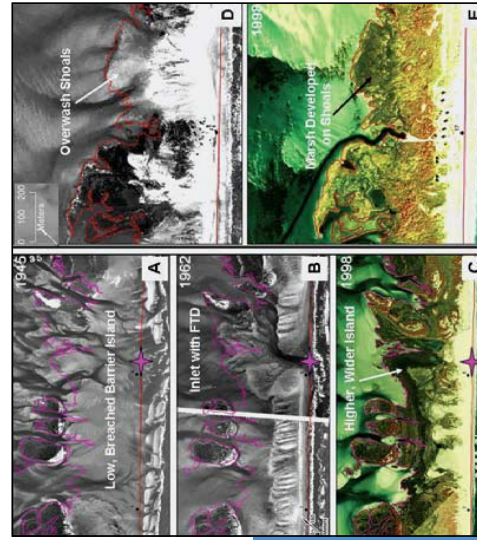


FIGURE 8. Aerial photographs of Core Banks show how storms built island elevation and width. Panel A is a 1945 aerial photograph of a low vegetated island segment consisting of multiple beach ridges. After inlet opened in 1962 and built flood-tide delta shoals (Panel B), the inlet closed and dune field developed. By 1998, swale part of a swale and vegetated island segment (Panel C). Panel D shows a swale and vegetated island segment as the island built elevation and width. Aerial photograph captured on the island beach elevation and width. Aerial photograph captured on the island beach elevation and width. The 1998 estuarine shoreline is superimposed on the historic photographs to demonstrate shoreline change. The superimposed ocean shoreline is that of 2006.

Simple barrier islands are dominated by storm overwash events (Fig. 9). Storm waters flowing across the island deposit large sand fans that build island elevation. Occasionally the overwash fans extend into the back-barrier estuary thus building island width and contributing to island migration (Fig. 8D, E).

History and Role of Storms

Sea level does not just gently rise and oceanic waters flood quickly across the land. Because storms are frequent and significant high energy events, they become the drivers that erode the shorelines, move the barrier islands, and cause ecosystems to migrate upward and landward (Fig. 8).

One hundred and five tropical storms and hurricanes impacted North Carolina during the 20th century (Robinson, 2005). Sixty four hurricanes made landfall between 1900 and 1999. The two decades in the 1940s and 1950s represent an active period followed by a relatively inactive period during the 1960s and 1970s. This was followed by two decades (1980s and 1990s) of frequent hurricane landfall in North Carolina.

The consequences of any given storm or series of storms vary and are generally unpredictable. Their impact upon the coastal system depends on type, size, strength, duration and forward speed of the storm, storm track, rainfall amount, storm surge height, tidal cycle, coastal elevation and orientation, and continental shelf geometry. The potential economic

impact not only depends on storm characteristics but also on land use and type and density of development. As urbanization increases, so does the potential economic loss. Even though nor easters are not as strong as tropical storms, they can have farreaching impacts since they are regional in extent and do not move as rapidly as hurricanes. They can build a sea state over several days and pound the coast through multiple tidal cycles (Stück, 1987). Up to 35 of these extra-tropical storms can occur every year during the fall to early spring.

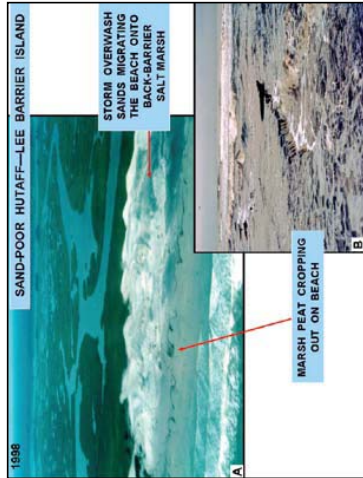


FIGURE 9. Hutaff-Lee Island is located between Figure 8 and Topsail Islands and is characteristic of what these two islands need to look like. Panel A is a 1998 oblique aerial photograph of the sediment-poor barrier island at low tide. Notice the dark line of back-barrier marsh part along the high-tide line and the large storm overwash fan that has transported beach sand onto the back-barrier marsh, thus building island elevation. Panel B is a close-up of the marsh peat on the beach at low tide. Photographs are by S. Riggs.

WHY ARE NORTH CAROLINA'S COASTS IN CRISIS?

Sea-level change results in a relatively slow and gradual reshaping of the North Carolina coastal system. More rapid change is achieved by hurricanes and not easters. Rising sea level floods up the stream valleys and adjacent land slopes, and storm waves erode and move the shorelines further landward.

Long-term tide gauge records (Hicks et al., 1983; Gornitz and Lebedeff, 1987; Douglas et al., 2001) indicate that sea level is rising at about 1.01 feet/100 years in the Charleston area and about 1.06 feet/100 years in the Norfolk area. Short-term data for the period from 1980 to 2000 at Duck, N.C. (Zervas, 2004) indicate that sea level for the Albemarle/Pamlico region is rising slightly faster at about 1.5 feet/100 years.

Extensive studies of salt-marsh peat on Roanoke Island have produced detailed sea-level curves for the past few thousand years (Kemp et al., 2007; Horton et al., 2007). Salt marshes grow vertically by depositing peat to keep up with rising sea level. The rate of sea-level rise recorded in cores of peat can be determined by using multiple research approaches (radiocarbon, lead and cesium isotopes, and various types of microfossils). The resulting data suggest that the rate of relative sea-level rise has increased from 3 inches/100 years between 0 AD and 1800 AD to 7 inches/100 years during the 19th century and to 16 inches/100 years during the 20th century (Table 2).

The increasingly rapid rate of sea-level rise results in flooding of low coastal land and almost ubiquitous recession of North Carolina's ocean shorelines. The NC Division of Coastal Management (NCDCM, 2004) ocean shoreline erosion data, based upon aerial photograph analysis from

TABLE 2. The varying rate of relative sea-level rise in northeastern North Carolina for the last 11,000 years (extracted from data in Horton et al., 2007, in press and Kemp et al., 2007).

11,000 - 8,000 yrs ago	30 inches/100 yrs
8,000 - 2,100 yrs ago	6 inches/100 yrs
2,100 - 200 yrs ago (100 BC - 1800 AD)	3 inches/100 yrs
200 - 100 yrs ago (1800 AD - 1900 AD)	7 inches/100 yrs
100 - 0 yrs ago (1900 AD - 2000 AD)	16 inches/100 yrs

1946 to 1998, calculates the average annual erosion rate of 1.6 feet/year (J. Warren, pers. comm., 2008) with local rates that range upwards to 15 feet/year. Riggs and Ames (2007) analyzed historic surveys and aerial photographs of Core Banks from 1849 to 2003 and demonstrated a net landward recession of the ocean shoreline for the past one and a half centuries. Figure 10 demonstrates island narrowing between Avon and Baxton where the ocean shoreline has receded up to 2,500 feet over 151 years (an average annual erosion rate up to 17 feet/year). Up to 76 % of the island width in 1852 has been lost and NC Highway 12 has been moved westward four times since 1955. The highway is now immediately adjacent to the Pamlico Sound shoreline. Figure 11 demonstrates island recession in the urbanized area of South Nags Head. The ocean shoreline has receded up to 1,000 feet in 149 years at an average annual erosion rate up to 7 feet/year. Sandbagged houses have been flanked by the ocean, the access road has been eroded, and the second and third rows of houses are threatened. Storms often damage the sandbagged houses and expose septic tanks and drain fields (Fig. 12).

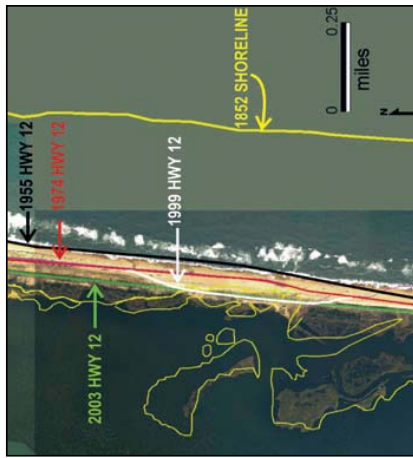


FIGURE 10. 2003 aerial photograph of the Avon-Baxton portion of the Cape Hatteras National Seaboard displays the location of the 1852 shoreline (yellow line) relative to the shoreline location in 2003 (NC Highway 12, black line) which was constructed in 1955 and has since gone eastward. The highway was rebuilt in 1974 (red line), in 1999 (white line), and again in 2003 (green line).

WHAT IS AT RISK?

The variety and scale of the natural resources and human infrastructure/activities that are at risk are quite staggering:

Natural Resources: Approximately 325 miles of barrier islands with more than 20 inlets; the second largest estuarine and wetland system in the US; over 5,000 miles of estuarine shoreline; eight major drainage basins and the associated wetland system.

People and Industry: Population of 865,000 residents in 20 coastal counties (population growth rates on the barrier islands of 75-150% since 1980); tourism, agriculture, forestry, and commercial fisheries.

Infrastructure: private, public and commercial buildings in 20 coastal counties; roads and bridges; power systems and sewage treatment plants; water treatment and distribution systems.

U.S. and NC Government Land Holdings and Operations: U.S. Military Bases (3 major bases and many support facilities); U.S. Coast Guard Facilities (numerous); U.S. National Park Service (two National Seashores and two Historical Sites); U.S. Fish and Wildlife Service (13 National Wildlife Refuges); U.S. Forest Service (one National Forest); NC Department of Transportation (two major ports, 16 ferry facilities; many miles of coastal highways and many coastal bridges); NC Division of State Parks (10 State Parks and Historic Sites); NC Division of Wildlife Resources (~300 public boat launch sites and ~2 million acres of game lands).

The Intergovernmental Panel on Climate Change Report (IPCC, 2007) predicts increased rates of global sea-level rise over the next century in direct response to global climate warming. Increased rates of sea-level rise and possibly increased intensity tropical storms will likely impact the North Carolina coastal zone adversely in the following ways.



FIGURE 12. Photographs of sand-bagged houses in South Nags Head on Bodie Island (Panel A) and Biggs Hill on Biggs Banks (Panel B) demonstrate the loss of the public beach. Photographs of sand-bagged houses in South Nags Head on Bodie Island (Panels C and D) with expanded and broken septic tanks and drain-fields. After storms these houses are contained until the septic systems can be temporarily repaired and removed in sand. Photographs are by S. Riggs.



FIGURE 11. Panel A is a 1998 aerial photograph of a portion of South Nags Head on Bodie Island and displays the location of the 1849 shoreline (red line) relative to the shoreline location in 1998 (black line). The location of the shoreline is shown in a recession sequence for 1940, 1955, and 1962 (white lines). Panel B is an oblique aerial photograph (2005) that shows a housing development built in the 1980s, enclosed in sand-bags for storm deaths, and the receding shoreline adjacent to the houses. The red star is the same location as both panels. Panel B photograph is by S. Riggs.

1. Accelerated rates of coastal erosion and resulting loss of agriculture and forestry lands, estuarine wetlands, and other coastal habitats.
2. Economic losses due to increased salt-water encroachment, higher flood levels, and increased storm damage.
3. Increased loss of urban infrastructure.
4. Collapse of some barrier island segments.
5. Negative impacts on North Carolina's coastal tourist and recreational fishing economy.

Approximately 25 miles of North Carolina's Outer Banks are immediately threatened by erosion. Along these island segments it is increasingly difficult and costly for NC DOT to maintain a coastal highway. More than 400 structures on the ocean-front and at inlet shorelines have been preserved only by walls of sand-bags (Figs. 11, 12). In the early 1990s about 12 miles of public ocean beach were being nourished on a regular basis; coastal communities are now trying to develop beach nourishment programs for over 122 miles (Fig. 13).

Is a rate of 16 inches/100 years (Horton et al., 2007; Kemp et al., 2007) for rising sea-level significant for the North Carolina coastal system? Major portions of Currituck, Carteret, Dare, Hyde, Tyrell, and Pamlico counties are only 1 to 2 feet above present sea level.

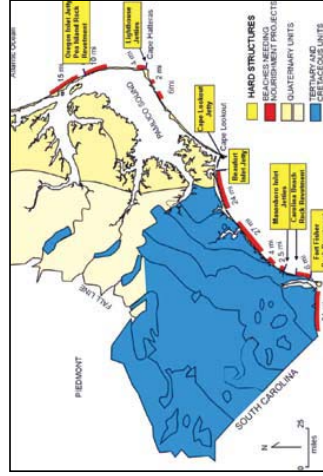


FIGURE 13. Map of North Carolina shows the 122 miles of ocean shoreline (red line) for which the associated communities are trying to find beach nourishment. Fig. 13 shows 122 of 325 miles shoreline miles represent a tropical coastline since the early 1990s. Also indicated are the locations of seven hundred structures (yellow boxes) that occur along the North Carolina ocean coast.

HUMAN RESPONSES TO CHANGING COASTAL SYSTEMS

During the 20th century, human development and engineering have become a dominant force in modifying barrier island evolution. Among these modifications are the construction of bridges, roads, and barrier dune ridges, beach management (e.g., hardening, sand bags, and nourishment), and inlet management (e.g., closing, hardening, and sand mining/dredging). All of these anthropogenic processes interrupt the natural barrier island dynamics.

Infrastructure Construction

Roads and Bridges

During the 20th century, highways and bridges were built to facilitate development of the Outer Banks. NC Highway 12 was paved in 1952 and connected to the 2.44 mile long Oregon Inlet bridge constructed in 1962-63. These structures were built across Cape Hatteras National Seashore and Pea Island National Wildlife Refuge to connect eight isolated villages with the Kitty Hawk to Nags Head urban area to the north.

Oregon Inlet was opened by a hurricane in 1846 north of the current Bodie Island lighthouse. It had migrated 2.5 miles southward by 1989. Construction of a bridge with a fixed navigational span over a migrating inlet required immediate dredging to keep the main channel under the fixed span. The amount of dredging required to hold the channel increased through time. By 1980 the problem became severe enough to require a substantial increase in the volume and frequency of dredging. The dredged sand was dumped offshore in deep water and lost to the inlet-barrier island system. This resulted in increased rates of inlet migration and beach erosion on Pea Island. As the inlet migrated southward, the bridge was becoming severed from Pea Island.

When the inlet approached the old US, Coast Guard Station, a variance was received from the NCCRC to stop inlet migration by constructing a rock jetty and to build an extensive rock revetment around the northern end of Pea Island to secure it to the bridge (Fig. 14). The jetty and revetment were built in 1989-1991 and did stop the southward migration of the inlet. In the meantime,

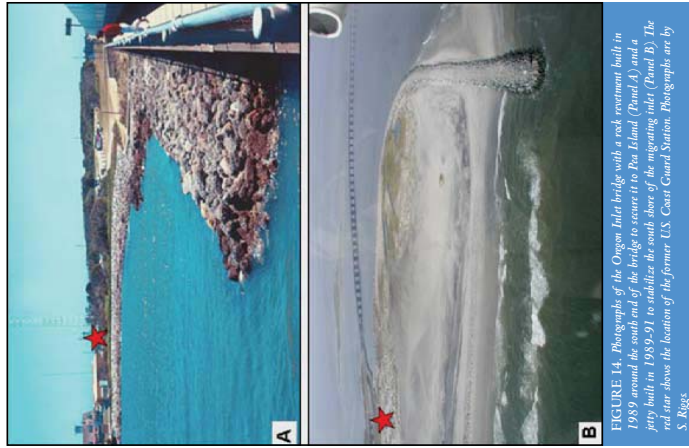


FIGURE 14. Photograph of the Oregon Inlet bridge with a rock revetment built in 1989 around the south end of the bridge to secure it to Pea Island (Panel A) and a jetty built in 1989-91 to stabilize the south shore of the migrating inlet (Panel B). The red star shows the location of the former US Coast Guard Station. Photographs are by S. Riggs.

however, the northern side of the inlet continued to migrate southward, thus narrowing the inlet width and substantially deepening the navigational channel under the fixed bridge span. This, in turn, jeopardized the central bridge piers and rock fill was required to rebury the piers.

With construction of the jetty, it was determined that the down-drift Pea Island beach should be nourished with sand obtained from inlet dredging. Approximately 7.7 million yards³ of inlet sand were pumped onto the beach and placed in shallow, near-shore waters of Pea Island during 23 operations between 1989 and 2005. In addition, about

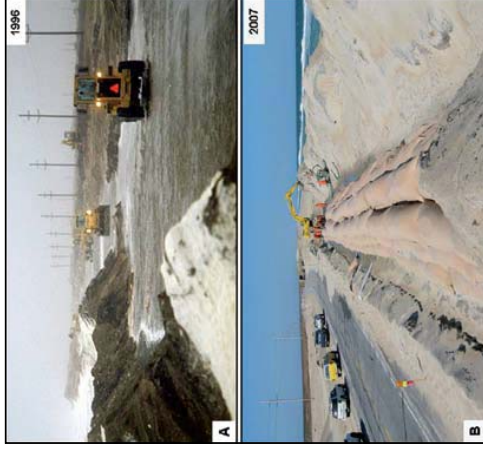


FIGURE 15. Panel A is a photograph that shows NC Highway 12 on Pea Island "gone-to-sea" in a 1996 storm. Panel B shows the late 2007 effort to anchor the constructed barrier dune ridge along NC Highway 12 with an internal core of sand bags. Panel A photograph is from Pilley and Thaler (1992). Panel B photograph is by D. Stewart, Pea Island Wildlife Refuge.

700,000 yards³ of sand were mined from the fillet south of the jetty by NC DOT and trucked down the coast to construct dune ridges. However, Pea Island's ocean shoreline continues to erode at average rates up to 13 feet/year, one of the fastest erosion rates in North Carolina. The consequence is that there are three "hot spot" segments of Pea Island where NC Highway 12 has previously "gone-to-sea" (Fig. 15). Even after being relocated to the west, the road on these three segments is continuously threatened. Every storm requires teams of bulldozers to mine the overwash sand and rebuild one or more constructed dune ridges.

Pea Island has been dominated by inlets and overwash throughout the last 500 years of its history. A new inlet could open in several places along the island depending upon the location and magnitude of a storm. In the context of this history and an ever-narrowing Pea Island, threatened by

overwash and inlet formation, the proposals for construction of a new Oregon Inlet bridge and Pea Island road are complex and expensive. One alternative is to build a new bridge parallel to the present bridge, maintain the Pea Island road on its present right of way, and rebuild new segments of road as needed. However, the Pea Island road, even with continued beach nourishment and construction of barrier dune ridges, is expected to ultimately require either elevation or relocation to a back-barrier causeway at some time within the life span of the new bridge. Minimum cost estimates for the parallel Oregon Inlet bridge and Pea Island road (to 2060) range from \$602 million to \$1.58 billion.

A second alternative is to build a back-barrier bridge-causeway across the Oregon Inlet FTD and into the deeper water of Pamlico Sound. This 17-mile long structure would return to the barrier island in the village of Rodanthe (Fig. 1). Minimum cost estimates for the back-barrier corridor (to 2060) range from \$1.3 billion to \$1.8 billion.

Constructed Barrier Dune Ridges

Natural coastal processes in the northern part of the state were forever altered in the late 1930's by construction of barrier dune ridges from the Virginia line south to Ocracoke Inlet. Continued reconstruction and maintenance of the

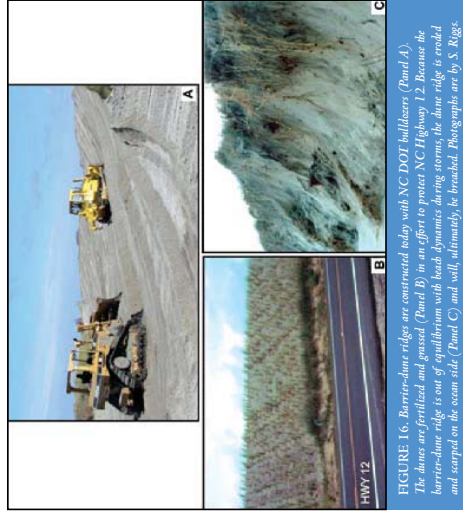


FIGURE 16. Barrier-dune ridges are constructed today with NC DOT bulldozers (Panel A). The dunes are fertilized and grassed (Panel B) in an effort to protect NC Highway 12. Because the barrier-dune ridge is out of equilibrium with beach dynamics, during storms, the dune ridge is eroded and scarped on the ocean side (Panel C) and will, ultimately, be breached. Photographs are by S. Riggs.

barrier dune ridges for the past six decades have changed the dynamics of all barrier islands, but particularly simple inlet- and overwash-dominated barriers (Fig. 16). The constructed barrier dune ridges have acted as walls that have prevented most overwash associated with average storm events. This has resulted in little sediment delivery to the barrier island's sound side. Lack of overwash sand has led directly to increased rates of sound-side shoreline erosion (Riggs and Ames, 2003).

The constructed barrier dune ridges, in concert with a natural sand deficiency and net ocean shoreline recession related to sea-level rise, cause the ocean beach profile to steepen, resulting in even higher rates of shoreline recession. The constructed dune ridges, built to protect the islands have, ironically, contributed to their erosion.

Beach and Inlet Management

Shoreline Hardening

Most North Carolinians have supported the concept of maintaining natural beaches and historically have preferred beach nourishment and relocation as the main measures for combating ocean-front and inlet shoreline erosion. North Carolina law dictates that trading concrete, steel, rock, and debris for the natural sand beach is not an acceptable erosion control measure. Further, hardened structures on beaches and inlets inevitably cause increased erosion and ultimate loss of the beach (Fig. 17).

However, as sea level rises and shorelines recede, there is ever increasing pressure for implementing more permanent shoreline stabilization structures along the North Carolina ocean beaches and inlets. Along the 325 miles of ocean and inlet shoreline in North Carolina, there are eleven

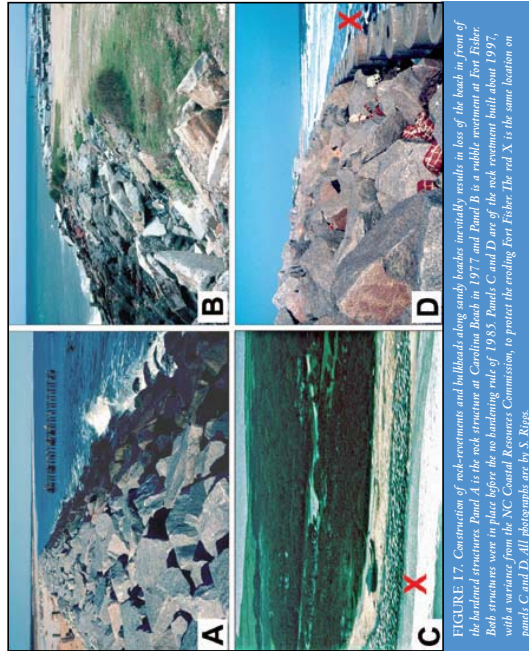


FIGURE 17. Construction of rock-revetments and bulkheads along sandy beaches inevitably results in loss of the beach in front of the hardened structures. Panel A is the rock structure at Carolina Beach in 1977 and Panel B is a rubble revetment at Fort Fisher. Both structures were in place before the no hardening rule of 1985. Panels C and D are of the rock revetment built about 1997, with a variance from the NC Coastal Resources Commission, to protect the eroding Fort Fisher. The red X is the same location on Panels C and D. All photographs are by S. Riggs.

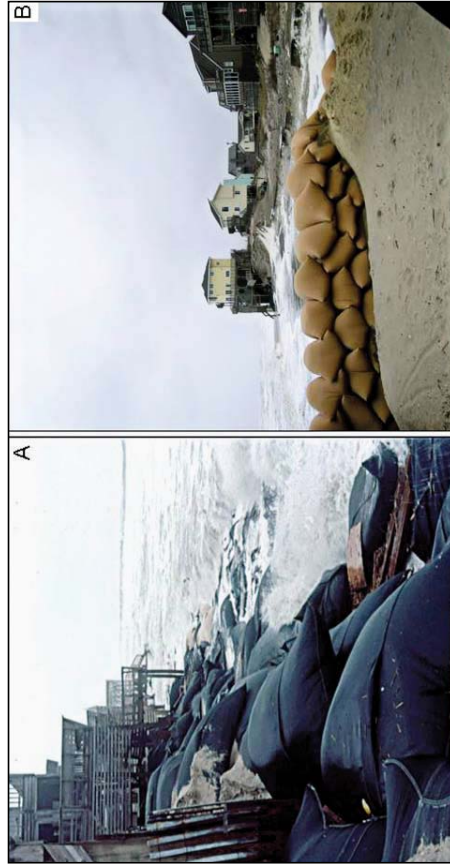


FIGURE 18. Panels A and B show the South Nags Head shoreline hardened with sand bags. Loss of the beach has left houses in the surf zone. Severe lateral erosion has also resulted, thus jeopardizing adjacent access roads and houses. Photographs are by S. Riggs.

hardened structures (Fig. 13), eight of which pre-date the 1985 no-hardening rule. The three structures constructed since 1985 required variances from the North Carolina state agencies. The rock jetty and rock revetment at Oregon Inlet were constructed to protect the bridge (Fig. 14). The third structure was a rock revetment constructed to protect the earthen-work Fort Fisher (Fig. 17).

The ban on hardened structures is increasingly challenged. Senate Bill 5599, proposed in 2007 was an effort to open the door to inlet-stabilization with construction of terminal groins (jetties) along many of North Carolina's developed inlets. The island communities desiring to stabilize adjacent inlets are those with threatened houses located within the Inlet Hazard Zone of the NC Division of Coastal Management's Areas of Environmental Concern. The Inlet Hazard Zones are well defined areas that have historically, and often recently, been occupied by active inlets.

Sand Bag Hardening

Bulkheads composed of sand bags form a hardened shoreline similar to any rock, concrete, or steel bulkhead. As a result,

the beach in front of the bags is lost and erosion is increased on the adjacent beaches (Fig. 18). The North Carolina regulations allow sand bags to be used as a temporary, stop-gap measure providing the owner time to either participate in a community beach nourishment program, move the structure to a new location, or dismantle it.

However, the sand bag regulation has not been enforced and as a result there are many segments of the North Carolina ocean shoreline where houses and their septic tanks are in the surf zone (Fig. 18). Storms often expose and break septic tanks, which are rapidly repaired and rebound. They may continue to leak and contaminate the adjacent beaches and near-shore coastal waters. North Carolina recently (May, 2008) began to enforce the sand bag regulation with the requirement that all exposed sand bags that have been in place beyond the permitted time must be removed.

Beach Nourishment

To locate and define potential sand sources for beach nourishment projects requires extensive exploration programs. Since the best sand is already on the beach and

there are only a few other potential sources, beach nourishment represents a temporary solution.

The ocean floor does not contain vast deposits of suitable sand. The sediment on the shoreline becomes finer grained offshore. The large sand bodies of Diamond Shoals, Lookout Shoals, and Frying Pan Shoals (Fig. 1) are too far from beaches that need nourishment and too difficult to mine to currently be viable as a source for beach sand. Unfortunately, the sand dredged from navigation channels is too often lost to the coastal system by being dumped in spoil piles or too far offshore for natural beach renourishment to occur.

Sand sources on the mainland are locally available. However, these sand deposits are generally more valuable for other uses or are far enough away that transportation costs make mining the sand for beach nourishment economically unviable. The most commonly utilized source of beach nourishment sand in North Carolina is the ebb-tide delta and channel sand in adjacent inlets. Even though this sand is usually high quality and beach-compatible, mining it destabilizes the inlets and results in negative impacts upon long-shore sediment transport and long-term sediment budget for both the barrier islands and their adjacent inlets.

Prior to the storms of the late 1990s, about 12 miles of public beaches in North Carolina ocean coast communities were regularly nourished. Wrightsville Beach started nourishing their beach in 1939. Carolina Beach started in 1955 (Fig. 19), and Kure Beach started in 1997, all with significant federal funding programs. Today, ocean beach communities desire over 122 miles of nourishment projects. Since the early 2000s, the federal government appears to be unwilling to fund any new beach nourishment projects, other than navigation projects, and public referendums have generally failed to produce the necessary support for local funding, except for Bogue Banks and a few other island communities.

A summary of available data (from the Program for the Study of Developed Shorelines) for two coastal towns

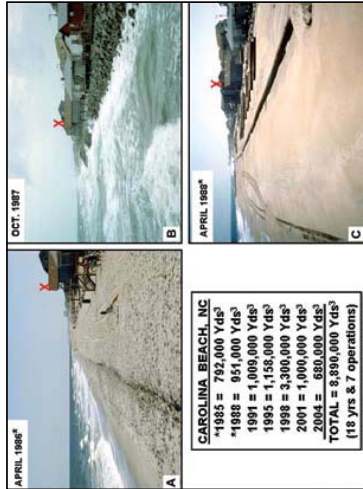


FIGURE 19. Three photographs clearly demonstrate the short-term survival of beach nourishment projects. The nourishment data show the recent record (1985 to 2004) of beach nourishment operations for Carolina Beach. Panel A shows what is left of a 1985 operation on April 1986. Panel B shows that all of the 1985 nourishment has gone by October 1987 and the rock excavation built prior to the 1985 "no shoreline landwarding rule" is exposed. Panel C shows the 1988 beach nourishment operation in progress. Beach nourishment during the 1985 to 2004 period averaged one operation of about 1.27 million cubic yards every 2.6 years. The red X marks the same house. Photographs used by Pilley and Helzer (1992) and the data are from the Program for the Study of Developed Shorelines, Western Carolina University (<http://pds.wcu.edu>).

follows:

Carolina Beach, NC

28 operations 1955-2004 (49 years)
 Total nourishment sand = about 18.85 million yds³
 Average = 1 operation of 662,321 yds³ every 1.75 years

Wrightsville Beach, NC

19 nourishment operations 1955-2002 (47 years)
 Total nourishment sand = over 10.84 million yds³
 Average = 1 operation of about 570,421 yds³ every 2.5 years

The histories of Carolina Beach and Wrightsville Beach nourishment projects demonstrate the generally short-term life expectancy and large volumes of nourishment sand required to "hold the line". What the data do not record is the dramatic increase in the cost of projects through time.

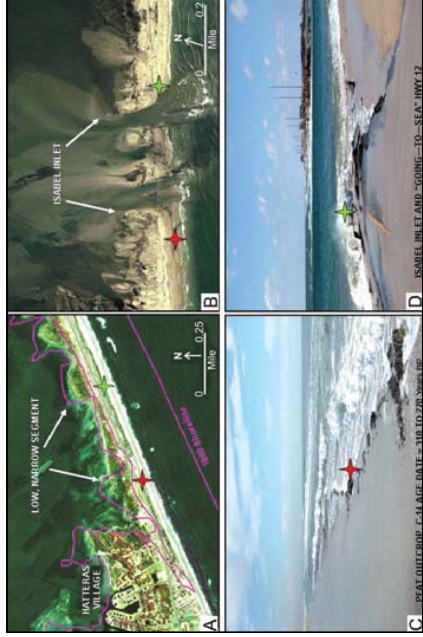


FIGURE 20. Panel A, a 1998 aerial photograph shows the vulnerable barrier island segment near Hatteras Village. The 1860 coastline is superimposed (purple lines) to show the east of island, extending over 138 years. Panel B is a September 2003 aerial photograph of the newly formed Isabel Inlet through this segment. At an such a location, shoals would normally build sand-side once the inlet there. Panel C shows marsh past exposed on the beach after the storm. The marsh pan, which is a few hundred years old, formed on the sand side of the barrier when the ocean shoreline was substantially seaward of its present location. The presence of pan at the location indicated by red stars reduced the likelihood of inlet formation at that site. Panel D shows NC Highway 12 "young-ocean" following Hurricane Isabel. The location of the north eastern margin of the inlet is indicated by the green stars. Panel C and D photographs are by S. Riggs.

Inlet Openings and Closings

Hurricane Isabel came ashore in the vicinity of Ocracoke Inlet on September 18, 2003. This small storm produced Isabel Inlet in a low and narrow portion of the barrier adjacent to Hatteras Village (Fig. 20). Two other weak spots (on the northeast end of Ocracoke Island and at the 1962 Buxton Inlet site) came close to forming inlets. Isabel Inlet was subsequently closed within five weeks utilizing sand from the dredged navigation channel for the Hatteras-Ocracoke ferry. This extremely narrow island segment, however, needed a flood-tide delta and its sand deposits to develop island width. This island segment is as vulnerable to inlet formation now as it was prior to Hurricane Isabel. In fact, there are several locations along the North Carolina coast where new inlets could open during a future storm. Using digital elevation data along the Outer

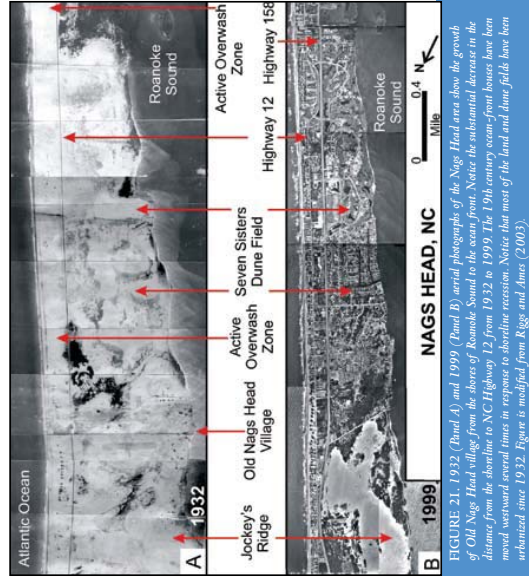


FIGURE 21. 1932 (Panel A) and 1999 (Panel B) aerial photographs of the Nags Head area show the growth of Old Nags Head village from the shores of Roanoke Sound to the ocean front. Note the substantial decrease in the distance from the shoreline to NC Highway 12 from 1932 to 1999. The 19th century ocean-front houses have been moved westward several times in response to shoreline recession. Notice that most of the land and June fields have been urbanized since 1932. Figure is modified from Riggs and Amis (2003).

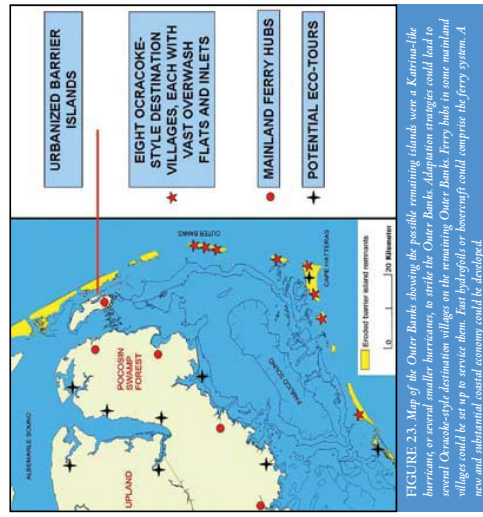
ADAPTATION ALTERNATIVES



Banks, areas of future inlet-opening potential have been mapped. This and other data sets can be explored at <http://www.coastalgeology.ecu.edu/NCCOHAZ/>.

Relocation

In North Carolina, one of the earliest ocean-front developments, which began after the Civil War in the area of Old Nags Head, was characterized by very deep lots to allow for the systematic relocation of the houses as the shoreline retreated (Fig. 21A). Most of these early houses were moved landward several times during the 20th century. They are now adjacent to NC Highway 12 and cannot be moved further (Fig. 21B). In 1999, the Cape Hatteras Lighthouse was finally relocated 1600 feet inland after many futile efforts from 1969 to 1999 to combat coastal erosion. Relocation (Fig. 22) can be considered for all buildings that



A Vision for the Future

Until the middle of the 20th century, the North Carolina barrier islands had several villages with subsistence populations that supported small tourist and fishing industries. However, in the second half of the 20th century, the coastal barriers evolved into an economic engine that has become a critical cornerstone of North Carolina's economy. Billions of tourism dollars are generated annually. North Carolina has 21 coastal counties with 865,000 residents (10.3% of the state population) and is growing. Several ocean-front counties had 76 to 150% population growth from 1970 to 2000 (<http://maps.csc.noaa.gov/hurricanes/pop.jsp>). The islands that used to be dominated by small beach cottages are now lined with high-rise hotels, condominiums, and large vacation homes. However, there are limits to growth and types of development on migrating barrier islands. To preserve the barrier island-based, tourist/recreation economy and the natural resources upon which it is based, it is imperative that we start to develop viable, long-term management plans that include adaptation to a dynamic, mobile, and rapidly changing natural system. The possibilities are limited only by our imaginations.

Northeastern North Carolina: "A String of Pearls"

Oregon Inlet Bridge and NC Highway 12 were constructed in the 1950s and 1960s to enhance the economic development of the Outer Banks. These structures were built across Cape Hatteras National Seashore and Pea Island National Wildlife Refuge to connect eight isolated villages to the Kitty Hawk to Nags Head urban area to the north. Over the following five decades, the ocean shoreline receded, overwash and inlet processes essentially terminated, sea-level rose, and many miles of the barrier islands narrowed substantially.

Thus, it is time to rethink our approach to utilizing the island segments that are threatened by rising sea level,

storms, and anthropogenic modifications. If we withdrew from some of the coastal highways and terminated the construction of barrier dune ridges, the islands would begin their natural rebirth as inlet and overwash dynamics would once more rebuild them. The eventual result would likely be a barrier island system with eight Ocracoke-style destination villages (Fig. 23) strung like a string of pearls upon a vast network of inlet and shoal environments that would afford us many new opportunities for economic development. We cannot stop major storms from striking North Carolina. We cannot stop sea-level from rising. We cannot stop the barrier islands' natural tendency to migrate landwards in response to rising sea level. We are now at a threshold. Large segments of the barrier islands have almost washed away. NC Highway 12 can no longer be relocated on narrow island segments. But we can still maintain a vital coastal economy and preserve the natural resource base. As a starting point for discussion, consider this possible course of action. If we were to withdraw from the Oregon Inlet bridge (except for the ends to be utilized as fishing piers)

and from NC Highway 12, except within Bodie Island and the villages of Rodanthe, Waves, Salvo, Avon, Buxton, Frisco, Hatteras, and Ocracoke, we could not only save billions of dollars, but also expect the following responses.

1. Several small inlets and associated inlet flats and ebb- and flood-tide deltas would be formed, thus building back-barrier shoal and marsh systems critical to island integrity.
2. Large areas of island overwash would begin to build island elevation and width.
3. The increased water exchange between Pamlico Sound and the Atlantic Ocean would result in substantial improvement in water quality and productivity of marine and estuarine ecosystems.
4. Significant increase in overwash, inlet, and shoal habitats would vastly expand the natural habitats for several endangered bird and animal species.
5. The increase in overwash and inlet-shoal habitats would also produce an increase in fishing sites, as well as opportunities for other forms of recreation including hiking, camping, kayaking, birding, and off-road recreational vehicle use.

6. New opportunities would present themselves for many new small businesses such as water taxis, mule train and ATV tours, fishing and hunting guides
7. Each of seven villages will have the potential to become an Ocracoke-style destination village (Fig. 23).
8. A world-class eco-tourism economy could be built around the natural and human history and culture of North Carolina's unique Outer Banks.
9. The villages could be inter-connected by a system of modern ferry and water-taxi systems (jet-powered catamarans and hydrofoils) capable of moving large volumes of visitors rapidly to and between destination villages with minimal disturbance to ecosystems
10. Supply trucks, tourist buses, garbage trucks, SUVs, and personal vehicles of the village residents could be transported using the NC DOT ferry system or hovercraft similar to those used by the US Marine Corps.



FIGURE 24. Example of alternate, non-invasive transportation systems utilized on small island communities throughout the world. Photographs are by S.R. Ggg.

11. Ferry terminals could be located at the small rural mainland villages such as Wanchese, Stumpy Point, Engelhard, Swan Quarter, and Cedar Island (Fig. 23).
12. These towns could maintain short- and long-term car parks, allowing tourists in the destination villages to utilize less invasive types of transport systems (e.g., bikes, golf carts, pedicabs, trolleys, mule-trains, etc.) (Fig. 24).
13. Mainland towns would be in a position to develop many local businesses (e.g., motels, restaurants, B and Bs, service stations, etc.) and become centers for new natural resource-oriented business opportunities (e.g., guiding and supplying eco-tours of the Outer Banks and mainland Inner Banks (e.g., black-water paddle and camping trips, estuarine cruising trips, coastal over-flight field trips, historical tours, hunting-fishing-birding tours, etc.).

Southeastern North Carolina: "Islands of Opportunity"

Imagine what could be done with our highly developed beach communities of southeastern North Carolina as sea-level rise and storm dynamics continue into the future. By determining levels of vulnerability through detailed geomorphic mapping, communities can begin to develop adaptation programs that involve sustainable economic development. Below are some concepts that could be included in planning for barrier island adaptation management. Some of these ideas might be characterized as unfeasible but we include them here in the hopes of encouraging discussion of these issues. The alternative is to ignore the reality of sea-level rise and the associated and inevitable coastal erosion and barrier island migration.

1. A regional evaluation of the southeastern barrier island system and the mainland shore could be undertaken to assess long-term usability of each island. Some islands may be suitable for "holding the line" and others less so.

2. Recognizing that not all islands have the same characteristics, some could sustain full development, some could sustain lesser development, the amount dependent on the economic viability of beach nourishment. Some islands and segments of the mainland may be best suited to various kinds of day-use, and others could become nature preserves and wildlife refuges.
3. Bridges become old and unsafe and are extremely expensive to replace. Not replacing some bridges is an option that should be thoroughly researched and discussed. If it is determined that a bridge should not be replaced, a system involving car parks on the mainland and a water-taxi and/or ferry service to the island in question could be developed. Bald Head Island, which utilizes only golf carts and bikes, except for service vehicles, already operates this kind of system.
4. Owners of the high-hazard land along the ocean-front, inlet hazard areas, and locations where inlets are most likely to occur could consider a wide range of alternative uses (for example, bait and tackle shops, concession stands, bath houses, parking, etc.).
5. All houses and commercial structures could be raised and piled high enough off the ground to allow storm-surge overwash and sediment accretion. Less damage will result, and the natural process of island building can take place.
6. Portions of shore-parallel roads could be left unpaved and, if necessary, portable metal ramping could be utilized on overwash fans after major storms. Shore-perpendicular roads could be staggered (to minimize flood conduits) and some could be maintained as sand roads.
7. Low supra-tidal zones and marshes on the sound sides of barrier islands could be protected to allow for natural island evolution. A similar strategy could be used for low-lying environments on the mainland coasts. These wetland systems, which are critical for fisheries and water quality, could continue to be utilized for eco-tourism.

A CONCLUDING THOUGHT

The documented increasing rate of sea-level rise and the possibility of increased intensity of tropical storms are threats to our coastal economy that we must not ignore. Adaptation to the ever-changing coastal environment is the key. Our vision for the future of coastal North Carolina, based on an understanding of the origin and evolution of the barrier island-estuarine system, is preliminary and unrefined. Future actions such as those outlined above could lead to a renaissance that has more potential pay-offs than our current approach to coastal management can provide in a changing climatic regime.

If we so determine, we can protect the natural resources of the barrier islands, preserve the historical and cultural heritage of coastal and mainland villages, and avert a head-on collision of an increasing population with the natural processes of a migrating shoreline. The climate is changing, sea level is rising. We must adapt to these changes if we hope to maintain a viable coastal economy and to preserve the natural resources upon which that economy is based.

ACKNOWLEDGEMENTS

E-74 Much of the work summarized in this report is the product of the North Carolina Coastal Geology Cooperative, a multi-year research program led by East Carolina University, the United States Geological Survey and the North Carolina Geological Survey, with contributions from scientists at the University of Delaware, University of Pennsylvania, and Virginia Institute of Marine Sciences. Funding for the USGS cooperative agreement awards 02ERAG0044, 02ERAG0050, 01ERAG0015, 07ERAG0020 and NSF cooperative agreement award OCE-9807266 is gratefully acknowledged. Additional support came from a University

of North Carolina Research Competitiveness award, as well as the US National Park Service, US Fish and Wildlife Service, Environmental Defense, N.C. Division of Coastal Management, N.C. Division State Parks and Recreation. The work of students and staff of the Department of Geological Sciences at East Carolina University and the ECU Institute for Coastal Science and Policy is gratefully acknowledged as is the review by G. "Rudy" Rudolph. Sources of aerial photographs: USACE-ERF; Duuk; USACE-Wilmington; CHNS; Manteo; NC State database; NC DOT; US Geological Survey.

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A digital version of this document, along with reports on related research funded by a grant from the University of North Carolina system, can be accessed at the North Carolina Coastal Hazards Decision Portal: <http://www.coastal.geology.unc.edu/NCCOHAZ/>.

BACK COVER PHOTOGRAPH. A NASA Terra satellite image of Hurricane Isabel as it made landfall across North Core Banks, North Carolina on September 18, 2003. Isabel was a category 5 hurricane while at sea, but slowed and diminished in intensity as it approached North Carolina. It came ashore as a category 2 storm with about a 6 to 8 foot storm surge and 100 mph winds. The storm opened Isabel Inlet adjacent to Hatteras Village, and came within minutes and/or inches of opening additional inlets between Avon and Buxton and on the northeast end of Ocracoke Island.



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240



SEP 11 2007

The Honorable Michael F. Easley
Governor of North Carolina
Raleigh, North Carolina 27699-0301

Dear Governor Easley:

Thank you for your letter of August 17, 2007, to Secretary Kempthorne regarding the replacement of the Herbert C. Bonner Bridge over Oregon Inlet in Dare County, North Carolina. The Department of the Interior shares your concern regarding the need to expeditiously replace the bridge in a way that meets public safety, environmental and fiscal needs.

In 2003, all of the agencies in this important project reached agreement that the Pamlico Sound alternative was the prudent solution. The North Carolina Department of Transportation (NCDOT) and the Federal Highway Administration (FHWA) now support the Parallel Bridge Corridor, with Phased Approach/Roadside Bridge (Phased Approach alternative) as their proposed Least Environmentally Damaging Practicable Alternative (LEDPA). As you know, Secretary Kempthorne has already agreed that replacement of the bridge itself can be accomplished in a way that is compatible with the National Wildlife Refuge System Improvement Act of 1997 (Refuge Improvement Act). The bridge must also be constructed within the same alignment or with minor realignment to meet safety standards.

The U.S. Fish and Wildlife Service (Service) is part of the interagency "merger" team working to develop a plan to replace the Bonner Bridge in a way that meets State and Federal requirements. The team is led by the NCDOT, the FHWA, and the Army Corps of Engineers. These agencies establish the schedule for project-related work activities and meetings. The Service has provided all necessary and appropriate support and input to the process in a timely manner and has exercised all flexibility available within our legal mandates, including the Refuge Improvement Act.

Please note that through the merger team planning process, the Service has requested additional information to allow us to fully evaluate the compatibility of NCDOT's preferred alternative with the purposes for which Pea Island National Wildlife Refuge (Refuge) was established, as required under the Refuge Improvement Act. To date, however, the Service has not received this information. The NCDOT's preferred alternative would replace the existing road with a series of bridges and would be built in four phases; the first phase being the bridge across Oregon Inlet, with remaining phases being constructed as necessitated by shoreline erosion.

ATTACHMENT
B



The Honorable Michael F. Easley

2


While the intent is to construct these new bridges within the existing road's right-of-way, we believe this alternative would require continued maintenance outside of the existing road's right-of-way through the Refuge until each subsequent phase of bridge construction along NC 12 is completed. Current information also indicates that all 4 phases would require at least 13 years of actual construction during a 28-year timeframe. Based on the information that the Service currently has, it is unlikely that we could find this alternative to be compatible with the purposes for which the refuge was established, as required under the Refuge Improvement Act.

The Merger Board met on August 27, 2007, to decide the future course of action for NCDOT regarding this project. The Corps and NC Department of Environmental and Natural Resources concurred with NCDOT and FHWA that the up-front costs of the Pamlico Sound alternative exceed the State's ability to finance the project and, as a result, is not practicable. They also concurred with NCDOT and FHWA that the Phased Approach alternative is the LEDPA. They determined that NCDOT and FHWA should proceed with preparation of a final environmental impact statement (EIS) with the Phased Approach identified as the preferred alternative, but proceed with seeking permits only for Phase I (replacement of the Bonner Bridge). The next step is for the NCDOT to complete the final EIS for the proposed project which is expected in the spring of 2008. The Service believes that, at the conclusion of the NCDOT/FHWA planning process, NCDOT will ask if they need a right-of-way permit based on whatever they describe as the specific design and location of the Phased Approach alternative structures. At that point, we will complete a compatibility determination for the project based on the specific plans provided with that request, if necessary.

Approximately 3 years ago, all of the agencies involved in this important project reached consensus on the Pamlico Sound alternative. While circumstances have changed since then, I assure you the Service and the Secretary remain committed to finding a solution that meets important public safety needs and is consistent with the Federal natural resource laws we are charged with administering.

Thank you for your continued interest in this important issue. If you have any questions or require further assistance, please contact me or Service Director Date Hall at (202) 208-4717.

Sincerely,


Acting Assistant Secretary for Fish
and Wildlife and Parks

Norburn, Robert E.

From: Smyre, Elizabeth A [bsmyre@ncdot.gov]
Sent: Monday, October 27, 2008 4:42 PM
To: Page, John; Norburn, Robert E.
Subject: FW: Bonner Bridge replacement comments

Attachments: NC 12 bonner bridge comments



NC 12 bonner
bridge comments (. . .) FEIS comment . . .

Beth Smyre, P.E.
Project Planning Engineer
NC Department of Transportation
Project Development & Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699-1548
(919) 733-7844 ext. 333

-----Original Message-----
From: wildlawn@aol.com [mailto:wildlawn@aol.com]
Sent: Monday, October 27, 2008 4:06 PM
To: Smyre, Elizabeth A
Subject: Bonner Bridge replacement comments

Ms. Smyre:

Please find attached and pasted in below WildLaw's comments on the NC 12/Bonner Bridge replacement FEIS. Thanks you for your time and attention.

Ms. Smyre:

Please accept WildLaw's comments on the proposed NC 12/Bonner Bridge replacement FEIS and 4(f) Evaluation.

Wildlaw supports the proposed alternative (parallel bridge with phased approach/Rodanthe Bridge). While Wildlaw has opposed other expensive (and expensive) road projects in the past, most notably the ill-fated North Shore Road in the Great Smoky Mountains National Park, we feel that the unique character of the North Carolina Outer Banks, the Cape Hatteras National Seashore, and the Pea Island National Wildlife Refuge (PINW) require a compromise approach that allows for all values, environmental, cultural, recreation, economic, etc., to be enjoyed, weighed, and considered. We feel the preferred alternative best approaches this appropriate level of compromise and consideration of values.

While true that the Pamlico Sound all-bridge alternative would on the surface appear to reduce impacts to PINW, such a wildly expensive alternative would have significant impacts of its own. The likelihood of implementation at a scale this large diminishes, and the Bonner Bridge certainly has existing safety issues that demand immediate attention.

The direct impacts to wetland resources appear to roughly equivalent to the preferred alternative, and increased impacts to submerged biotic communities from the increased need for dredging with the all-bridge alternative are troublesome and should not be underestimated. Further, the all-bridge alternative appears fill 7.9 acres (3.2 hectares), the phased approach alternatives (including the preferred alternative) would

fill 3.0 acres (1.2 hectares), and the nourishment alternative would fill 2.9 acres (1.2 hectares). This significant additional fill to jurisdictional wetlands in an area where wetland impacts are magnified is worrisome.

Although not ideal, the Parallel Bridge Corridor alternatives (including the Preferred Alternative) also generally would allow long-term natural shoreline movement except for the retention of the terminal groin. Shoreward migration is an issue constantly facing residents and projects planned for barrier islands such as the North Carolina Outer Banks.

We would also urge FHWA and NCDOT to reach out to the Department of Interior, specifically the Assistant Secretary for Fish and Wildlife and Parks. It appears there is some genuine and potentially valid concern at that agency about the compatibility of the preferred alternative with DOI policy and regulation as well as legislative language dealing with PINW. Willdow encourages an active outreach effort to educate, inform, and demonstrate to the DOI the relative merits of each alternative, as well as the reality that the all-bridge alternative would be so prohibitively expensive that pursuit of that approach would essentially doom this project to failure. Simply determining that a "finding of compatibility" is not necessary (FEIS Summary P. xxx) is not a sufficient analysis of the issue, and may provide a legal "hook" for anyone opposing the construction of the preferred alternative.

Once again, the FEIS, while not perfect, does strike a fair balance with the competing interests and demands on this unique part of our state. We support the preferred alternative and would appreciate being apprised of upcoming developments, issuance of the ROD, etc. Thanks you for your time and attention.

Stephen Novak
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Appendix D

**Response to Comments on
the Final Environmental
Impact Statement**

D. Response to Comments on the Final Environmental Impact Statement

The Federal Highway Administration (FHWA) and the North Carolina Department of Transportation (NCDOT) signed a Final Environmental Impact Statement (FEIS) for the Bonner Bridge Replacement Project on September 17, 2008. This appendix presents and provides responses to comments on the FEIS received from the public, state, and federal environmental resource and regulatory agencies, local agencies, and non-governmental organizations (NGOs). The written correspondence received is included in Appendix E. The comments and responses to those comments are presented in the following sections:

D.1	Public Comments.....	D-1
D.1.1	Pamlico Sound Bridge Corridor Comments.....	D-1
D.1.2	Parallel Bridge Corridor Comments.....	D-2
D.1.3	Other Comments	D-2
D.2	Government Agency Comments and Responses	D-3
D.2.1	Federal Agencies.....	D-3
D.2.2	State Agencies.....	D-32
D.2.3	Local Agencies—The Albemarle Commission.....	D-38
D.2.4	Non-Governmental Organization Comments and Responses	D-39

D.1 Public Comments

This section presents the comments on the FEIS submitted by the public. These comments come from oral testimony (phone calls), e-mails, and letters. The comments primarily included expressions of support or opposition to specific alternatives, expressions of opinion on the positive and negative aspects of a particular alternative or alternatives, and requests to begin building whichever alternative is chosen. Fifteen total written and oral comments were received before the end of the FEIS public comment period on October 27, 2008. The written correspondence received is included in Appendix E.

D.1.1 Pamlico Sound Bridge Corridor Comments

There were two comments that expressed support for the Pamlico Sound Bridge Corridor. Both comments were non-specific in their support for a Pamlico Sound Bridge Corridor Alternative. There was one comment against the Pamlico Sound Bridge Corridor. Those opposed to the Pamlico Sound Bridge Corridor believe that the alternative is unrealistic and is a politically correct alternative to appease environmental agencies. Those that supported the Pamlico Sound Bridge Corridor gave the following reasons:

- It is the least environmentally damaging alternative;
- It is not subject to natural shoreline movement;

- The higher cost is offset by the environmental benefits; and
- It is preferred over the Parallel Bridge Corridor because the Parallel Bridge Corridor would result in the following problems not likely to occur with the Pamlico Sound Bridge Corridor:
 - Far greater effects of storm damage at Oregon Inlet;
 - Much shorter life span;
 - Expensive maintenance and repair;
 - Destroy more than 30 acres of Pea Island National Wildlife Refuge; and
 - Require far more expense of taxpayer money.

D.1.2 Parallel Bridge Corridor Comments

Eleven comments were received that expressed support for the Parallel Bridge Corridor in general during the public comment period. Four comments supported the Parallel Bridge Corridor with no preference, while seven comments supported the Phased Approach/Rodanthe Bridge Alternative as the Preferred Alternative. Those opposed to the Parallel Bridge Corridor gave the following reasons:

- Long-term maintenance of NC 12 through Refuge would be too expensive and environmentally damaging;
- Concern about maintenance on a bridge that eventually would be in ocean;
- It would be less safe; and
- Negative economic impacts.

Those that supported the Parallel Bridge Corridor supported it because it maintains Refuge access.

D.1.3 Other Comments

Other comments received indicated:

- The alternative chosen must maintain access to the Pea Island National Wildlife Refuge;
- Private property would be negatively affected (visual and access) by some of the alternatives, including the Phased Approach/Rodanthe Bridge Alternative (listed as the Preferred Alternative in the FEIS);
- The bridge should be built as soon as possible (four comments);
- Concern about the safety of the existing bridge; and

- With the Phased Approach/Rodanthe Bridge Alternative, the improvement in Rodanthe is needed more than the bridge.

A letter also was received from State Senator Marc Basnight (see Appendix E) who restated his support of the Phased Approach/Rodanthe Bridge Alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA), as well as his position that the Bonner Bridge must be replaced as soon as possible for the safety of local residents and visitors. He also provided additional thoughts on the following issues: Refuge compatibility of the Phased Approach/Rodanthe Bridge Alternative; continued road access required to state-owned property; the terminal groin; CAMA development rules; fishing activities on northern Hatteras Island; and blockage of the Natural Bridge to Old House Channel.

D.2 Government Agency Comments and Responses

This section responds to written comments on the FEIS submitted by state and federal environmental resource and regulatory agencies, as well as local agencies. Each substantive comment requiring a response is listed below, followed by a response. The comments in the sections quote the correspondence received. The original correspondence is presented in Appendix E.

D.2.1 Federal Agencies

US Department of the Army, Wilmington District, Corps of Engineers

1. **Comment:** “Page 4-92, Section 4.7.3.2, **Parallel Bridge Corridor with NC 12 Maintenance.** It appears based on information presented in other sections of the FEIS that dredging for the construction barge channel could have affects to submerged aquatic vegetation (SAV) similar to constructing a haul road to complete the bridge behind (west side) Bodie Island. A statement should be added saying that potential dredging impacts would affect SAV. If these impacts are known they should be identified and quantified similar to how they are identified for the haul road.”

***Response:** Commitment 3 in the “Project Commitments” section of the FEIS and in this Environmental Assessment (EA) indicates that temporary work bridges (rather than dredging for barges) would be used for movement of construction equipment in shallow areas where submerged aquatic vegetation (SAV) is present. The impact would then be confined to the temporary impact of the work bridge foundation and shading. If SAV is in waters deep enough to float a barge without dredging, the use of a work bridge would not be necessary. In addition, Commitment 3 has been updated to emphasize that dredging would not be allowed within SAV areas. This issue also was discussed and resolved at the Concurrence Point 4A Merger Team meeting for Phase I on November 10, 2008 (see Section 3.3.1 in this EA).*

2. **Comment:** “It appears there still may be unresolved issues pertaining to whether or not the Phased Approach/Rodanthe Bridge Alternative (Preferred) will require a compatibility determination from the Pea Island National Wildlife Refuge. There are numerous references in the FEIS that a compatibility determination is not required because the Preferred Alternative [Phased Approach/Rodanthe Bridge] and any storm related NC maintenance to existing Highway 12 fall within the terms of the easement permit. However on page 4-8, it

states, “the USFWS will be responsible for determining whether or not the Phased Approach/Rodanthe Bridge Alternative is consistent with both the Refuge’s mission and plans, including the Comprehensive Conservation Plan, as well as the provisions of the National Wildlife Refuge System Act (NWRSA) of 1997.” It is unclear whether or not the term “consistent” encompasses the provisions of compatibility under the NWRSA of 1997.”

***Response:** In its October 2008 comment letter on the FEIS, the US Department of the Interior (USDOI) – Office of the Secretary confirmed that “If all the proposed work (staging areas, construction, and future maintenance of existing NC 12) is performed within the existing right-of-way and is in compliance with any terms and conditions contained within the easement deed, a Refuge compatibility determination will not be required.” NCDOT and FHWA believe this work can be performed within the existing easement or within the historic confines of what would constitute only a “minor” modification; however, a final decision regarding compatibility is the responsibility of the US Fish and Wildlife Service (USFWS).*

3. **Comment:** “In some sections of the FEIS documenting construction techniques it mentions SAV and wetlands will be bridged and in other sections it says there may be temporary impacts to these resources. It is our preference that all wetlands and SAV’s be bridged to the maximum extent practicable to reduce impacts to these valuable resources. All impacts both temporary and permanent will need to be identified and included as part of the Section 404 permit application.”

***Response:** This preference is acknowledged and all impacts will be identified in the permit application. Commitment 3 in the “Project Commitments” section of the FEIS and in this EA indicates that temporary work bridges (rather than dredging for barges) would be used for movement of construction equipment in shallow areas where SAV is present. If SAV is in waters deep enough to float a barge without dredging, the use of a work bridge would not be necessary. In addition, Commitment 3 has been updated to emphasize that dredging would not be allowed within SAV areas. This issue also was discussed and resolved at the Concurrence Point 4A Merger Team meeting for Phase I on November 10, 2008 (see Section 3.3.1 in this EA).*

4. **Comment:** “It should be noted that in addition to the U.S. Coast Guard Permit for the Oregon Inlet Bridge (Phase 1) component a Corps Section 10 permit would be required for any utility lines in or affecting navigable waters of the United States. A “utility line” is defined as any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, and telegraph messages, and radio and television communication. Pipes or pipelines used to transport gaseous, liquid, liquescent, or slurry substances over navigable waters of the United States are considered to be bridges, not utility lines, and may require a permit from the U.S. Coast Guard pursuant to Section 9 of the Rivers and Harbors Act of 1899.”

***Response:** Electric and telephone lines would be placed on the new Oregon Inlet bridge so they would not affect navigable waters. No pipes or pipelines would be built across Oregon Inlet in association with the new Oregon Inlet bridge.*

5. **Comment:** “Issues pertaining to the removal or retention of the terminal groin still exist with the Phased Approach/Rodanthe Bridge Alternative. It appears based on information presented in the FEIS that NCDOT needs the terminal groin to remain in place for its preferred alternative [Phased Approach/Rodanthe Bridge]. NCDOT should act accordingly

in trying to obtain the necessary special use permit from the U.S. Fish and Wildlife Service (FWS) for the retention of the terminal groin prior to the issuance of the Corps Section 404/10 permit, CAMA permit, and US Coast Guard Permit. A National Park Service (NPS) Special Use Permit would also need to be obtained for the bridge terminus on Bodie Island. Additionally, the Corps navigation section in a letter dated September 18, 2008 expressed concern that delaying the application and issuance of the Special Use Permit may render the constructed Navigation Zone useless and most likely jeopardize the structural integrity of the newly constructed southern bridge abutment.”

***Response:** The FEIS assumes that the terminal groin would remain in place, which is also a critical issue for the US Army Corps of Engineers (USACE) in its efforts to maintain the navigation channel through Oregon Inlet. NCDOT will continue coordinating with USFWS on terminal groin permit requirements, as well as with the National Park Service (NPS) on its permit requirements. NCDOT plans to seek retention of the groin in association with Phase I of the project. All permits needed in association with the project will be obtained prior to the start of construction.*

6. **Comment:** “It is recommended to prevent possible permit delays that NCDOT and FHWA coordinate and complete a Memorandum of Agreement with the State Historic Preservation Office and the Advisory Council on Historic Preservation in consultation with other consulting parties, as per the requirement of Section 106 of the Historic Preservation Act of 1966. Additionally, to prevent possible permit delays, coordination needs to be completed with NOAA’s National Marine Fisheries Service (NMFS) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) specifically as it relates to Essential Fish Habitat (EFH). To date, we haven’t seen any documentation that the NMFS concurs with the Essential Fish Habitat Assessment which was completed for this project nor have we seen any conservation recommendations proposed. Prior to Corps authorization for this project, we will need to ensure that our legal requirements are satisfied and fulfilled under Section 106 of the Historic Preservation Act of 1966 and the Magnuson Stevens Act.”

***Response:** Coordination with the ACHP and the HPO under Section 106 is underway, and the final Programmatic Agreement will be finalized before the release of the Record of Decision (ROD). Coordination with the National Marine Fisheries Service (NMFS) under the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.) has been completed. The findings of the Essential Fish Habitat (EFH) report prepared as a part of this coordination are summarized in FEIS Section 4.7.6.2. These findings are affirmed by NMFS in their FEIS comment letter of October 27, 2008 by the following recommendation: “If NCDOT moves forward with the currently selected plan [Phased Approach/Rodanthe Bridge Alternative], we recommend early initiation of a long-term study to characterize changes in habitats along Hatteras and Bodie Islands so that adequate information is available for examining applications to USACE for project authorization, including mitigation for unavoidable impacts to EFH.” EFH findings related to the NC 12 Transportation Management Plan Alternative are presented in Section 2.3.3.5 of this EA.*

7. **Comment:** “Page 4-131, Section 4.7.10.3, **Compensatory Mitigation.** The FEIS states “temporary impacts to wetlands would be mitigated on a 1:1 basis by restoring these areas to their preconstruction condition.” As we discussed in our December 14, 2005 comment letter for the SDEIS, until these impacts can be more thoroughly assessed we are unable to agree that a 1:1 ratio for temporary impacts is appropriate. Factors such as compaction and changes

to adjacent landscape sometimes limit how these areas can be restored. Mitigation ratios and/or specific mitigation guidelines and conditions for temporary impacts will be assessed during the permit process.”

***Response:** NCDOT will continue to coordinate with USACE during the final design engineering to identify adequately all temporary impacts to wetlands and appropriate mitigation ratios. These issues will be resolved prior to the start of construction during the permitting process, which includes Merger Team meetings for Concurrence Points 4B and 4C.*

8. **Comment:** “Pages 4-132, 4-134, 4-135, and 4-131, Section 4.7.10.3, **Mitigation of Permanent Wetland Impacts.** The mitigation section is a little confusing since temporary impacts are discussed in one context and permanent impacts in another (also Tables 4-25 and 4-26) but then it appears the later narrative sections describing the different types of wetlands includes all impacts. Then the second to last paragraph on page 4-134 then states Section 404 jurisdictional wetlands will total 0.47 acres for the Parallel Bridge Corridor with Phased Approach/ Rodanthe Bridge Alternative. The total wetland impacts for the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative considering all permanent and temporary impacts far exceed 0.47 acres. The Record of Decision (ROD) should clarify and quantify all impacts described in this section of the FEIS. While we agree that potential compensatory wetland mitigation includes on-site restoration and enhancement of in-kind wetlands as compensation for as much of the permanently affected areas as possible, we are in disagreement at this point in time that the mitigation credit available from the Balance Farm Mitigation could provide for all or a portion of the mitigation required for the Preferred Alternative [Phased Approach/Rodanthe Bridge]. Our basis for this is that the wetlands that exist at the Balance Farm Mitigation Site are out-of-kind as compared to the impacts that would take place for the proposed project. More in-depth analysis needs to be completed for the mitigation options that may exist for this project and should be submitted ideally at the time of permit application so they may be assessed accordingly without causing permit delay.”

***Response:** The commenter’s position on proposed wetland mitigation is acknowledged. NCDOT will continue to coordinate with USACE during the permit process on appropriate mitigation sites. As noted by the commenter, FEIS Tables 4-25 and 4-26 summarize the total permanent (0.47 acre) and temporary (7.12 acres) wetland impacts, respectively, for the detailed study alternatives. Tables 2-5 and 2-6 of this EA present amended permanent wetland impact numbers for Phase I and all phases (replacing Table 4-25 of the FEIS). They take into account revisions to several detailed study alternatives within the community of Rodanthe and at Oregon Inlet. They also reflect the NC 12 Transportation Management Plan Alternative (Preferred). Temporary impacts remain as presented in FEIS Table 4-26.*

9. **Comment:** “We respectively would like to place emphasis on **Section 2.15** on page 2-148, **Section 8.10.3** on page 8-32, and pages **D-12-D-14** in Volume 2 of the FEIS which address key points in selecting the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the LEDPA (preferred alternative) for this project. As this project proceeds forward it should be duly noted that the agreement was that the ‘remaining phases of work in the Phased Approach/Bridge Alternative indicate work on Pea Island will be done within the existing easement via the construction of short bridge segments, or other alternatives as determined at that time. The agencies concur, based on the information available today, they can not conclusively say that permits or approvals will or will not be granted for these

additional phases. The agencies do agree that permits will not be granted for these remaining phases of work until their applicable laws and regulations have been satisfied. The agencies are reaching concurrence on this approach for the purposes of advancing the project to a ROD but are making it clear the remaining phases of work may need further study after the ROD but before any permits or approvals are granted.”

***Response:** Comment noted. These points were acknowledged again in the LEDPA (Least Environmentally Damaging Practicable Alternative) amendment, which was signed by FHWA, NCDOT, NCDENR, and USACE in January 2010 to acknowledge the agreement of the signatories that the NC 12 Transportation Management Plan Alternative (Preferred) is the LEDPA. A copy of this agreement is included in Appendix A.*

US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service

1. **Comment:** “Our previous comment letters and material submitted in conjunction with the Merger 01 process details the essential fish habitat (EFH) and federally managed fishery species that could be adversely affected by the project over its design life. For brevity, that information will not be repeated here.”

***Response:** Comments previously submitted were addressed in FEIS Section 8.12.3. In addition, an Essential Fish Habitat Assessment (CZR, Incorporated, 2008) was prepared to assess impacts to EFH resulting from the Phased Approach/Rodanthe Bridge Alternative. The EFH assessment was prepared in accordance with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act (16 USC 1801 et seq.), which requires federal agencies to consult with the US Secretary of Commerce on all actions, or proposed actions, authorized, funded, or undertaken by the agency that might adversely affect EFH. The EFH assessment was prepared in coordination with NMFS and the report’s findings are summarized in FEIS Section 4.7.6.2 and EA Section 2.3.3.5. These findings are applicable to the NC 12 Transportation Management Plan Alternative (Preferred) given that they represent the reasonably foreseeable range of potential actions and impacts for Phase I and future phases of the NC 12 Transportation Management Plan based on current knowledge. Impacts to EFH for both Phase I and future phases are shown in Table 4-27 on page 4-105 of the FEIS.*

2. **Comment:** “While no beach nourishment is proposed in the short term, over the long term the beach nourishment needed to protect NC 12 could significantly alter and degrade the value of surf zone habitat to migrating fish and to fish that use the surf zone as nursery habitat.”

***Response:** Beach nourishment is not a part of Phase I of the NC 12 Transportation Management Plan Alternative (Preferred). However, in the course of developing the details of future phases and associated updates to the environmental impact assessments contained in the FEIS and this EA, if the inclusion of nourishment was found to be desirable and applicable environmental protection laws including the Magnuson-Stevens Fishery Conservation and Management Act could be met, then nourishment could be included in future phases. The impact of nourishment is addressed in the FEIS for the length of the project.*

3. **Comment:** “The FEIS improves upon the SSDEIS in discussing the value of and impacts to surf zone EFH in the Pea Island National Wildlife Refuge, however, the FEIS does not fully consider the significant habitat changes associated with bridge supports in the surf zone and ultimately the near shore ocean. As noted in our comments on SSDEIS and during the Merger 01 process, NMFS believes habitat impacts associated with the Pamlico Sound Bridge Corridor could be mitigated while the impacts associated with a bridge in the surf zone are largely unknown.”

***Response:** FEIS Section 4.7.6.2 discusses the potential impacts to surf zone EFH resulting from the Phased Approach alternatives. These findings are applicable to future phases of the NC 12 Transportation Management Plan Alternative (Preferred) given that they represent the reasonably foreseeable range of potential actions and impacts for future phases of the alternative based on current knowledge. The potential habitat changes are sufficiently understood and presented in the FEIS and Section 2.3.3.5 of this EA, and FHWA and NCDOT would welcome and respond to specific comments that NMFS may have.*

4. **Comment:** “Under the phased approach alternatives, the maximum length of bridge over the ocean beach is expected to be 8 miles in 2060 and 3.3 miles in 2020. NMFS notes there is considerable uncertainty in these estimates and the impacts to fishery species and their habitats from the project also are not well known.”

***Response:** The estimates in FEIS Table 4-23 of the “Bridge Length and Area beneath Bridge by Habitat and Year” for the Phased Approach alternatives are based on the best information on shoreline erosion available. A high erosion shoreline (i.e., a shoreline that experiences an erosion rate greater than past trends) was assumed in developing alternatives for NC 12 maintenance through 2060 (see page 3-57 of the FEIS). Any inaccuracy in these estimates would be addressed in appropriate NEPA documentation to be completed prior to each future phase of the NC 12 Transportation Management Plan Alternative (Preferred) in accordance with 23 CFR 771.129-130. In the FEIS, only the Phased Approach alternatives result in bridges over open beach.*

5. **Comment:** “Accordingly, we continue to support the Pamlico Sound Bridge Corridor as the preferred alternative, and we disagree with the statement in Section 4.7.6, paragraph 1, line 16 that the Parallel Bridge Corridor would have less of an impact on fish and shellfish communities.”

***Response:** Disagreement acknowledged. FHWA and NCDOT reaffirm the statement in Section 4.7.6 on page 4-102 that says: “The Parallel Bridge Corridor would have less of a construction impact on fish and shellfish communities because of less bridge construction over open water.” Further analysis presented in the October 2009 Revised Final Section 4(f) Statement indicates that the Pamlico Sound Bridge Corridor is not a prudent option to avoid Section 4(f) resources such as Pea Island National Wildlife Refuge. Therefore, the Pamlico Sound Bridge Corridor alternatives have been dropped from further consideration.*

6. **Comment:** “Page xxxiv, 7. Design Coordination: NMFS should be added to the agencies participating in the project design and mitigation strategies.”

Response: *Commitment 8 in the “Project Commitments” section of this EA (revised from a similar commitment [Commitment 7] in the FEIS) specifically commits NCDOT to coordinate design work with those who own the lands through which the NC 12 easement passes, as well as the members of the project’s NEPA/Section 404 Merger Team. Merger Team members are listed in Section 8.3.1 of the FEIS. NMFS would have an opportunity to participate in project design and mitigation strategies for Phase I during the Merger Team meetings for Concurrence Points 4B and 4C.*

7. **Comment:** “Page xxxiv, 9. Disposal of Dredged Material: Any dredged material disposal site should be designed as a multi-purpose site in consultation with NMFS.”

Response: *Commitment 10 in the “Project Commitments” section of this EA (revised from a similar commitment [Commitment 9] in the FEIS) says NCDOT would coordinate disposal sites with appropriate agencies. That would include NMFS.*

8. **Comment:** “Page xxxviii, 26. Submerged Aquatic Vegetation Survey: Any survey of SAV in the vicinity of Oregon Inlet should follow protocols endorsed by NMFS.”

Response: *Commitment 26 in the “Project Commitments” section of the FEIS has been revised in this EA to include this request. It is Commitment 27 in this EA.*

9. **Comment:** “Page 3-61, 3.6.3.4 Potential for a Breach to Open in the Project Area: This section provides substantial detail regarding the future conditions in the project area; however it should be noted that the level of concern NMFS has over these conditions would be substantially lessened by the construction of a Pamlico Sound Bridge Alternative.”

Response: *Position noted; however, the Pamlico Sound Bridge Alternatives have been determined not to be feasible and prudent under Section 4(f) of the Department of Transportation Act and subsequently dropped from further consideration. Also of note, the NEPA/404 Merger team, through its elevation process, has determined that neither Pamlico Sound Bridge alternative is practicable.*

10. **Comment:** “Page 3-78, 3.7.3.2 Beach: This section should include information on the invertebrates found in the beach intertidal zone or be relabeled as “Dry Beach” and a new section should be added called “Wet/Intertidal Beach.””

Response: *In response to this comment the first paragraph in FEIS Section 3.7.3.2 (page 3-78) is hereby replaced with the following (new material is in bold text):*

These bare, transitional areas between the open water and upland terrestrial community are characterized by sand flats. They typically consist of a dry berm zone beyond the mean high tide line, an intertidal zone that is regularly covered by tidal action, and a subtidal zone that exists below the low tide mark, including the top and beachside of dunes. This community undergoes frequent, natural disturbance and is typically void of vegetation, however, it can be characterized by a small number of species and the dominance of succulents. Within the project area, sea kale (*Cakile harperi*) and seaside pennywort (*Hydrocotyle bonariensis*) dominate, with small occurrences of beach pea (*Strophostyles helvola*), beach spurge (*Euphorbia polygonifolia*), and sea rocket (*Cakile edentula*) situated along the highest wrack or seaweed lines. **Invertebrates such as the Atlantic ghost crab (*Ocypode ceratophthalma*) occur in the dry berm**

zone and feed in the intertidal zone. Subtidal invertebrates include coquina clams (*Donax sp.*), mole crabs (*Emerita sp.*), the spionid polychaete (*Scolopsis squamata*), and several species of amphipod and occur in the intertidal and wet beach zones (Street et al., 2005). Substantial erosion of the beachside of the dunes in the Refuge occurred during Hurricane Isabel in 2003. Along the southern end of Bodie Island near the campground, the beach within the project boundary is approximately 400 feet (122.0 meters) wide; the widest point within the project boundary at Rodanthe is approximately 700 feet (213.4 meters) wide.

The following additional reference is added to the FEIS as a result of the revisions documented above:

Street, M. W., A. S. Deaton, W. S. Chappell, and P. D. Mooreside. 2005. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, North Carolina. 656 pp.

These two changes provide additional information related to the Affected Environment. However, neither change is significant.

11. **Comment:** “Page 3-90, Table 3-20: The information on fish harvests is old and should be updated to depict the most recent information from NCDENR Division of Marine Fisheries.”

***Response:** This is background information that is not directly related to the impact assessment or decision. An update is not needed in the current context of the project.*

12. **Comment:** “Page 3-91, 3.7.6.3 Essential Fish Habitat: For clarity, we recommend this section be combined with Section 4.7.6.2 EFH Assessment.”

***Response:** FEIS Section 3.7.6.3 discusses EFH in terms of the “Affected Environment” (i.e., FEIS Chapter 3 issues) and Section 4.7.6.2 discusses EFH-related “Environmental Consequences” (i.e., FEIS Chapter 4 issues). All of the natural and human environment-related issues discussed in the FEIS are arranged in this format.*

13. **Comment:** “Page 3-92, 3.7.6.3 Essential Fish Habitat: Table 3-22 Inshore and Marine Essential Fish Habitats. The surf zone should be included in this table and a corresponding section added to the text associated with this table.”

***Response:** In response to this comment, FEIS Table 3-22 is replaced with the following (new table row is in bold text):*

Table 3-22. Inshore and Marine Essential Fish Habitats

Inshore	Found in Project Area
Estuarine emergent	Yes
Estuarine shrub/scrub (mangrove)	No
Seagrass	Yes
Oyster reef and shell bank	Yes
Intertidal flats	Yes

Table 3-22 (concluded). Inshore and Marine Essential Fish Habitats

Inshore	Found in Project Area
Palustrine emergent and forested (freshwater)	Yes (interdunal swales)
Aquatic bed (tidal freshwater)	No
Estuarine water column	Yes
Marine	
Live/hard bottom	No
Coral and coral reef	No
Artificial/manmade reef	No
Sargassum	No
Water column	Yes
Surf zone	Yes

In addition, the following new paragraph is inserted on FEIS page 3-94 after the “Marine Water Column” sub-section:

Surf Zone

The surf zone includes shallow subtidal areas of breaking waves seaward of the intertidal beach. These high salinity areas contain constantly shifting sandbars, ridges, and swales that develop in response to wave energy. There are high levels of sand transport and these areas experience rapid scour and fill events. The burrowing benthic invertebrates present in this area are abundant and provide an important fishery food source (Street et al., 2005).

In addition, the first sentence in the second paragraph in FEIS Section 4.7.6.2 (page 4-104) is replaced with the following (new material is in bold text):

Both replacement bridge corridor alternatives would produce turbidity, noise, and siltation resulting from construction, which in turn would create localized, short-term impacts to essential fish habitat (EFH) including estuarine emergent wetlands, oyster reef and shell bank, SAV beds, intertidal flats, marine and estuarine water column, **and the surf zone.**

Finally, FEIS Table 4-27 is replaced with the following (new table rows are in bold text):

Table 4-27. Potential Construction Impacts to Inshore and Marine Essential Fish Habitat

Pamlico Sound Bridge Corridor		
Inshore EFH	Bridge Construction	Dredging
Estuarine emergent	Temporary disturbance; shading; some permanent loss from piles	None
Seagrass ¹	Temporary disturbance; shading; some permanent loss from piles	Temporary indirect disturbance; potential for some permanent loss because of turbidity and siltation

Table 4-27 (continued). Potential Construction Impacts to Inshore and Marine Essential Fish Habitat

Pamlico Sound Bridge Corridor		
Inshore EFH	Bridge Construction	Dredging
Oyster reef and shell bank ²	Temporary disturbance; some permanent loss from piles	Removal in areas where this habitat is present; potential permanent loss of living beds through direct or indirect dredging impact
Intertidal flats	Temporary disturbance; some permanent loss of habitat from piles	Removal of sediment
Palustrine emergent and forested (freshwater wetlands)	Small loss of wetland maritime grassland	None
Estuarine water column (Pamlico Sound) ³	Temporary increase in turbidity and decline in dissolved oxygen	Temporary increase in turbidity and decline in dissolved oxygen
Marine EFH	Fill and Pile	Dredging
Water column (Oregon Inlet) ⁴	Potential temporary increase in turbidity in Oregon Inlet	Potential temporary increase in turbidity in Oregon Inlet
Surf zone (Oregon Inlet)⁴	Potential temporary increase in turbidity in Oregon Inlet	Potential temporary increase in turbidity in Oregon Inlet
Parallel Bridge Corridor (Oregon Inlet and Rodanthe area bridges)		
Inshore EFH	Bridge Construction	Dredging
Estuarine emergent	Temporary disturbance; shading; some permanent loss from piles and temporary loss of habitat from construction of temporary haul road for the Oregon Inlet bridge	None
Estuarine shrub-scrub mangroves	None	None
Seagrass ¹	Temporary disturbance; shading; some permanent loss from piles	Temporary indirect disturbance; potential for some permanent loss because of turbidity and siltation
Oyster reef and shell bank ²	Temporary disturbance; some permanent loss from piles	Removal in areas where this habitat is present; potential permanent loss of living beds through direct or indirect dredging impact
Intertidal flats	Temporary disturbance; some permanent loss of habitat from piles	Removal of sediment
Palustrine emergent and forested (freshwater)	Temporary disturbance; shading; some permanent loss from piles	None

Table 4-27 (concluded). Potential Construction Impacts to Inshore and Marine Essential Fish Habitat

Parallel Bridge Corridor (Oregon Inlet and Rodanthe area bridges)		
Inshore EFH	Bridge Construction	Dredging
Estuarine water column (Pamlico Sound) ³	Temporary increase in turbidity and decline in dissolved oxygen	Temporary increase in turbidity and decline in dissolved oxygen
Marine EFH	Fill and Pile	Dredging
Water column (Oregon Inlet) ⁴	Potential temporary increase in turbidity in Oregon Inlet with Oregon Inlet bridge	Potential temporary increase in turbidity in Oregon Inlet with Oregon Inlet bridge
Surf zone (Oregon Inlet)⁴	Potential temporary increase in turbidity in Oregon Inlet with Oregon Inlet bridge	Potential temporary increase in turbidity in Oregon Inlet with Oregon Inlet bridge

¹Also Habitat Areas of Particular Concern (HAPC) for summer flounder, red drum, and the snapper grouper management unit.

²Oyster reef and shell bank is also HAPC for the snapper grouper management unit.

³Pamlico Sound is also HAPC for Penaeid shrimp.

⁴Oregon Inlet is also HAPC for Penaeid shrimp, red drum, and the snapper grouper management unit.

These changes provide additional information related to the Affected Environment. These are not significant changes.

14. **Comment:** “Page 3-98, 3.7.6.4 Benthic Communities: Common surf zone benthic species (such as *Donax* sp. and *Emerita* sp.) that are important food sources for fishery resources should be included in this section.”

Response: In response to this comment, the first paragraph in FEIS Section 3.7.6.4 (page 3-98) is replaced with the following (new material is in bold text):

Bottom-dwelling polychaetes, oligochaetes, amphipods, isopods, and the commercially valuable oyster (*Crassostrea virginica*) and hard clam (*Mercenaria mercenaria*) ingest both phytoplankton and zooplankton. Benthos (organisms that live on or in the bottom sediments of a body of water) found near Oregon Inlet, as documented by the NCDENR, indicate that polychaetes (*Nereis succinea*, *Laeonereis culveri*, and *Heteromastus filiformis*), decapods (*Rithropanopeus harrisi* and *Palaemonetes pugio*), amphipods (*Corophium lacustre*, *Gammarus fasciatus* and *G. palustris*), isopods (*Cyathura polita* and *Cassinidea ovalis*), tanaids (*Hargeria repax*), and mollusks (*Rangia cuneata*, *Geukensia demissa*, *Macoma balthica* and *Teredo* sp.) are frequently found in the nearby sounds. (Personal communication, August 14, 1990, Lawrence Eaton, Division of Environmental Management.) **Additional benthic invertebrates that are also important fishery food sources are present in the project area in the high salinity surf zone exposed to the ocean. These include macrofauna such as mole crabs, coquina clams, the spionid polychaete, and amphipods, as well as a high diversity of microscopic meiofauna (Street et al., 2005).**

This change provides additional information related to the Affected Environment. It is not a significant change.

15. **Comment:** “Page 4-104, 4.7.6.2 Essential Fish Habitat: For clarity, we recommend this section be combined with Section 3.7.6.3 Essential Fish Habitat.”

***Response:** FEIS Section 3.7.6.3 discusses EFH in terms of the “Affected Environment” (i.e., FEIS Chapter 3 issues) and Section 4.7.6.2 discusses EFH-related “Environmental Consequences” (i.e., FEIS Chapter 4 issues). All of the natural and human environment-related issues discussed in the FEIS are arranged in this format.*

16. **Comment:** “Page 4-107, 4.7.6.2 Parallel Bridge Corridor with NC 12 Maintenance: The title of this section is confusing since it addresses impacts to EFH that are not within the context of bridge maintenance.”

***Response:** The phrase “Parallel Bridge Corridor with NC 12 Maintenance” as used in the subheading on FEIS page 4-106 does not refer to **short-term** NCDOT efforts to maintain NC 12 through the Refuge and in northern Rodanthe, but rather to the **long-term** maintenance of NC 12 associated with Phases II to IV of the Phased Approach alternatives, and now also the NC 12 Transportation Management Plan Alternative (Preferred). This phrase is used in this context consistently throughout the FEIS for all of the alternatives in the Parallel Bridge Corridor.*

17. **Comment:** “Page 4-134, 4.7.10.3 Compensatory Mitigation, Submerged Aquatic Vegetation Beds: This section is out dated and should be rewritten to focus on the substantial improvements in SAV mitigation techniques that have occurred since 1994.”

***Response:** Commitment 3 in the “Project Commitments” section of this EA (revised from a similar commitment in the FEIS) indicates that work bridges (rather than dredging for barges) would be used for movement of construction equipment in shallow areas where SAV is present. If SAV is in waters deep enough to float a barge without dredging, the use of a work bridge would not be necessary. No update is needed given NCDOT’s commitment to this mitigation strategy. Commitment 3 was updated for the EA to emphasize that dredging would not be allowed within SAV. This issue also was discussed and resolved at the Concurrence Point 4A Merger Team meeting for Phase I on November 10, 2008.*

18. **Comment:** “NMFS remains concerned that bridge replacement alternatives that require long-term beach nourishment and construction and maintenance of bridge structures in the surf zone (i.e., the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge) could result in long-term adverse impacts to NOAA trust resources.”

***Response:** Concern noted. Beach nourishment is not a part of Phase I of the NC 12 Transportation Management Plan Alternative (Preferred). However, if in the course of developing the details of future phases and associated updates to the environmental impact assessments contained in the FEIS and this EA, the inclusion of nourishment was found to be desirable and applicable environmental protection laws could be met, then nourishment could be included in future phases. The impact of nourishment is addressed in the FEIS for the length of the project.*

19. **Comment:** “We acknowledge that alternatives within the Pamlico Sound Bridge Corridor involve direct impacts to SAV and estuarine marsh, but we believe these impacts could be adequately addressed through sequential mitigation.”

Response: NCDOT will continue to coordinate with NMFS during the permitting process on an appropriate compensatory mitigation plan, including during the Merger Team meetings for Concurrence Points 4B and 4C.

20. **Comment:** “We continue to believe that the Pamlico Sound Bridge Alternative best supports the purpose and need for this project with the least impact to important estuarine and marine resources in the project area.”

Response: Position noted; however, the Pamlico Sound Bridge Alternatives have been determined not to be feasible and prudent under Section 4(f) of the Department of Transportation Act and subsequently dropped from further consideration. Also of note, the NEPA/404 Merger team, through its elevation process, has determined that neither Pamlico Sound Bridge alternative is practicable.

21. **Comment:** “If NCDOT moves forward with the currently selected plan [Phased Approach/Rodanthe Bridge Alternative], we recommend early initiation of a long-term study to characterize changes in habitats along Hatteras and Bodie Islands so that adequate information is available for examining applications to the US Army Corps of Engineers for project authorization, including mitigation for unavoidable impacts to EFH.”

Response: This comment relates to the Preferred Alternative in the FEIS rather than the new Preferred Alternative, NC 12 Transportation Management Plan Alternative. EFH findings related to the NC 12 Transportation Management Plan Alternative are presented in Section 2.3.3.5 of this EA.

US Department of Interior, National Park Service

1. **Comment:** “NPS concurs with the comments being prepared by USFWS on the FEIS.”

Response: NPS’ concurrence with USFWS’ FEIS comments is acknowledged. Responses to USFWS’ comments are provided in the next section of this appendix.

2. **Comment:** “We continue to note that the Final Environmental Impact Statement (FEIS) does not adequately examine or address the economic and physical impacts to the Park’s largest concessioner, the Oregon Inlet Fishing Center (OIFC) nor does it adequately address impacts on visitor access to the OIFC and other recreational sites in the project area (e.g., NPS Oregon Inlet Campground, Ramp 4 accessing the Bodie Island Spit).”

Response: The NPS comment on impacts to the OIFC was responded to on page 8-72 and 8-81 of the FEIS. Impacts to the OIFC are limited to the potential relocation of its septic field. Minimal or no disruption of access (and associated economic impacts) is anticipated for the OIFC, including Ramp 4 and the Oregon Inlet Campground. NCDOT has been coordinating with NPS and OIFC management since 2008 on several issues, including providing for access to the OIFC and other recreational areas during construction. Coordination on these issues will continue as the project moves into the final design and permitting stage.

3. **Comment:** “The FEIS does not address the environmental and financial consequences of the loss of the “crack” by the fleet of Charter Boat Captains of the OIFC. The loss of the “crack” would result in an increased consumption at an estimated volume of 90,000 gallons of fuel annually, in addition to increasing the travel time for every trip of the Charter Fleet by one hour roundtrip.”

Response: Page 8-43 of the FEIS includes a summary of the discussion with OIFC management on the loss of use of the crack. The discussion indicated that an extra 30 minutes would be required each way with the loss of the crack, so the one hour increase in roundtrip is correct. The “crack,” however, is not the formally designated navigation route between Oregon Inlet and the OIFC. The crack first opened and was used by boaters in 1991/1992, and OIFC captains started maintaining it with rope, buoys, and reflective tape in 1993. Vessels are operating along this informal route in an area immediately west of Bonner Bridge, making the “crack” impossible to avoid. The loss of the “crack” for use by OIFC Charter Boat Captains would mean they would have to use the formally designated route. It should be noted that both the Parallel Bridge Corridor alternatives and the Pamlico Sound Bridge Corridor alternatives would both affect the “crack.” Prior to the release of a Record of Decision, NCDOT will investigate whether it is possible to reduce the impacts of Phase I to the “crack” and will coordinate with the NPS on its findings.

4. **Comment:** “With respect to impacts on visitor access to other recreational sites in the project area, implementation of the preferred alternative would necessitate the relocation of Ramp 4 and mitigation for damage of the NPS-owned segment of NC 12 on Bodie Island incurred as a result of transporting the projected 100 ton loads for construction of the bridge.”

Response: Ramp 4 and the Oregon Inlet Campground driveway will be connected to NC 12 at their current location. NC 12 is owned and maintained by NCDOT and not NPS. If it is damaged by transport of materials and equipment during construction, it will be repaired by NCDOT. It is expected, however, that virtually all materials used in bridge construction will be transported to the site by barge and not over the area’s highway system. NCDOT will continue to coordinate with NPS access to recreational sites within the Seashore during construction

5. **Comment:** “The FEIS discusses the necessity to use barging for the transportation and erection of bridging structures, the possible dredging of NPS submerged lands at Oregon Inlet that may be required to accommodate such barging, and the disposal of dredging spoil. The NPS must be consulted for any barge channel dredging that occurs within Seashore jurisdiction. NPS will not authorize any NPS-owned land within the Seashore to be used as a borrow pit nor will it allow any dredged materials to be permanently deposited on NPS-owned land, with the possible exception of Green Island following appropriate consultation with other Federal and state agencies. NPS suggests NCDOT consult with the NPS, NC, ACOE, WRC, and USFWS on the potential to apply dredge spoils to Green Island, a small naturally occurring island, to improve habitat quality as a nesting site for American oystercatchers and colonial waterbirds. NPS requests that NCDOT confirm that the area referred to as the “Oregon Inlet Shoal” in the FEIS is in fact the submerged lands surrounding Green Island. NPS suggests that NCDOT clarify whether the proposed floating of construction barges and dredging of the Oregon Inlet Shoal would affect Green Island and in fact be performed in accordance with the Terms and Conditions of the Biological and Conference Opinions (USFWS 2008). All of the proposed activities related to replacement of

the Bonner Bridge must comply with the Terms and Conditions of the Biological and Conference Opinions (USFWS 2008).”

Response: *The area referred to in the FEIS as Oregon Inlet Shoal is also Green Island. NPS will be consulted on all construction activities within the Seashore, including barge channel dredging. The “Biological and Conference Opinion Terms and Conditions” (included on FEIS page 4-139) state that dredge spoil excavated for construction barge access must be used to augment either existing dredge-material islands, or to create new dredge-material islands for use by foraging piping plovers. No NPS owned land in the Seashore will be used as a borrow pit. No dredged material will be deposited on NPS-owned land except following appropriate consultation. Note that the Oregon Inlet Shoal is a naturally occurring island is not a dredge material island.*

6. **Comment:** “NPS acknowledges that, where possible, proposed actions have been described in detail and corresponding impacts have been identified in this FEIS. However, a number of proposed actions related to the preferred alternative for bridge replacement may require additional environmental analysis and documentation (compliance) prior to the issuance of NPS permits to implement each of these proposed actions within or with the potential for impacting Cape Hatteras National Seashore. NPS reasserts that additional environmental compliance would be required for any proposed action related to the preferred alternative not fully evaluated in the FEIS and will require that NCDOT or its designee plan and prepare the required documents. Among the proposed actions for which separate environmental compliance documents may be required are:

- construction staging;
- construction of a haul road, use of dredge, or construction of work bridge to facilitate construction of the north approach spans;
- relocation of septic fields near the Oregon Inlet Fishing Center;
- relocation of Ramp 4 beach access road on Bodie Island;
- dredging and disposition of dredge spoils;
- subsequent phases relating to other NC12 construction and maintenance components;
- the fate of the terminal groin at Pea Island NWR;
- procedures involved in demolition and removal of bridge;
- Addressing ACOE concerns on substructure to protect the Davis Slew and confirmation of the continued existence of the terminal groin.

Environmental compliance and resultant decision documents would be required prior to the issuance of NPS permits to implement each of these proposed actions within the National Seashore.”

Response: *NCDOT will provide any information requested by NPS for the topics above that relate to Oregon Inlet bridge construction and Bonner Bridge demolition*

as a part of its coordination with NPS during the final design, right-of-way acquisition, and permit development of Phase I. NPS will continue to be a member of the NEPA/Section 404 Merger Team that will select future phases of the project for implementation, as discussed in Section 2.3.2.2 of this EA. NCDOT is currently working with USFWS regarding the retention of the terminal groin at the north end of Hatteras Island. NCDOT and FHWA are working with USACE and the US Coast Guard, the federal agencies that issue navigation permits for the project, on issues relating to the navigational channel and Davis Slough; other agencies will be apprised of any decisions related to channel navigation as the project moves forward.

US Department of the Interior, Office of the Secretary

1. **Comment:** “The Department and the Fish and Wildlife Service (FWS) have provided detailed comments on this project throughout the planning process; raising numerous concerns about the effects of Parallel Bridge Corridor alternatives (including the [Phased Approach/Rodanthe Bridge]) on Pea Island National Wildlife Refuge (Refuge). While the FEIS does a better job of acknowledging our previously submitted comments, concerns still remain about the project and its potential impact to the Refuge. Rather than repeat those concerns here, the purpose of this letter is to succinctly state our views regarding the proposed project.”

Response: *Observations noted.*

2. **Comment:** “Specific comments related to the Endangered Species Act of 1973 will be provided by the Service under separate cover.”

Response: *The letter referenced is dated November 2008 and the comments and responses are presented below.*

3. **Comment:** “Currently, with NC-12 passing through the Refuge at grade over its entire 11.8-mile length, the Refuge has a predominantly natural character (in terms of both visual and acoustic qualities). As such, the existing road represents a relatively small intrusion on the quality of the wildlife viewing and photography activities of our many visitors. Similarly, while the existing road does adversely affect the wildlife resources and ecological processes of the Refuge, the current configuration represents the lowest possible level of such effects, while maintaining a paved transportation corridor through the Refuge. Although an elevated roadway through the Refuge would allow for westward sand migration to proceed unabated, issues such as lighting and disorientation of sea turtle hatchlings, and shading of sea turtle and migratory bird nests that require open, sun heated sand would increase. We recommend NCDOT fully address measures or plans to off-set these new issues on the Refuge.”

Response: *NCDOT and FHWA considered this comment and others regarding the potential impacts of the Parallel Bridge with the Phased Approach bridging. NCDOT and FHWA conducted additional agency coordination meetings to reconsider other alternatives, including the Parallel Bridge with Road North/Bridge South alternative, in response to this comment. Additional Phase I bridge length within the Refuge is described in Section 2.3.2.1 of this EA. The elevation of future phases will depend on the design approach taken, with the Road North/Bridge South and Nourishment Alternatives retaining current road elevations and the All Bridge and the Phased Approach placing NC 12 on a bridge. Issues related to lighting and*

sea turtle hatchling nesting and piping plover nesting are addressed in Section 4.7.9, 4.7.10.5, and Appendix E (USFWS' Biological and Conference Opinions [USFWS, 2008]) of the FEIS.

4. **Comment:** “Even though the information presented in the FEIS and Section 4(f) Evaluation is proposing a Parallel Bridge Corridor alternative, it still demonstrates that implementation of any of the Parallel Bridge Corridor alternative may violate section 4(f) because the Pamlico Sound alternative would appear to be feasible and prudent and would minimize harm to the Refuge (a section 4(f) property).”

Response: *FHWA issued a Revised Final Section 4(f) Evaluation on October 9, 2009. The Revised Final Section 4(f) Evaluation included an evaluation of the Pamlico Sound Bridge Corridor Alternative as a feasible and prudent avoidance alternative under Section 4(f) of the Department of Transportation Act. FHWA determined that the Pamlico Sound Bridge Corridor Alternative would not be a feasible and prudent avoidance alternative as defined in 23 CFR 774.17. USDOJ's December 3, 2009 letter provided comments on the Revised Final Section 4(f) Evaluation. The letter did not disagree with this conclusion nor offer any additional information pertaining to the analysis of the Pamlico Sound Bridge Corridor Alternative as a feasible and prudent avoidance alternative under Section 4(f). Also see in Appendix F the response to USDOJ's comment 11 on the Revised Final Section 4(f) Evaluation.*

5. **Comment:** “Though all alternatives have some form of 4(f) impact, the Preferred [Phased Approach/Rodanthe Bridge] Alternative has far greater impacts in quantity and quality on lands protected by section 4(f). Based upon Section 4(f) directives, park and refuge lands should not be used whenever there are feasible and prudent alternatives that would avoid or minimize harm to those lands. The NCDOT, in previous planning documents, has clearly demonstrated that the Pamlico Sound Bridge Corridor alternatives present feasible alternatives from an engineering standpoint. This reduces the analysis to the question of prudence, which seems to be only an issue of cost and visitor access. It was our understanding that throughout the planning process NCDOT indicated that although the Pamlico Sound Bridge Corridor alternative was more expensive initially, it would be comparable to the Parallel Bridge Corridor due to the extensive maintenance cost over the life of the project. We recommend an independent economic analysis of the alternatives be conducted because of the significant environmental effects and the fluctuating economics of the project.”

Response: *NCDOT has performed sufficient detailed financial analysis of the cost and funding aspects of the alternatives. Revised cost estimates were presented in the Supplemental SDEIS that was issued in February 2007. These cost estimates were also included in the FEIS. Cost estimates presented in the FEIS were presented to USDOJ representatives in the Merger Process; the cost estimates included the methodology and the detailed data used in calculations. Representatives were given time to review the information and were given the opportunity to provide comments and additional data as part of the Merger process. USDOJ representatives did not comment on the cost information, provide information, nor suggest alternative predictive methodology for analysis. The Revised Final Section 4(f) Evaluation contained additional financial analysis to evaluate the Pamlico Sound Bridge Corridor as a feasible and prudent avoidance alternative. In addition, FHWA had its own national highway finance experts from its headquarters office conduct a review*

of the analysis, which confirmed the validity of the conclusions. Another independent economic analysis is not warranted.

6. **Comment:** “There appears to remain a distinct possibility that the Preferred [Phased Approach/ Rodanthe Bridge] Alternative will require activities to occur outside the existing right-of-way, which would constitute either a permanent or temporary use of 4(f) properties. More importantly, we disagree that implementation of the Preferred Alternate as proposed in the right-of-way would not constitute a “constructive use” of 4(f) property. The 4(f) evaluation presents NCDOT’s and FHWA’s conclusions regarding the effects of the Preferred Alternative [Phased Approach/ Rodanthe Bridge] on the Refuge in terms of noise, visual character, access, and ecology; all section 4(f) constructive uses. In each case, it is our opinion that the analysis understates the magnitude of these effects in order to reach a conclusion (page 5-18) that “...attributes of the Refuge would not be substantially impaired, and thus would not be a constructive use of the Refuge.” As stated repeatedly by the Service and the Department of the Interior throughout the planning process, in particular the noise, visual character, and access on the Refuge would be impacted by construction and operation of a bridge alternative through the Refuge. It is our opinion that these impacts rise to the level of substantial impairment as described in section 4(f) regulation 23 CFR 774.1 5.”

***Response:** Based on consideration of this comment and other comments received from USDO, the North Carolina Department of Cultural Resources, and the Southern Environmental Law Center on the Final Section 4(f) Evaluation, FHWA revised several conclusions and published a Revised Final Section 4(f) Evaluation on October 9, 2009. The Revised Final Section 4(f) Evaluation concluded that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Refuge.*

7. **Comment:** “Noise resulting from vehicles traversing the elevated bridges would replace wind and surf as the prevailing sounds experienced by visitors and wildlife. Vehicles traveling on elevated structures such as bridges produce more tire-to-pavement noise than they do on an at-grade roadway. Also, exhaust noise will travel farther into the Refuge from an elevated point of origin. Increased noise levels may negatively impact bird breeding adjacent to the new bridge structure.”

***Response:** As discussed in Section 4.10.3 of the FEIS, the Potential noise impacts from the detailed study alternatives associated with wildlife are addressed in FEIS Section 4.7.6.6 under “Noise Disturbance.” Noise level change in the Refuge is presented in the last paragraph of Section 4.10.3 on page 4-154 of the FEIS in the form of 66 dBA contour lines for existing conditions and 2025. The 2025 contour is 117 feet (35.7 meters) from the road centerline and applies to all of the Parallel Bridge Corridor Alternatives. The existing conditions contour is at 96 feet (29.3 meters). The increase results from traffic growth. In general, noise levels adjacent to a bridge are lower than with an at-grade road because the structure partially blocks noise transmission. As one moves further from the bridge, the influence of the bridge structure on noise levels declines and noise levels become similar to that of an at-grade road.*

8. **Comment:** “The large, concrete bridges would replace dunes and water as the predominant visual features of the Refuge. We suggest that the FEIS plainly state that the Preferred [Phased Approach/Rodanthe Bridge] Alternative would introduce a large elevated man-made

structure (bridge) through the previously open vista on the Refuge landscape; causing negative impacts to the visual characteristics of the Refuge.”

Response: *FEIS Section 4.3.2 discusses the visual impacts to the Refuge as a result of the detailed study alternatives. Among other items, this section states that the Phased Approach and All Bridge alternatives would “introduce a sizeable new linear man-made feature for approximately 10 miles (16.1 kilometers) through the Refuge,” and “The bridge would dominate views from the dunes lining the beach and, as the dunes disappear over time, it also would dominate views of the beach and ultimately the ocean.” Consideration of this comment contributed to FHWA’s Revised Final Section 4(f) Evaluation, which was published on October 9, 2009. The Revised Final Section 4(f) Evaluation concluded that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Refuge. The visual intrusions of the bridging in this alternative, particularly near the impoundments, contributed to the constructive use determination.*

9. **Comment:** “The FEIS places considerable emphasis on the ability of the Phased Approach to provide paved-road access to the Refuge. However, the FEIS understates the fact that the Preferred Alternative [Phased Approach/Rodanthe Bridge] would not provide any vehicular access to the Visitor’s Center or the impoundments, which are two of the major destinations for Refuge visitors. Also overlooked in the FEIS is the quality of the visitor experience that would be provided under the Preferred Alternative and the effect it would have on visitation. While the FEIS notes that respondents to surveys indicated that most would continue to visit the Refuge whether or not paved access were provided, it is unclear if the respondents understood that under the Preferred Alternative the afforded access would be very limited, and the activities they traveled to the Refuge in which to engage (bird watching, nature photography, fishing) would be occurring adjacent to or under a bridge. As a result, even though the Preferred Alternative would nominally afford access to the Refuge, the Visitor’s Center would no longer be available, and we anticipate that the quality of the visitor experience would be degraded to the point that visitation may be reduced. This would represent a substantial loss to the American public.”

Response: *Access changes in the Pea Island National Wildlife Refuge with the detailed study alternatives are discussed in Section 4.5.3 of the FEIS, including changes in access to various facilities, such as the Visitor Center. It is acknowledged that of the Parallel Bridge Corridor alternatives, the Phased Approach alternatives would provide the least amount of paved road access, however, this is because of the requirement that the Phased Approach alternative remain within the existing easement. Access to the Refuge is an important component of this project, but it is important to note that USDOJ has consistently indicated a preference for the Pamlico Sound Bridge Corridor, which would likely result in the elimination of all vehicular access to the Refuge. In consideration of this comment, NCDOT and FHWA included the importance of visitor access expressed by USDOJ in its re-evaluation of the Section 4(f) analysis, published on October 9, 2009. Visitor access would not change with Phase I of the NC 12 Transportation Management Plan Alternative except that the driveway connection on NC 12 to the fishing parking lot would move south to the same area as the existing road to the (former) US Coast Guard Station.*

10. **Comment:** “Over the project’s life, ocean shoreline erosion predictions will place the complex of bridges next to and over the beach habitat. The shading effect from the bridges will affect nesting, foraging, and roosting habitat quality for some migratory birds - piping

plover, American oystercatcher, least tern, black skimmer, and nesting habitat quality for sea turtles. Section 4.7.6 of the FEIS, beginning on page 4-102, falls short of presenting a comprehensive analysis of project impacts on fish and wildlife resources inhabiting or using the Refuge and project area. Through careful selection and use of literature for general discussion of certain topics relative to impacts on wildlife from the project, there is a deflection of issues and concerns. For example the FEIS selectively cites literature regarding the minor effects of road-kill on wildlife species population demographics, and ignores literature that demonstrates the major effect road-kill has on species population demographics.”

Response: *Information on impacts to present and projected future shorebird and sea turtle habitat are included in Section 4.7.9 of the FEIS and the Biological and Conference Opinions (USFWS, 2008). The analysis in FEIS Section 4.7.6 (Fisheries and Wildlife) is comprehensive and includes several literature references showing that impacts ranging in severity would occur to fish and wildlife as a result of bridge and road construction. The project’s EFH report (CZR Incorporated, 2008) also is available from NCDOT upon request. The literature referenced was that found by the biological study team and no literature was deliberately ignored. The detailed study alternatives (except for the alternatives that would include beach nourishment) would allow more natural barrier island ecosystem function than the current situation (FEIS Sections 4.7.7 and 4.7.8) and thus would improve habitat, and existing negative impacts (e.g., roadkill and habitat disturbance from NC 12 maintenance) are projected to decrease as a result. Impacts to fish and wildlife and their habitat under the NC 12 Transportation Management Alternative (Preferred) are the same as those presented for the Parallel Bridge Corridor Alternatives in Section 4.7.3 of the FEIS, except as revised by Sections 2.1, 2.3.2.1, and 2.3.6 of this EA.*

11. **Comment:** “Another point that should have been addressed is that some shorebirds move back and forth from the ocean beach to overwash fans or mudflats in the sound on a regular basis. The more often these species must fly near a highway, the greater the probability of their becoming a road-kill statistic. Elevating the roadway to a bridge 30-40 feet above grade within these areas of prime habitat will remove the road-kill potential from an at grade road, but it fails to mention that birds perch (sometimes en-masse) on bridge abutments, and when they land and take off, they will be doing so directly into bridge traffic. Some forms of mitigation have been shown to reduce avian mortality along bridges but this type of information is not mentioned in the FEIS; we recommend it be added.”

Response: *The Service’s points regarding avian behavior are noted. At this time, the Service has not provided guidance on physical bridge features that could substantively reduce avian mortality without exacerbating the impacts to the historic landscape under Section 106. Coordination with USFWS and other consulting parties will continue during the final engineering design of Phase I. Under the NC 12 Transportation Management Alternative (Preferred) for future phases, USFWS would have an opportunity to identify any areas of prime habitat in existence at that future time so that the possible increases in avian mortality with elevated structures and possible mitigation measures could be assessed as part of the decisionmaking for the future phase.*

12. **Comment:** “NCDOT states in the FEIS that the project [Phased Approach/Rodanthe Bridge Alternative] will be contained within the existing 100-foot-wide right-of-way. If all the

proposed work (staging areas, construction, and future maintenance of existing NC-12) is performed within the existing right-of-way and is in compliance with any terms and conditions contained within the easement deed, a Refuge compatibility determination will not be required. However, we want to take this opportunity to express that we do not believe it will be possible to maintain the existing NC-12 corridor and construct the new bridges entirely within the existing right-of-way.”

***Response:** Opinion noted. The referenced FEIS statement for the Phased Approach/Rodanthe Bridge Alternative was based upon the shoreline forecasts, which were based upon the best available science, and upon current highway construction and maintenance technologies.*

13. **Comment:** “The FEIS indicates that significant NC-12 maintenance activities (other than road scraping which occurs 1 to 2 times per month) currently occur 4 to 7 times per year. Based on our records, these activities occur outside the existing right-of-way (requiring permits from the Refuge) 2 to 4 times per year and have been increasing in frequency. These activities include dune maintenance, dune reconstruction, dune translation (moving sand from the back side of the dune to the seaward side) and sand bagging. Given the scope of these activities and based on our experience in seeing these activities implemented in the past, it is unlikely that it will be possible to conduct these activities completely within the right-of-way, while being as efficient or effective as current practices.”

***Response:** Opinion noted; however, as documented in the FEIS, construction of the Phased Approach alternatives and future maintenance work can be completed within the existing NC 12 easement in accordance with the NEPA/Section 404 Merger LEDPA agreement. FEIS Section 4.6.8.6 of the FEIS describes how short-term maintenance activities could be carried out within the existing easement. If a decision were made in association with USFWS that work should be done outside of the easement, NCDOT would continue to be responsible for obtaining any requisite permits.*

It is noted that no previous maintenance work performed on NC 12 has ever been found to have significant environmental impacts under NEPA nor been found incompatible with the primary mission of the Refuge. Prior to NCDOT paving NC 12, the Refuge staff performed many maintenance tasks necessary to keep the public road passable for vehicles. This is documented in the Refuge’s Annual Narrative Reports of 1939 to 1951 (<http://www.fws.gov/alligatorriver/ANRs.html>).

14. **Comment:** “Also, we would like to remind you that by signing a Record of Decision on this FEIS, all previous SUPS for maintenance and repair of the existing at grade NC-12 would be nullified because the FEIS (now the National Environmental Policy Act (NEPA) document of record) clearly states NCDOT’s intent to conduct all activities related to this project (including existing NC-12 maintenance and repair) within the existing right-of-way. If any work related to bridge construction, or maintenance or existing NC-12 maintenance goes outside the existing right-of-way, you would need to re-comply with the Refuge’s Appropriate Use Policy and Compatibility Policy. If the requested use is found to be appropriate and compatible, the Refuge is obligated to follow through with NEPA compliance, Section 7 Endangered Species Act compliance, and compliance with several laws relative to cultural and archaeological resources, including Section 106 of the National Historic Preservation Act.”

***Response:** Position and requirements understood; also see the response to the previous comment.*

15. **Comment:** “If the NCDOT is faced with an emergency, we have the ability to accelerate everything through the administrative process under emergency declarations. However, since we can reasonably anticipate storms, planning should occur now to avoid emergencies that can be reasonably anticipated. Even if the administrative processes can be suspended for the “emergency within the right-of-way,” they can only be suspended by the Refuge Manager for 30 days and all corrective measures must be completed within that time frame. Full compliance with administrative regulations must follow the corrective action.”

***Response:** Position acknowledged; NCDOT understands USFWS’ policies on emergency repair requests. NCDOT will continue to work with USFWS on planning future project phases and planning for potential emergency maintenance activities that may be needed prior the completion of future phases.*

16. **Comment:** “The Service issued an SUP in 1989 to NCDOT for construction of the terminal groin for the purpose of protecting the existing Bonner Bridge. A new or revised SUP would be required to keep the terminal groin for a different bridge or purpose. In 2003, NCDOT and the Refuge decided to separate terminal groin issues from the Bonner Bridge replacement NEPA document. As you recall, the decision in 2003, was to defer planning on the terminal groin SUP renewal or on the removal of the terminal groin until a later date.”

***Response:** NCDOT understands USFWS’ position that a new or revised SUP is required to keep the terminal groin for a different bridge or purpose. Towards that end, NCDOT has initiated and will continue coordination with USFWS on determining and meeting terminal groin permit requirements for Phase I of the NC 12 Transportation Management Plan Alternative (Preferred). FHWA will not authorize construction to begin with federal funds until USFWS’s permit requirements are satisfied. Also see the response to USDOJ comment 18 in Appendix F regarding the Revised Final Section 4(f) Evaluation.*

17. **Comment:** “An assumption inserted into the FEIS analysis involves the dependency of the Terminal Groin for the success of the Preferred Alternative [Phased Approach/Rodanthe Bridge]. The discussion on page 3-65 is somewhat confusing and appears to be contradictory. First, the new parallel bridge appears to be designed (at least for this stage of planning) to have clearance for a much wider navigation zone. This would allow the Oregon Inlet channel to migrate to some extent without impacting navigation or the new bridge. The third paragraph actually states an assumption that the Corps of Engineers will terminate dredging the channel for the bridge navigation span with the implication being that the channel can move and maintain necessary depths through natural scouring and without impacting navigation. Further down on the page (next to last paragraph) there is a statement that removal of the terminal groin would pose new challenges for maintaining the current navigation channel. This discussion leaves us unclear as to what the Preferred Alternative will actually involve. The navigation channel, old bridge, new bridge, and terminal groin are all in such close proximity that dredging in one spot versus another is likely to precipitate changes in an adjacent site including the navigation channel underneath the bridge. Basically, it appears that more analysis with regards to inlet dynamics and coastal processes is critical to further model development.”

Response: The section referenced in Chapter 3, “Affected Environment,” discusses potential Oregon Inlet movement through 2085 with and without the terminal groin. It is not discussing the Parallel Bridge Corridor alternatives other than to assume that the replacement Oregon Inlet Bridge would have a longer navigation zone than the existing Bonner Bridge, which would increase the opportunity for USACE to let the federal navigation channel move with the natural gorge. Removal of the terminal groin would likely result in a change in the characteristics of Oregon Inlet creating new challenges for maintaining the channel, particularly if the inlet becomes wider and more shallow. Retention of the groin is a bridge design consideration and not an interdependent action. NCDOT plans to seek retention of the groin in association with Phase I of the project.

18. **Comment:** “Finally we note that NCDOT has not requested a new SUP to retain the groin. As mentioned above, there are many issues related to the groin that will need to be resolved before a new SUP could be issued. The FEIS does not provide sufficient basis for decision-making regarding those issues, and additional analysis will be needed. This would appear to be an area of considerable unresolved uncertainty.”

Response: NCDOT plans to seek retention of the groin in association with Phase I of the project. NCDOT has initiated and will continue coordination with USFWS on determining and meeting the terminal groin permit requirements. The impact assessment in the FEIS and this EA assume as a baseline that the groin remains in place.

US Department of Interior, US Fish and Wildlife Service

1. **Comment:** “Specifically, the effects of artificial lighting on sea turtle nesting were not sufficiently covered on pages 4-122 through 4-125, and...”

Response: Additional analysis regarding the effects of artificial lighting on sea turtle nesting is included in the USFWS Biological and Conference Opinion presented in Appendix E of the FEIS beginning on page E-32, specifically on pages 17, 18, 36, 37, 40, 41, 42, 44, and 45 of the Opinion. The information presented in the FEIS was sufficient for the purpose of identifying the potential impact and determining the need for formal consultation under Section 7 of the Endangered Species Act.

2. **Comment:** “...the information regarding the green sea turtle (*Chelonia mydas*) on page 4-124 is outdated. Green sea turtles have nested within the action area as recently as 2002 and 2008.”

Response: Additional information on the green sea turtle is included in the USFWS Biological and Conference Opinion presented in Appendix E of the FEIS beginning on page E-32, specifically on pages 8, 9, 17, 23, 27 and 30 of the Opinion. The information presented in the FEIS was sufficient for the purpose of identifying the potential impact and determining the need for formal consultation under Section 7 of the Endangered Species Act.

3. **Comment:** “on page 5-32, the FEIS states “The FHWA and NCDOT consider the replacement bridge corridors (including the alternatives within the two replacement bridge corridors) to be substantially equal in terms of the remaining harm to protected species in the Refuge after mitigation”. We disagree with this statement. The Parallel Bridge Corridor

would involve take of the following federally threatened and endangered species: piping plover (*Charadrius melodus*), loggerhead sea turtle (*Caretta caretta*), leatherback sea turtle (*Dermodochelys coriacea*), and green sea turtle (as determined in the Section 7 consultation for the preferred Phased Approach/Rodanthe Bridge Alternative). The Pamlico Bridge Corridor would not involve any take of federally threatened and endangered species. We do not view take versus no take as being “substantially equal”.

Response: *The October 2009 Revised Final Section 4(f) Evaluation no longer makes this statement.*

4. Comment: “Also, the adverse effects (i.e. take) of the preferred alternative on federally listed species are not “mitigated” by the conservation measures and reasonable and prudent measures described in the biological opinion”.

Response: *We agree. We will clarify that our proposed conservation measures and the USFWS reasonable and prudent measures are not mitigating the effects of the proposed action. Rather, they are efforts to conserve the species and critical habitat. The Revised Final Section 4(f) Evaluation no longer makes this statement.*

US Environmental Protection Agency

1. **Comment:** “The vulnerability of maintaining a reliable transportation corridor along an ever changing coastal barrier island is particularly a concern with the PBC-PA-RB Alternative. After considering all of the issues presented in the 1993 DEIS, the 2005 SDEIS, the 2007 SSDEIS, and the FEIS, EPA continues to believe that the transportation agencies should re-evaluate some of the preliminary alternatives that were not carried forward for detailed study, including the rehabilitation of the existing Bonner Bridge combined with continued NC 12 maintenance activities. Based upon the most recent Outer Banks Task Force meeting in July of 2008, current NCDOT Bonner Bridge maintenance contracts and rehabilitation projects appear to be very successful in extending the useful life of the existing bridge and keeping the NC 12 corridor open to traffic.”

Response: *Page 8-90 of the FEIS contains NCDOT’s response to EPA’s question about bridge rehabilitation from EPA’s April 20, 2007 comment letter. That response was “Regarding rehabilitation, currently a major maintenance effort (NCDOT TIP Project No. B-5014) is underway to add an estimated ten years to the life of the current bridge. In order to rehabilitate completely the bridge for a long-term life would require replacing every part of it; essentially building a new bridge (and requiring the structure to be closed during construction) (see Section 2.2.4 of the SDEIS and the FEIS). The capacity, environmental impact, and cost concerns associated with a ferry alternative are addressed in Section 2.2.6 of the SDEIS and this FEIS remain valid. A reassessment of the bridge rehabilitation and ferry service alternatives is not needed.” Continued maintenance of existing NC 12 as an alternative is reflected in the Parallel Bridge Corridor with Nourishment Alternative, which was analyzed in detail in the SDEIS and FEIS but was not selected as the LEDPA.*

2. **Comment:** “EPA is also concerned with the adequacy of the proposed compensatory mitigation plan for jurisdictional wetland impacts that is being offered by FHWA and NCDOT.”

Response: *NCDOT will continue to coordinate with USEPA during the permitting process on an appropriate compensatory mitigation plan, including during the Merger Team meetings for Concurrence Points 4B and 4C.*

3. **Comment:** “On Page xxi, the FEIS states that a bridge within the replacement bridge corridor (i.e., PBCPA Alternatives) alternatives would have a negligible effect on inlet migration, profile, and gorge alignment other than the continued effect of the presence of the terminal groin. However, it is the need to retain the terminal groin for these alternatives that has the significant effect on inlet migration, profile, and gorge alignment.”

Response: *Retention of the groin maintains the status quo. As discussed on pages 3-65 to 3-67 of the FEIS, removing the groin also would have a substantial effect on the northern end of Hatteras Island, inlet location, and gorge alignment. Retention of the groin is a bridge design consideration and not an interdependent action. NCDOT plans to seek retention of the groin in association with Phase I of the project.*

4. **Comment:** “On Page xxi, the FEIS states that the Phased Approach alternatives (including the preferred [Phased Approach/Rodanthe Bridge] alternative) would directly affect activities on the beach front, from the presence of bridge piles on the beach and in the surf. These alternatives appear to have the most substantial effect on recreational use of the PINWR beaches, whereas the Pamlico Sound Bridge Corridor (i.e., PSBC Alternatives) alternatives would have no effect.”

Response: *FHWA and NCDOT agree with this observation related to the impact to recreational activities of the presence of bridge piles on the beach and in the surf with the Phased Approach alternatives. This impact would not occur initially since the project would be built in the existing NC 12 easement, but would occur only as the beach erodes under the project’s bridges. The impacts are discussed in Section 4.5.3.3 of the FEIS.*

5. **Comment:** “On page xxxv in the Green Sheets (i.e., Project Commitments), NCDOT states that they consider the 2060 high erosion shoreline to be reasonable for planning purposes. NCDOT also plans to implement a monitoring program on Hatteras Island in the project area to assist in decision-making for Phases III and IV. These monitoring studies may greatly change the plans and timing for Phases III and IV.”

Response: *This observation and additional interagency coordination with EPA and the other resource agencies influenced the decision to change the Preferred Alternative to the NC 12 Transportation Management Plan Alternative considered in this EA.*

6. **Comment:** “EPA notes the changes in design for bicycle accommodations indicated on Page xxxiii of the FEIS. The design of an 8-foot wide shoulder would be safer for bicycle and pedestrian traffic than the current 2-foot wide shoulders on Bonner Bridge. EPA also acknowledges that a bicycle-safe rail on the bridges would be provided. EPA requests that FHWA and NCDOT consider the use of a 4-foot separated bicycle shoulders with rail sections. This could reduce project construction costs by a total of 8 feet in width and also serve to provide bicycle and pedestrian uses consistent with the new roadway’s 4-foot paved shoulders along NC 12. NC 12 south of Oregon Inlet is not a designated bicycle route. EPA

supports the Outerbanks Bicycle initiatives and strongly recommends the 4-foot outside shoulders along NC 12 between Bonner Bridge and Hatteras Village.”

Response: *The commenter is mistaken in their assumptions on what would be required to provide separated bicycle shoulders in the bridge. They cannot be implemented in the way described by the commenter. Separation of bicycle traffic on the bridge would require 2 feet on each side of the roadway for the placement of a barrier plus 4 feet for bicycles, which would increase the current bridge width since the currently proposed 8-foot shoulder would still be needed for use by disabled vehicles. Also, currently the 40-foot clear width would allow for the temporary emergency designation of three lanes during evacuations, with two lanes moving off of the island. If a barrier is placed inside this 40-foot clear width, three lanes could not be accommodated. NC 12 is a designated a bicycle route by NCDOT and shown as a bicycle route on maps published by Bikecentennial. See Section 1.5.4 of the FEIS.*

7. **Comment:** “On Page 1-6, the FEIS discusses the USACE’s plan to conduct a feasibility study of Hatteras and Ocracoke islands to determine possible long-term solutions to the transportation problems. This T.I.P. project # R-3116H and its associated feasibility study are currently unfunded.”

Response: *FHWA and NCDOT agree with this observation.*

8. **Comment:** “Section 2.10.1.2 of the FEIS includes a discussion of design criteria for the bridges, to withstand wave energy, storm surge, and scour. However, it appears that AASHTO has not finalized guidance on specifications. Therefore, the FEIS simply states that NCDOT will design the bridges in conformance with requirements (unspecified) and to deal with conditions that are anticipated. It remains unclear whether NCDOT and FHWA have the ability to design structures that will withstand the heavy surf along the shoreline. This issue has been generally discussed for several years during Merger team meetings. EPA believes that these critical design and safety specifications need to be finalized before any Phase II decisions are made (i.e., A bridge at Rodanthe).”

Response: *Structures can be and are designed and constructed to withstand the ocean environment. NCDOT will take into consideration the recently adopted AASHTO guidelines (published in 2009) for designing coastal bridge projects in designing bridges associated with the Preferred Alternative.*

9. **Comment:** “A haul road is expected for construction of the northern approach to the Phase I bridge. The FEIS indicates on Page 2-112 that this haul road will be constructed on top of sandy soil. EPA requests that haul roads should not be used over wetlands as compaction may prevent the wetland from being restored.”

Response: *The preference of the commenter is noted. Commitment 3 in the “Project Commitments” section of this EA (revised from a similar commitment in the FEIS) indicates that SAV areas would be bridged. This issue was discussed at the November 10, 2008 Concurrence Point 4A Merger Team meeting for Phase I of the project (replacement of Bonner Bridge). NCDOT indicated that minimizing environmental impacts such as fill in wetlands would be a factor in selection of the Design-Build contractor. NCDOT would continue to coordinate with USEPA during the permitting process regarding construction access procedures, including during*

the Merger Team meetings for Concurrence Points 4B and 4C. See the response to a similar question related to haul roads made in USACE comment 1.

10. **Comment:** “On Page 2-127, NCDOT commits to implement an island monitoring program in the project area and to conduct breach response-related data gathering to help determine where acceptable sand could be found to close breaches, and options available for bridging a breach. EPA believes that this monitoring program is an essential component of the long-term strategy for addressing unpredictable and dynamic shoreline erosion problems along the NC 12 corridor.”

Response: *FHWA and NCDOT agree with this position. The monitoring program is listed as Commitment 17 in this EA (Commitment 16 in the FEIS), and it is a component of the new Preferred Alternative, the Parallel Bridge Corridor with NC 12 Transportation Management Plan.*

11. **Comment:** “On Page 2-133 of the FEIS, the Highway Cost by Expenditure Timeframe for the Phased Approach/Rodanthe Bridge from 2021 to 2060 is believed to be under-estimated, considering the extended construction and bridge maintenance that is expected. Considering that NCDOT and FHWA do not appear to have reliable information on the design specifications for these bridges that will be in the surf zone and out at sea, the costs may be much higher than the amount estimated. Also, the estimates are presented in 2006 dollars, which may also significantly underestimate the future costs for additional bridges.”

Response: *The unit costs used in the FEIS for the Phased Approach alternatives reflect the ultimate presence of the Phase II to IV bridges in the surf zone and beyond. The cost estimates were developed by NCDOT and independently verified by both an independent engineering firm not otherwise associated with the project and by FHWA. Cost estimate details were presented to the NEPA/Section 404 Merger Team during the selection of the LEDPA at a meeting on June 20, 2007. Current year dollars, as opposed to a dollar inflated to the expected year of expenditure, are customarily used when planning and evaluating highway projects. Further, the costs for the Phased Approach/Rodanthe Bridge Alternative are based on bridging all potential “hot spots.” While there is scientific consensus on the location of the potential hot spots, there is less consensus and more uncertainty whether a breach will form at each potential hot spot. The FEIS included costs associated with bridging each potential hot spot so as not to underestimate the cost of the Parallel Bridge Corridor with Phased Approach Alternatives.*

12. **Comment:** “On Page 2-141 of the FEIS it states that the Refuge costs include costs to provide alternate access to the Refuge. These costs are only considered for the two PSBC alternatives. However, the need for alternate access may be applicable for the Phased Alternatives also, if the shoreline is allowed to naturally migrate, and existing paved access roads are lost to the ocean.”

Response: *FHWA and NCDOT agree that the need for additional Refuge access is a possibility with the Phased Approach and All Bridge alternatives. However, tourist sites, such as the visitor center, are forecasted to be affected by shoreline erosion. USFWS consistently indicated in their comments on the Pamlico Sound Bridge Corridor that Refuge access is their responsibility. The Phased Approach and All Bridge alternatives would provide access until that area is threatened by shoreline erosion. If desired and implemented by USFWS, the tram service noted in Table 2-12*

could provide access between the access points provided by the alternatives that include bridges in the Refuge.

13. **Comment:** “The FEIS does not identify potential disposal sites for excavated, dredge, and fill material generated by the bridge construction. On Page 2-146 of the FEIS it simply states that appropriate locations will be determined near the time of construction. EPA requests that FHWA and NCDOT investigate potential environmentally acceptable locations as soon as possible and in concert with the USACE and other regulatory agencies. These disposal locations also need to be identified and detailed for any future Concurrence Point 4A Merger meetings on avoidance and minimization.”

***Response:** NCDOT will coordinate with the appropriate regulatory agencies on disposal sites when the project is closer to construction and final construction procedures are known. Authorization by regulatory agencies to dispose of dredged materials in wetlands or in SAV areas is not expected.*

14. **Comment:** “EPA recognizes that Sections 3.6.3 and 4.6.6 of the FEIS discuss potential shoreline changes during the life of the project (through 2060), and include a discussion of accelerated Sea Level Rise. The Peer Exchange (a panel of coastal engineering and geology experts) did not recommend revising the 2060 shoreline. The FEIS states that the conditions expected to occur in the shoreline forecasts in the FEIS are those which “Scenario 2 [20th century rate + 2 millimeters per year] considers ‘virtually certain’ to occur (overwash, erosion, and inlet formation).” However, the likelihood of “Scenario 3 [20th century rate + 7 millimeters per year]” was not extensively discussed in the FEIS. According to Page 3-59, Scenario 3 “will lead to further loss of island width and ‘threshold behavior’ leading to island segmentation and disintegration.” Based on recent projections, it appears increasingly probable that a greater rate of sea level rise than 2 millimeters per year will occur, and therefore the potential for Scenario 3 should be further considered during planning of future Phases. As the FEIS indicates, the potential for Scenario 3 should be investigated as part of the future monitoring prior to construction of Phases II - IV.”

***Response:** Changes in sea level rise forecasts would be considered when planning for the implementation of future phases of the Phased Approach alternatives and the NC 12 Transportation Management Plan Alternative (Preferred).*

15. **Comment:** “On Page 3-64 of the FEIS it is unclear whether the terminal groin would need to remain after Phase II bridges are constructed. The potential for removing the terminal groin after Phase II should be fully investigated in a future NEPA document.”

***Response:** The FEIS is based on the groin remaining in place, and coordination related to required permits is underway. NCDOT plans to seek retention of the groin in association with Phase I of the project.*

16. **Comment:** “Section 4.6.8 of the FEIS discusses potential impacts that the bridge piles would have on scour, breakers, waves, ‘longshore’ sediment transport, beach erosion, and potential for island breaches [with the Phased Approach alternatives]. However, the FEIS does not discuss the impact of the waves, scour, sediment transport, and other offshore coastal process on the bridge piles. It remains unclear whether a bridge may be practicably maintained on the beach and in the ocean.”

Response: *As described in FEIS Section 2.10 for the Phased Approach alternatives, structures can be and are designed and constructed to withstand ocean environments. If a Phased Approach alternative is selected, the bridge piles would be designed to withstand the waves, scour, sediment transport and other offshore coastal processes.*

17. **Comment:** “Section 4.7.2 of the FEIS discusses water quality impacts from construction and operation of the alternatives. Temporary BMPs must be implemented prior to construction to adequately treat construction storm water from the project. The PSBC alternatives have a slightly larger amount of impervious surface than the preferred alternative [Phased Approach/Rodanthe Bridge] (86.6 acres vs. 72.4 acres). The FEIS provides estimated annual pollutant loads for the various alternatives for several pollutants. Also, several potential BMPs are described. It appears that end-of-pipe treatment is feasible at the northern and southern ends of the PSBC alternatives, but may be more difficult to construct on the replacement bridge alternatives due to slope requirements of the bridge, and potential issues with acquiring land for water treatment on the Refuge side of the bridge. The FEIS indicates that it is not possible to provide treatment for the entire bridge length of either the PSBC alternatives or the short bridge alternatives. As future bridge phases of the PBC/PA Alternative pass into the sea, storm water treatment would not be possible on those sections. In Section 4.7.6.5, the FEIS states that runoff from Bonner Bridge is currently not captured and treated, so the proposed project will not change runoff in the vicinity. However, the Bonner Bridge was constructed prior to passage of the Clean Water Act, which prohibits unpermitted discharges of pollutants to waters of the U.S., including Oregon Inlet and the Atlantic Ocean. FHWA and NCDOT have not demonstrated how they will comply with the Clean Water Act requirements for future phases of the project.”

Response: *Site specific conditions would be addressed as future phases warrant under the applicable Clean Water Act regulations at the time.*

18. **Comment:** “Page 4-114 of the FEIS describes the timing of construction for the four phases of bridges in the Phased Approach alternatives. This section describes 7 years of construction for Phases I and II (together), followed by a 7-year gap of no construction, then 10 years of construction for Phase III, a 10-year period of no construction, then 10 years of construction for Phase IV. This totals 27 years of construction over a 44-year period, although the FEIS states that it is 17 years of construction. Given the unknowns in this project concerning shoreline erosion, breach/inlet formation, and other unpredictable factors, this timeline may change considerably, with phases built sooner than predicted. The FEIS does not investigate the potential impacts of 27 years of construction in a shorter overall timeframe, although it seems likely.”

Response: *The construction duration and estimated year for starting construction on each phase of the Phased Approach alternatives is stated on pages 2-124 through 2-126 of the FEIS. Phase I was expected to start in 2009, Phase II would be post-2015, Phase III would be post-2020, and Phase IV would be post-2030. The construction duration for Phases II to IV is estimated to be approximately three years from letting. The construction duration for Phase I is estimated to be 3.5 years. Therefore, based on current estimates, the total construction duration for the Phased Approach alternatives is expected to be approximately 12.5 years.*

Also, in response to this comment, the first paragraph on page 4-114 of the FEIS is replaced with the following text shown in bold:

The two Phased Approach alternatives include bridge construction over four phases, with construction in different parts of the Refuge, as described in Section 2.10. Thus, there would be four periods of construction disturbance within the Refuge. As currently planned, Phase I is expected to start upon the release of a Record of Decision for the project, Phase II would be post-2015, Phase III would be post-2020, and Phase IV would be post-2030. The construction duration for each of Phases II to IV is estimated to last approximately three years from letting; Phase I is estimated to last 3.5 years. Therefore, based on current estimates, the total construction duration for these alternatives is expected to be approximately 12.5 years. Periods of no construction are expected between Phases II and III and between Phases III and IV. Without phasing, construction noise disturbance in the Refuge with the Parallel Bridge Corridor alternatives would occur over a single construction period of approximately four years.

This change does not represent a significant change to the findings of the FEIS. It is acknowledged that the timeline could change based on future conditions in the Refuge, which is one reason why the decision was made to change the Preferred Alternative to the NC 12 Transportation Management Plan Alternative as documented in this EA.

19. **Comment:** “Page 4-134 and 4-135 of the FEIS discuss on-site or other opportunities in close proximity to the project to provide compensatory mitigation for any permitted impacts. The FEIS also recommends that the Ballance Farm Mitigation Site may be used for all compensatory mitigation requirements. However, Ballance Farm is a considerable distance from the project site and it was not intended to provide mitigation for the B-2500 project. It is also in a different 8-digit Hydrologic Unit (HUC). More importantly, the tidal marsh mitigation at Ballance Farm is freshwater marsh, not salt marsh. Therefore, mitigation at Ballance Farm would be out-of-kind and out-of-HUC. EPA prefers that wetland impacts on the Outer Banks be replaced with in-kind wetland mitigation on the Outer Banks. If there are opportunities to restore wetlands on-site or on the Outer Banks, those opportunities should be pursued first. There may be several on-site opportunities for wetland mitigation. Submerged Aquatic Vegetation (SAV) must be mitigated as close to the project as possible and within appropriate areas. We defer to NOAA and DCM on the determination of SAV mitigation.”

Response: *NCDOT will continue to coordinate with USEPA during the permitting process and during the Merger Team meetings for Concurrence Points 4B and 4C to develop an appropriate compensatory wetland and SAV mitigation plan.*

D.2.2 State Agencies

North Carolina Department of Cultural Resources

1. **Comment:** “Having carefully reviewed the final Section 4(f) Evaluation, we do not concur with FHWA’s finding that the proposed undertaking will not constructively use historic properties. The document notes that the Preferred Alternative [Phased Approach/Rodanthe Bridge] will have a “Sizeable visual intrusion into the landscape of the Refuge and views in Rodanthe will be affected.”

The Refuge is an outstanding example of the national wildlife refuges created in the early 20th and associated with efforts of the Civil Conservation Corps to protect and revitalize natural resources. Retaining its key original elements and integrity of location, setting, materials, feeling and association, the Refuge as a historic landscape will not only be adversely affected, it will be substantially, visually impaired by the presence of a bridge of the height and length proposed with the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge (Preferred). While the bridge may not eliminate the Refuge's ability to function as a wildlife refuge, it will destroy its integrity as a historic landscape.

Similarly, the introduction of a thirty-foot elevated bridge with flanking one-way frontage roads in the Rodanthe Historic District will not only adversely affect the historic district, it will substantially impair the characteristics which make the district eligible for listing in the National Register. The district, which is comprised of one and two-story buildings that are linked by their association with and views to the National Register-listed Chicamacomico Life Saving Station, will be completely dominated by the bridge proposed as part of the Preferred Alternative [Phased Approach/Rodanthe Bridge]. Views to the Pamlico Sound, which are part of the historic viewshed from the station's tower and are still an important part of the visitor's experience will be destroyed as will the visual relationships between the district's contributing buildings. In an effort to minimize the degree of impairment caused by the proposed bridge, the Final Section 4(f) Evaluation suggests that modern development adjoining the district has already diminished this connection. However, the photographs in the Finding of Adverse Effect Documentation, prepared by the NCDOT Historic Architecture and Landscapes Section for the undertaking, clearly illustrates that this connection exists today and that a nearly three-story bridge will dwarf the one and two-story buildings that make up the historic district.

Given the serious access problems and visual impacts caused by the proposed bridge, we believe that the Preferred Alternative [Phased Approach/Rodanthe Bridge Alternative] substantially impairs the functions, features and attributes of the Rodanthe Historic District and Chicamacomico Life Saving Station and, thereby, constitutes a constructive use of the historic properties.”

***Response:** Based on this comment, FHWA and NCDOT modified the conceptual designs for the Road North/Bridge South, All Bridge, and Phased Approach/Rodanthe Bridge alternatives to remove them from the Rodanthe Historic District. The State Historic Preservation Office (HPO) agreed that these changes reduced the effects of these alternatives on the District and the Chicamacomico Life Saving Station from an Adverse Effect to No Adverse Effect, eliminating the potential for a constructive use of these resources. This outcome also applies to the NC 12 Transportation Management Plan Alternative (Preferred).*

NCDOT and FHWA considered the HPO's views on the constructive use of the Refuge as a site on or eligible for the National Register of Historic Places, and this comment contributed to a re-evaluation of determinations made in the Section 4(f) Evaluation published with the FEIS. NCDOT and FHWA published a Revised Final Section 4(f) Evaluation, which changed several determinations from the document published with the FEIS. One change included a determination that the Parallel Bridge with Phased Approach alternatives would constructively use the Refuge, concurring with the HPO's view expressed in this comment.

2. **Comment:** “We would finally note that we understand from discussions with the Merger Team and as outlined in Section 2.15 - Preferred Alternative [Phased Approach/Rodanthe Bridge], that there will be an opportunity to explore possible adjustments in the alignment and specific plans for Phases II-IV in order to address changes that may occur in the project area due to its dynamic and unpredictable nature, especially in the undertaking’s APE for the historic properties.”

***Response:** The commenter’s understanding is correct. This opportunity is re-enforced by the decision to change the Preferred Alternative to the NC 12 Transportation Management Plan Alternative assessed in this EA.*

***North Carolina Department of Environment and Natural Resources,
Division of Coastal Management***

1. **Comment:** “Please note that the narrative concerning land use planning and the Coastal Area Management Act (CAMA) on pages 4-4 to 4-5 is not completely accurate. Please see the attached memorandum written by the DCM District Planner Charlan Owens dated 10/13/08 for more information.”

***Response:** The additional CAMA plan information included in the commenter’s letter is noted and is incorporated by this reference in the FEIS findings.*

2. **Comment:** “A formal DCM review of the project to determine consistency with the state’s Coastal Management Program cannot occur until a CAMA major permit application is received. At that time, the CAMA major permit application will be circulated to the network of state agencies that comprise North Carolina’s Coastal Management Program. The statutes, rules and policies of each of these agencies must be considered during the review of the CAMA permit application. This process will also include a consistency review by the DCM District Planner of the CAMA land use plan in effect at the time of permit authorization.”

***Response:** Requirements understood.*

3. **Comment:** “Due to the complexity of the project and the extent of environmental impacts that are proposed, NCDOT is urged to submit the CAMA major permit application for this project to DCM a minimum of one year prior to the anticipated construction let date. During the CAMA major permit application review process, DCM may have additional comments after examining the more detailed environmental information that will be provided with the permit application.”

***Response:** The Design-Build contract would likely outline a timeline that affords the Design-Build contractor at least 12 months from the execution of the contract to the successful completion of the permitting process. The prospective contractors would be made aware of this anticipated timeline.*

4. **Comment:** “DCM may also place conditions on any CAMA permit that is issued to avoid, minimize and/or mitigate environmental impacts. The comments provided in this letter shall not preclude DCM from requesting additional information throughout the CAMA major permit application review process, and following normal permitting procedures. Furthermore, nothing in this letter shall be interpreted as providing an opinion on the ultimate outcome of any CAMA permit decision. Such a decision can only be made following a complete multi-agency review of the final permit application. DCM will work closely with

NCDOT, the Design-Build contractor, and the relevant state and federal agencies, to ensure that the final project is consistent with the N.C. Coastal Management Program, including the N.C. Administrative Code [i.e. N.C. Coastal Resources Commission (CRC) rules].”

Response: Position understood.

5. **Comment:** “Given the importance of this transportation link and the advancing age of the existing Bonner Bridge, DCM continues to urge DOT to move expeditiously towards the development of a final project design that satisfies the transportation needs of the residents and visitors of Bodie, Hatteras and Ocracoke Islands, while also ensuring that coastal resources are adequately protected.”

Response: Comment acknowledged; it is FHWA and NCDOT’s intent to move expeditiously towards the development of a final project design for Phase I of the NC 12 Transportation Management Plan Alternative (Preferred) that satisfies the transportation needs of the residents and visitors of Bodie, Hatteras and Ocracoke islands, while also ensuring that coastal resources are adequately protected. FHWA and NCDOT also intend to develop expeditiously an agreement or protocol with the land management agencies to determine timing and triggers for future phases of work.

6. **Comment:** “Consistency Determination: The preferred alternative [Phased Approach/Rodanthe Bridge] is consistent with/not in conflict with the Dare County 2003 Land Use Plan certified by the Coastal Resources Commission (CRC) on July 24, 2003.”

Response: The Consistency Determination for the Phased Approach alternatives with respect to the Dare County 2003 Land Use Plan is noted.

7. **Comment:** “Dare County is in the process of updating their Land Use Plan (LUP). A Major Permit Application for project construction would be reviewed based on the LUP in effect at the time of permit authorization.”

Response: Requirement understood.

North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries

1. **Comment:** “The Division acknowledges the Phases II - IV will present substantial challenges before the various agencies will be satisfied so appropriate permits and approvals are granted. As this agency has indicated in previous memos, concern is expressed with construction of bridges that will ultimately be in the surf zone. However, at the time of permit application for the other phases, all reasonable, practicable, and feasible alternatives will be considered and evaluated in pursuit of the LEDPA/Preferred Alternative.”

Response: Position understood. The decision to change the Preferred Alternative to the NC 12 Transportation Management Plan Alternative responds to this expectation.

2. **Comment:** “This agency continues to recommend that same type of fishing access for the public be maintained at the north end of Hatteras Island. The FEIS indicates that the temporary traffic maintenance bridge could be left in place for a fishing pier. This agency supports this possibility.”

Response: *The temporary traffic maintenance bridge that was part of the Phased Approach alternatives could be left in place for a fishing pier if permitted by the Refuge. The temporary traffic maintenance bridge is not necessary to construct Phase I of the NC 12 Transportation Management Plan Alternative. However, providing catwalks on the new structure, leaving a portion of the old structure in place, or constructing a boardwalk remain as potential methods to restore fishing access under the NC12 Transportation Management Plan Alternative. NCDOT will continue to work with federal and state agencies and local government to restore fishing access because NCDOT supports the provision of some type of fishing access at the north end of Hatteras Island, and a commitment to this effect has been added to the list of Project Commitments (Commitment 7). Ultimately, the parameters of the public fishing access under any build alternative are up to the Refuge manager.*

3. **Comment:** “In summary, the Division supports the Parallel Bridge (Phase I) and Phases II - IV in the future as needed. In the future when permit applications are submitted for Phase II – IV each phase must be evaluated to include avoidance, minimization and compensatory mitigation. All reasonable, practical and feasible alternatives must be considered and evaluated for each phase.”

Response: *Position understood. The decision to change the Preferred Alternative to the NC 12 Transportation Management Plan Alternative responds to this expectation.*

North Carolina Department of Environment and Natural Resources, Division of Water Quality

1. **Comment:** “According to the Green Sheet and, as discussed in the text, the NCDOT and the contractor are planning on jetting the piles in place before being seated to their final elevation. The DWQ understands the necessity for completing this project as quickly as possible and jetting is quicker than some other methods. It is also understood that the velocity through Oregon Inlet is high and may negate some potential turbidity and noise problems, which during tourist season may be undesirable. However, the DWQ does not generally prefer this method. Other methods allow for better control of turbidity. If the NCDOT and its contractor(s) plan on pursuing this method, then the NCDOT will need to provide a plan in the 401 Water Quality Certification application that adequately addresses turbidity concerns to the best extent practicable.”

Response: *Comment noted. The Design-Build contract for any build alternative would require each prospective contractor to include their proposed means and methods for minimizing turbidity in their pre-bid Technical Proposal. The means and methods would then be evaluated as part of the contractor selection process. In addition, approaches to minimize jetting impacts are discussed on pages 2-110 to 2-111 of the FEIS. Additionally, this issue was discussed at the November 10, 2008 Concurrence Point 4A Merger Team meeting for Phase I of the project (replacement of Bonner Bridge). It was agreed that NCDOT’s Design-Build contractor would utilize construction techniques to minimize damage to wetlands/SAV/Oregon Inlet from jetting spoils.*

2. **Comment:** “There is mention on the document of dragging barges into position for use as a temporary work bridge. The DWQ does not approve of dragging barges along the bottom. It is preferred to float the barge into position, and then sink it. The dragging of barges is very destructive to the bottom and subsequently to aquatic life.”

Response: *Comment noted. The Design-Build contract for any build alternative would not allow the dragging of barges except in unavoidable localized situations. The prospective contractors would be required to address this situation in their pre-bid Technical Proposal, and this information would be evaluated as part of the contractor selection evaluation criteria.*

3. **Comment:** “The DWQ would prefer that temporary dredging during construction be kept to a minimum. The use of temporary work bridges, when possible, is preferred. At the very least, dredging should be kept to a minimum during the spring in order to reduce potential impacts to fisheries resources.”

Response: *Comment noted. This issue was discussed at the November 10, 2008 Concurrence Point 4A Merger Team meeting for Phase I of the project (replacement of Bonner Bridge). Substantial and unreasonable use of dredging would be discouraged in the Design-Build contract for any build alternative. Prospective contractors would be required to outline the extent of dredging that they anticipate in order to satisfy their design and construction requirements. The anticipated extent of dredging therefore would be a part of the contractor selection criteria.*

4. **Comment:** “The document indicates that not all stormwater on the bridge may be able to be collected and treated. The DWQ does not allow stormwater to be discharged from bridges directly into stream or wetlands without proper treatment and velocity dissipation. The NCDOT will be required to find a way to properly collect and treat all stormwater from the bridge.”

Response: *NCDOT acknowledges this comment and would design the bridge to accommodate bridge deck drainage for any Parallel Corridor alternative in a manner consistent with recent projects with similar characteristics.*

5. **Comment:** “NCDOT is respectfully reminded that all impacts, including but not limited to, bridging, fill, excavation and clearing, to jurisdictional wetlands, streams, and riparian buffers need to be included in the final impact calculations. These impacts, in addition to any construction impacts, temporary or otherwise, also need to be included as part of the 401 Water Quality Certification Application.”

Response: *Position acknowledged. All impacts will be reflected in the 401 Water Quality Certification Application.*

6. **Comment:** “The 401 Water Quality Certification application will need to specifically address the proposed methods for stormwater management. More specifically, stormwater shall not be permitted to discharge directly into streams or surface waters.”

Response: *NCDOT acknowledges this comment and would design the bridge to accommodate bridge deck drainage for any Parallel Corridor alternative in a manner consistent with recent projects with similar characteristics.*

7. **Comment:** “Bridge deck drains should not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of NC DWQ *Stormwater Best Management Practices*.”

Response: *NCDOT acknowledges this comment and would design the bridge to accommodate bridge deck drainage for any Parallel Corridor alternative in a manner consistent with recent projects with similar characteristics.*

**North Carolina Department of Environment and Natural Resources,
North Carolina Wildlife Resources Commission**

1. **Comment:** “We remain concerned with the uncertainty of the impacts associated with an elevated roadway located waterward of the dune line. More specifically the indirect and Cumulative Impact (ICI) assessment does not address this topic. It is necessary, to understand, to the greatest degree possible, the situation of the roadway to the shoreline with the formation of new inlets. Furthermore the ICI does not fully address the extent of indirect impacts to wildlife associated with the migration of the shoreline toward the elevated structures.”

Response: *The impacts associated with an elevated roadway are considered a direct impact and are discussed in relation to shoreline migration in Sections 4.7.3.2 and 4.7.6.2 of the FEIS. The former includes a table (Table 4-23) that shows the change in the habitat type bridged and the latter includes a discussion of the effect of bridge piers in the ocean on EFH.*

2. **Comment:** “In addition, Section 2.10.2.5 states: “...after the issuance of the Record of Decision for this project, NCDOT will confine future NC 12 maintenance to the existing NC 12 easement”. Further in this section it is then stated: “Availability of funds recognizes that future funding analyses indicate that funding availability will continue to limit how much can be built at one time and the need for phasing.” Both philosophies are not possible. If beach erosion is accelerated or funding continues to be inadequate, the only option will likely be hardening the shoreline and therefore significantly impacting habitat within the project area.”

Response: *The intent of the statement quoted was to indicate that it is unlikely that the balance of the Phased Approach Alternative (after Phase I) could be built in a single second phase. Instead, funding was expected to be available for a multi-phase program (four phases were assumed as most likely in the FEIS) over the fifty-year time span assumed (with some flexibility, if needed, to accommodate a different pattern of erosion than that forecast in the FEIS).*

3. **Comment:** “The document adequately address potential impacts and conservation measures for the construction of the preferred alternative [Phased Approach/Rodanthe Bridge], however several question remain from our March 16, 2007 comments on the phased approach alternatives, as well as the FEIS.”

Response: *NCWRC’s March 16, 2007 comments were responded to in FEIS Section 8.12. Since these comments were made, the Preferred Alternative has changed. FHWA and NCDOT will continue to coordinate with and seek input from NCWRC.*

D.2.3 Local Agencies—The Albemarle Commission

1. **Comment:** “The Albemarle RPO recommends the short bridge alternative for the new Highway 12 bridge. This option is more financially feasible considering the budget shortfalls we are facing throughout the state and nationally.”

Response: *Position acknowledged. The Parallel Corridor Alternatives have been characterized locally as a “short” bridge.*

2. **Comment:** “Most importantly, the Albemarle RPO requests the expedited construction of a new Highway 12 bridge due to the critical nature of this project. ... Continual repairs to the bridge remain futile, and the construction of a new and much wider bridge is necessary for the traffic volume it carries. If the Bonner Bridge must be taken out of commission without a replacement, motorists will be required to take a 100-mile detour to access Hatteras Island.”

Response: *Position acknowledged; however, FHWA and NCDOT would like to clarify that repairs to the existing bridge have not been “futile.” The current repair contract is expected to keep the existing bridge in service without weight restrictions for approximately 10 years. All the Parallel Corridor alternatives under consideration would provide the same two traffic lanes as is currently provided. The new Oregon Inlet bridge will have two 8-foot (2.4-meter) shoulder. These shoulders are wider than Bonner Bridge’s 2-foot (0.6 meter) shoulders and will allow room for movement around stranded vehicles and accidents, as well as accommodate bicyclists.*

D.2.4 Non-Governmental Organization Comments and Responses

This section responds to written comments on the FEIS submitted by non-governmental organizations (NGOs). The comments in the sections that follow consist of quotes from the correspondence received. Each substantive comment requiring a response is listed below. The original correspondence is presented in Appendix E.

North Carolina Coastal Federation

1. **Comment:** “In December 2005, NCCF submitted a letter to DOT recommending an alternative route that would build a bridge down the west side of Pea Island, using top-down construction methods (such as that used on the Highway 17 bypass in Chocowinity) to minimize impacts to wetlands, aquatic grass beds, and other sensitive natural communities. A copy of that letter is attached. While there would still be environmental impacts during construction, the natural communities would quickly recover once Pea Island was allowed to move and shift as a natural barrier island. Building a bridge on the west side of the island would provide better protection for both the transportation corridor and the refuge. We found what may be a brief reference to our alternative on page 2-77, in Section 2.6.4. The passage reads, “Relocating NC 12 west of the freshwater ponds in the Refuge was dropped because meeting participants agreed that it would have the greatest impact on Refuge operations and use.” We believe this option has been dismissed too quickly. With some creative thinking, it may be possible to provide a way for refuge operations to continue as needed; for the public to have access to the most popular parts of the refuge, including North and South ponds; and for a reliable transportation corridor to be built and maintained. Please note that we are proposing a somewhat different alignment than the corridors studied in the 1990s and early 2000s, and that our approach calls for top-down construction of each platform.”

Response: *The NC Coastal Federation’s position is acknowledged; however, our response to the alternative suggested in the Coastal Federation’s December 2005 letter in Section 8.12.3.7 of the FEIS is unchanged. The reasons for not relocating NC 12 west of the ponds, as discussed in FEIS Section 2.6.4, remain valid.*

2. **Comment:** “If this alternative is seriously studied, it is our feeling that it will provide a practical solution. It will minimize the long-term economic, social and environmental costs of the project by locating the road where it can best be integrated into this dynamic island system. In contrast, we are very concerned that the Phased Approach, as described in the FEIS, will leave the public without a reliable transportation corridor as storms continue to cover the highway with sand and ocean water.”

***Response:** See the response to the commenter’s comment 1 above. The comment specifically refers to the Phased Approach alternatives, which when complete would limit paved road access in the Refuge to two points. The Refuge, however, has indicated that they will provide alternative access. Visitor access would not change with Phase I of the NC 12 Transportation Management Plan Alternative except that the driveway connection on NC 12 to the fishing parking lot would move south to the same area as the existing road to the (Former) US Coast Guard Station. Refuge access would be a consideration in final decision making related to future phases.*

3. **Comment:** “We believe the Phased Approach represents a good-faith effort to resolve this contentious issue. Nonetheless, conditions have changed so quickly on the north end of Hatteras Island that the approach as presented in the FEIS is no longer a practical option. Even if bridges are built immediately over the hot spots, it will only be a matter of a few years before they are on the beach, sustaining the full impact of the surf.”

***Response:** The FEIS (Section 4.6.8) discusses the likelihood that portions of the Phased Approach alternatives would eventually be located in the surf zone, as well as in the ocean, to the east of Hatteras Island, and the bridge structures would be designed accordingly.*

Southern Environmental Law Center

1. **Comment:** “After reviewing the Supplement, the SDEIS, associated scientific research, and the FEIS, we continue to support the Pamlico Sound Bridge alternatives and do not agree that any of the alternatives that utilize the Parallel Bridge corridor, including the preferred alternative, the Phased Approach, are viable alternatives.”

***Response:** The commenter’s position is acknowledged. See the evaluation of the Pamlico Sound Bridge Corridor as a feasible and prudent alternative in Appendix G of the Revised Final Section 4(f) Evaluation; responses to the commenter’s comments on that appendix that are presented in Appendix F of this EA.*

2. **Comment:** “The Phased Approach ... cannot meet the purpose and need or the Outer Banks Task Force objectives because it fails to protect NC 12 from shoreline movement during the project life, fails to take into account channel migration and to let the channel move, and fails to preserve the natural barrier island system. The Phased Approach will have significant effects on Hatteras Island and the transportation corridor cannot be maintained safely and efficiently within this dynamic environment. The Phased Approach attempts to continue to maintain a fixed transportation corridor on a shifting barrier island at the cost of public safety, reliability, and ecological protection.”

***Response:** The Phased Approach meets the purpose and need expressed in the FEIS. By placing portions of NC 12 on a bridge, the Phased Approach alternatives protect NC 12 from shoreline movement and provides for Hatteras Island access. The longer*

navigation zone on the Oregon Inlet bridge would provide additional opportunities for allowing the dredged channel in Oregon Inlet to move in response to the changing location of the natural gorge. Preserving the natural barrier island system is not a purpose of the project, however, the Phased Approach alternatives would allow for natural overwash to occur on Hatteras Island. This also is the case for the other detailed study alternatives, including the NC 12 Transportation Management Plan Alternative, except for the alternatives that would involve beach nourishment.

3. **Comment:** “The Pamlico Sound Bridge is the only alternative that will work and can be authorized pursuant to applicable federal laws.”

Response: FHWA and NCDOT do not agree with this comment and respectfully refer the commenter to Appendix G of the Revised Final Section 4(f) Evaluation and our responses to the commenter’s comments on that appendix that are presented in Appendix F of this EA.

4. **Comment:** “NC 12 and its associated maintenance are steadily degrading the Refuge, and the Phased Approach does not protect against this degradation.”

Response: The FEIS Sections 4.6.8.6 and 4.7.8 discuss expected future NC 12 maintenance activities and the resulting potential impacts until all phases of the Phased Approach alternatives or phasing of any of the detailed study alternatives, including the NC 12 Transportation Management Plan Alternative (Preferred). The degradation of island features, such as the impoundments, would likely result from allowing the natural processes to occur under the Phased Approach alternatives.

5. **Comment:** “The Phased Approach is not a viable, or lawful, alternative.”

Response: FHWA and NCDOT disagree with the comment.

6. **Comment:** “The Phased Approach would keep NC 12 under construction for the life of the project as short bridges are perpetually built through the Refuge north of Rodanthe.”

Response: FHWA and NCDOT do not agree with this comment. The construction duration and estimated year for starting construction on each phase is stated on pages 2-124 through 2-126 of the FEIS. As currently planned, Phase I is expected to start immediately after the release of the ROD, Phase II would be post-2015, Phase III would be post-2020, and Phase IV would be post-2030. The construction duration for each of Phases II to IV is estimated to last approximately three years from letting and Phase I is estimated to last 3.5 years. Therefore, based on current estimates, the total construction duration for all phases is expected to be approximately 12.5 years. It is acknowledged that the timeline could change based on future conditions in the Refuge, and that is one reason why the NC 12 Transportation Management Plan Alternative (Preferred), including an island monitoring program, is proposed as the preferred alternative.

7. **Comment:** “The “phased” short bridge locations are estimated based on current shoreline erosion and inlet formation predictions. Shoreline changes, however, are often episodic in nature and are difficult to predict precisely. An inlet could form or the shoreline erode prior to or during a planned construction phase.”

Response: *The observation of the commenter is correct. Phasing as planned and described in the FEIS and EA accounts for this concern in two ways: 1) Phase II is defined to address the locations of NC 12 most threatened by shoreline erosion and to bridge four of the five potential island breach locations; and 2) a monitoring program is incorporated so changes in the evolution of the shoreline from what was forecast for project planning purposes can be taken into account in the implementation of future phases. (See Section 2.10.2.5 of the FEIS.) FHWA and NCDOT note the same commenter is critical of our acknowledgement of the episodic nature of coastal dynamics when he/she asserts that “certainties” in predictive modeling are being ignored in subsequent comments (Comment 4, Appendix F, Section F.3).*

8. **Comment:** “The effect of climate change has not been adequately evaluated. Any increase in storm intensity and/or sea level rise may cause substantial revisions to the current predictions, further exacerbating the uncertainty associated with predicting inlet/breach locations and timing.”

Response: *FHWA and NCDOT do not agree with this comment. A Peer Exchange was conducted to assess the effects of Global Climate Change on Accelerated Sea-Level Rise for the project in May 2008. The experts in attendance at the Peer Exchange concluded that the analyses in the FEIS accounts for accelerated sea level resulting from climate change, as well as its possible effects, to the extent possible given the amount of future uncertainty involved. The participants of the peer exchange are listed on page 3-61 of the FEIS. One participant was Dr. Stanley Riggs who was one of the authors of the information related to sea level rise attached (Attachment A) to the commenter’s comments. The new Preferred Alternative also provides an opportunity to address shoreline uncertainty by finalizing design decisions closer to the time each project phase is implemented.*

9. **Comment:** “The FEIS attempts to respond to this natural uncertainty by proposing a monitoring program and by acknowledging that some of the phases may be different than those evaluated in the FEIS. This proposal, however, amounts to a blank check that cannot pass legal scrutiny.”

Response: *FHWA and NCDOT disagree with this statement. The monitoring program is an essential component of prudent long-term project implementation and an opportunity to identify and take into consideration the evolving shoreline closer to the time of implementation for each phase. Further, FHWA and NCDOT would need to meet the requirements of NEPA and other environmental laws when implementing all future project phases.*

10. **Comment:** “As the FEIS acknowledges, the Phased Approach would substantially interfere with fishing, surfing, and other beach activities and will severely limit and reduce access to the Refuge. In contrast, the Pamlico Sound Bridge is safer, more reliable, and more protective of the environment.”

Response: *Position acknowledged, but FHWA and NCDOT do not agree with the commenter’s assessment of the Pamlico Sound Bridge in the comparative context which it is relayed. All of the alternatives presented for detailed study to date would be safe and reliable. We note also that neither of the Pamlico Sound alternatives were selected as the Least Environmentally Damaging Practicable Alternative*

through the Merger Process. Practicability necessarily must be weighed into project decisions. FHWA and NCDOT also note the Pamlico Sound Bridge would likely eliminate all paved road access to the Refuge during the life of the project.

11. **Comment:** “The Pamlico Sound Bridge would not be subject to ocean overwash, inlet formation, or erosion. It would allow the U.S. Fish and Wildlife Service to preserve and protect the Refuge and the associated wildlife. Furthermore, the Pamlico Sound Bridge is the only alternative that can be authorized pursuant to applicable federal laws.”

Response: *FHWA and NCDOT agree the Pamlico Sound Bridge would not be subject to ocean overwash, inlet formation, or erosion. This is also true of many of the Parallel Bridge Corridor options. FHWA and NCDOT also believe that all of the options would allow USFWS to preserve and protect the Refuge and associated wildlife, and have documented anticipated impacts to these resources in the collective planning documents produced to date. FHWA and NCDOT disagree the Pamlico Sound Bridge is the only alternative that can be authorized pursuant to applicable federal laws, but note the commenter’s opinion.*

12. **Comment:** “The Phased Approach rests on faulty legal assumptions, inadequate economic analysis and flawed predictions about engineering around future coastal conditions within the project area.”

Response: *Position acknowledged, but FHWA and NCDOT do not agree with this comment.*

13. **Comment:**

- I. “The Phased Approach fails to comply with the National Wildlife Refuge System Improvement Act.
- A) NCDOT and FHWA must demonstrate that bridge replacement is compatible with the purposes of Pea Island National Wildlife Refuge.
- B) The Phased Approach cannot comply with the National Wildlife Refuge System Improvement Act.
1. Restricting the Phased Approach to the current NC 12 easement does not exempt the Phased Approach from a compatibility determination.
 2. The Phased Approach cannot be found to be compatible.
- C) Only the Pamlico Sound Bridge alternative complies with the National Wildlife Refuge System Improvement Act.

Of particular significance is the policy’s statement that cumulative, indirect, and direct impacts of the use in conjunction with other existing or planned uses of the refuge and uses of adjacent lands and waters are all to be considered in determining whether the ecological integrity of the refuge is maintained. Thus, in the case of Bonner Bridge, the Refuge Manager’s compatibility determination of replacement of the bridge under any alternative must consider all the impacts related to both NC 12 and the subsequent construction of the Phased Approach.

The FEIS rests on the erroneous assumption that any activity can take place within the existing right-of-way and not trigger a compatibility determination. The National Wildlife Refuge System Improvement Act requires the Refuge Manager to consider direct, indirect, and cumulative impacts associated with existing or planned uses of the refuge and the impact on adjacent lands and waters. This analysis should include the effect on the Refuge from keeping NC 12 in its current location; the impact on the Refuge from construction spanning the life of the project; the impact on the Refuge from measures taken within the easement to address shoreline erosion or storm events; and impacts on the Refuge from the final Phased Approach—a bridge that sits in the ocean and on the shore of the Refuge.”

Response: *While NCDOT has not yet requested a formal compatibility determination for any of the alternatives, FHWA and NCDOT note that in its October 2008 comment letter on the FEIS, USDOJ – Office of the Secretary confirmed that “If all the proposed work (staging areas, construction, and future maintenance of existing NC-12) is performed within the existing right-of-way and is in compliance with any terms and conditions contained within the easement deed, a Refuge compatibility determination will not be required.” Further, the congressional record shows that the National Wildlife Refuge System Improvement Act of 1997 was not intended to eliminate or restrict existing highway right-of-way from Refuges. In addition, although not related to a compatibility determination, the analyses listed in the final sentence of these comments are addressed in the FEIS in Sections 4.6.8 and 4.7.6.*

14. **Comment:** “Finally, the final Phased Approach is a bridge in the Atlantic Ocean. This ocean-side bridge will be a new feature on the beach, which the FEIS fails to evaluate adequately. For example, an ocean-side bridge may affect erosion rates, inlet formation, ocean overwash, etc. Once these natural processes are interrupted, the bridge will impact migratory bird and other wildlife habitat. Although the FEIS refers to studies conducted on a pier, it is illogical to assume that a pier would have the same effects on the adjacent shoreline as a bridge that travels parallel to the shore for miles. The FEIS also acknowledges the disastrous impact from storms like Hurricane Katrina on bridges, but fails to analyze the increased impact on a bridge that would bear the brunt of an impact from a hurricane. For these reasons, the Phased Approach is not compatible with the Refuge.”

Response: *FHWA and NCDOT do not agree with this comment. The Interstate 110 bridge in Biloxi withstood the disastrous impact from Hurricane Katrina. Its substructure is located in the surf zone of the Gulf of Mexico. FEIS Section 4.6.8 includes substantial detail on off-shore coastal processes with the Phased Approach alternatives. FEIS Section 4.7.6 discusses the potential impacts of the Phased Approach alternatives on wildlife and fish habitat. In addition, the bridge would be designed to take into account hurricanes. These findings equally apply if the Phased Approach location and design is adopted as a part of future phases of the NC 12 Transportation Management Plan Alternative (Preferred).*

15. **Comment:** “For example, maintenance of an existing right-of-way is subject to review and approval by the U.S. Fish and Wildlife Service and is restricted to minor actions such as minor expansions or minor realignments to meet safety standards. See Final Compatibility Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997, 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). The Phased Approach’s impacts on the Refuge are far from minor, include significant direct and indirect effects, and cannot be determined to be compatible. Furthermore, the FEIS fails to provide adequate information about how

construction and maintenance could be restricted to the easement, which NCDOT has never done within the Refuge. The FEIS adds to this oversight with contradictory statements about activities outside the easement that could be part of future phases and maintaining that no work will occur outside the existing right-of-way. See e.g., FEIS at 2-96, 2-147, and 4-8.”

***Response:** Future short-term NC 12 maintenance work, as well as all phases of the project can be confined to the existing easement. USDOJ’s comments on the FEIS indicate that a compatibility determination would not be required with the Phased Approach/Rodanthe Bridge Alternative because this alternative falls within the terms of the NC 12 easement permit.*

If in the course of developing the details of future phases of the NC 12 Transportation Management Plan Alternative (Preferred) and associated updates to the environmental impact assessments contained in the FEIS and this EA, the implementation of a future phase that is outside the existing easement was found to be desirable and applicable environmental protection laws including the compatibility determination could be met, then such an alternative would be implemented.

16. **Comment:** “The FEIS acknowledges that future phases may not be built; may include different components from a “mix and match” menu; and may not meet federal legal requirements. These difficulties are not adequately addressed within the FEIS and in essence create a carte blanche approach that cannot be compatible with the Refuge. And NCDOT cannot rely on the existing easement as a legal shield to a compatibility analysis.”

***Response:** The Phased Approach alternatives are not a carte blanche approach because they assume that specific bridges would be built at specific times and specific locations, based upon the best available science. USDOJ’s comments on the FEIS indicate that a compatibility determination would not be required with the Phased Approach/Rodanthe Bridge Alternative because this alternative falls within the terms of the NC 12 easement permit. The uncertainties noted in this comment for the Phased Approach alternatives contributed to the development of the current preferred alternative addressed in this EA.*

As indicated in Commitment 16 of this EA (revised from a similar commitment [Commitment 15] in the FEIS), NCDOT is committed to building future phases based on available funding with resolution of the three “hot spots” as soon as possible, based on the results of the coastal monitoring program proposed as part of the NC 12 Transportation Management Plan. Rather than the NC 12 Transportation Management Plan Alternative being a carte blanche approach, as each project phase is planned, additional NEPA analyses would be conducted in association with USFWS and other stakeholders to take into consideration the changed setting and circumstances found in the project area at that time.

17. **Comment:** “Retaining the terminal groin is an essential part of the Parallel Bridge, and the impacts to the Refuge of retaining the groin must be considered in the compatibility analysis. If the groin is instead determined to be necessary to protect the new Parallel Bridge and it is retained, it will have numerous adverse environmental consequences that are not compatible with the purposes of the Refuge. These consequences must be considered in the compatibility analysis.”

Response: *The terminal groin was determined compatible with the purposes of the Refuge when it was constructed. Consideration for the permit was “the protection of wildlife habitat by stabilizing the north end of Pea Island and partially restoring land lost to avulsive action.” The terms of the permit require bi-monthly monitoring of the effectiveness of the groin to stabilizing the northern shoreline.*

We also noted that the National Wildlife Refuge System Improvement Act requires USFWS to identify and describe significant problems that may adversely affect the populations and habitats of fish, wildlife, and plants with the planning unit and actions necessary to correct or mitigate such problem in each comprehensive conservation plan. We have reviewed the Pea Island National Wildlife Refuge Comprehensive Conservation Plan as part of our analysis for this project. It does not note any significant problems associated with the terminal groin that may adversely affect the populations and habitats of fish, wildlife and plants within the Refuge. Instead it documents that USFWS and NCDOT have been able to establish new habitat suitable for wintering piping plover. This habitat was included in the USFWS designation of critical habitat for the planning unit in December 2008.

FHWA and NCDOT have been coordinating with USFWS on requirements necessary to comply with a compatibility determination if the groin is to be retained.

18. Comment:

- II. “The Department of Transportation Act of 1966 section 4(f) analysis is inadequate.
 - A) NCDOT erroneously concludes that the Phased Approach will not “use” Refuge lands because it will operate within the existing NC 12 easement.
 - B) NCDOT’s erroneous determination that the Phased Approach will not “use” the Refuge impermissibly skews the evaluation of the factors in the “least overall harm” analysis.
 - C) Section 4(f) Evaluation of the Phased Approach’s impacts does not provide the decisionmaker with sufficient information to engage in a meaningful “least overall harm” analysis required by Section 4(f).”

Response: *FHWA and NCDOT prepared a Revised Final Section 4(f) Evaluation based in part on points raised by the commenter. It was distributed for review in October 2009. Comments on the Revised Final Section 4(f) Evaluation and responses are presented in Appendix F. They include updated comments from this commenter.*

19. **Comment:** “Indeed, NCDOT posits that it will be able to accomplish “all construction activities, such as material/equipment deliveries, excavations, temporary shoring, pile driving, and erection of bridge girders” within the existing right-of-way. FEIS at 2-123. NCDOT fails to explain how it is feasible to construct and maintain an elevated bridge within the existing right-of-way, construct a service road, while maintaining the current NC 12 and cause no further encroachments into the Refuge. While it lists a host of activities that will allegedly occur contemporaneously within the refuge, the Section 4(f) Evaluation falls short of explaining how all construction equipment and activities, including pile driving and shoring, and construction of a temporary road are going to co-exist.”

Response: *The commenter's opinion is noted. However, the work would be performed within the existing 100-foot-wide easement as described in the FEIS. FHWA and NCDOT have experience overseeing construction activities within tight confines similar to the situation at hand. Figure 2-24 of the FEIS illustrates the positioning of bridges in the Refuge and a temporary access road used to maintain traffic, all within the existing easement. The requirement for contractors to submit a staging plan for remaining in the easement is addressed on page 2-123 of the FEIS.*

As indicated in responses to USFWS comments, based on coordination with the Refuge, it is now proposed that the southern terminus of the first phase of the NC 12 Transportation Management Plan Alternative (Preferred) (replacement of Bonner Bridge) be built within a minor modification of the existing NC 12 easement in the Refuge. The Refuge, NCDOT, and FHWA have had meetings with regard to what would constitute a minor modification to the existing easement. To date, there have been no final agreements on either the easement terms or conditions.

FHWA and NCDOT recognize that future decisions must be made in association with the Refuge and other environmental regulatory agencies. This is the underlying rationale for the coastal monitoring program and continued agency coordination through the NEPA/Section 404 Merger Process described in Section 2.3 of this EA. If the outcome of that decision-making is that maintenance activities, Phase I, and/or future project phases must remain in the existing easement, then FHWA and NCDOT are prepared to do so as indicated in the FEIS, including implementation of the Phased Approach/Rodanthe Bridge Alternative.

FHWA and NCDOT note that NC 12 maintenance activities to date have neither been found to have a significant impact under NEPA nor found to be incompatible with the purposes of the Refuge.

20. **Comment:** "NCDOT's Section 4(f) Evaluation also neglects to address the projected dune building and maintenance activities through 2030 that are integral to the Phased Approach (FEIS at 4-71, 4-72), much less explain how future dune building and maintenance also will stay within the easement and cause no further encroachment onto the Refuge. For example, the FEIS makes reference to smaller dunes of indeterminate size and unquantified impact which will purportedly be built within the easement on the Refuge, but the Section 4(f) Evaluation omits dune maintenance and building from the discussions of Refuge use and Refuge impacts. Absent credible information to the contrary, it is infeasible that NCDOT will be able to accomplish all of the activities it proposes – new dune construction and maintenance, a temporary road, and constructing a bridge over forty-foot wide – entirely within the its existing easement. Hence, it is foreseeable that the Phased Approach will result in actual use of additional Refuge land."

Response: *The commenter's opinion is noted. Future maintenance work can be performed within the existing easement. Table 4-14 and Table 4-15 on pages 4-71 and 4-72 of the FEIS document maintenance activities likely to occur within the existing easement with a phased alternative. How this would be done is presented on pages 4-70 and 4-71. The tables and text (page 4-73) note that NCDOT intends to place a high priority on implementing Phase II, which would include the three "hot spots" where much of the NC 12 maintenance occurs today. The impact of maintenance activities prior to the completion of all phases is discussed in Section 4.7.8 of the FEIS. A typical section showing the position of the bridge and temporary*

construction road associated with the Phased Approach alternatives within the existing easement are presented in Figure 2-24 of the FEIS. If a temporary dune also is found in the easement at the time of construction, the bridge foundations could be driven through the dune. See the response to the previous comment related to coordination with the Refuge related to the merits of the Phase I bridge terminus leaving the existing easement.

21. **Comment:** “Assuming NCDOT feasibly could implement the Phased Approach within the bounds of the existing easement, the definition of “use” under 23 C.F.R. § 774.17 is broader than actual use. “Use” is not limited to physical takings and land acquisition, as is suggested by the Section 4(f) Evaluation’s repeated reference to the Phased Alternative staying within the easement and thereby avoiding “use” of the Refuge. Rather, “use” for purposes of Section 4(f) encompasses certain temporary and constructive uses of protected land. See 23 C.F.R. § 774.17. Temporary occupancies are categorically excluded from “use” only if they satisfy all of conditions set forth in the regulation. 23 C.F.R. § 774.13 (d). NCDOT fails to address whether and what kinds of temporary occupancies associated with construction and maintenance under the Phased Approach, particularly those occupancies which may result in permanent adverse impacts on the Refuge, could potentially constitute a temporary occupancy adverse to the statute’s preservation purpose and hence a “use” under Section 4(f) analysis. Even if NCDOT could carry out the Phased Approach within the existing easement and avoid any actual temporary uses, the Phased Approach’s proximity impacts at a minimum will result in a “constructive use” of the Refuge.... The Section 4(f) Evaluation includes a constructive use section. However, that analysis appears to be an afterthought with a foregone conclusion.”

***Response:** In consideration of this comment and others, NCDOT and FHWA published a Revised Final Section 4(f) Evaluation on October 9, 2009. The Revised Final Section 4(f) Evaluation concluded that the Parallel Bridge Corridor with Phased Approach/ Rodanthe Bridge Alternative would constructively use the Refuge. The Phased Approach, as described in the FEIS, included no temporary use of Refuge land.*

22. **Comment:** “More fundamentally, within the constructive use analysis provided, NCDOT consistently reads the constructive use threshold more narrowly than the regulation provides in determining that the various proximity impacts do not amount to 4(f) “uses.” The appropriate guidepost for constructive use throughout the regulation is “substantial impairment” of the property. ... Total loss of the resource is not required; rather, meaningful reduction of the significance of the resource is sufficient for a proximity impact to amount to a constructive use.”

***Response:** The Section 4(f) regulations do not permit a finding of constructive use absent a “substantial impairment” of the protected features, activities, or attributes of the Section 4(f) property. 23 CFR 774.15(a). The regulations do not describe a “meaningful reduction of the significance of the resource” as a constructive use.*

NCDOT and FHWA published a Revised Final Section 4(f) Evaluation on October 9, 2009. The Revised Final Section 4(f) Evaluation concluded that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Refuge.

23. **Comment:** “In addition, the Section 4(f)’s Evaluation’s examination of specific proximity impacts as constructive uses fails to adequately assess ecological impacts and access restrictions of the Phased Approach in the Refuge.”

***Response:** The original Final Section 4(f) Evaluation in the FEIS addresses ecological impacts in Sections 5.5.14 and on pages 5-51 to 5-52. Access restrictions are addressed in Section 5.5.13 and on page 5-51. The material presented in both cases summarizes and cross references more extensive analyses in Chapter 4, “Environmental Consequences.” This information combined with consideration by FHWA and NCDOT of comments on the FEIS’ Section 4(f) Evaluation are reflected in the Revised Final Section 4(f) Evaluation published on October 9, 2009.*

24. **Comment:** “In addition, the Section 4(f) Evaluation completely omits an analysis of ecological impacts on the Refuge stemming from planned “short-term” dune construction and maintenance within the easement during implementation of Phased Approach, which is estimated to be completed by 2030. FEIS at 4-68 to 4-73. In fact, the Section 4(f) Evaluation ignores the dune construction and maintenance planned with the Phased Approach, and submits that the Phased Approach “would allow more natural coastal processes to occur by eliminating artificial dune construction and beach nourishment.” FEIS at 5-52. This conclusion is not only inaccurate but underscores the inadequacy of the ecological impact analysis presented in the Section 4(f) Evaluation. The Section 4(f) Evaluation fails to consider whether and to what degree sand dune construction, maintenance, and the resulting interference with natural coastal processes will impact the Refuge and result in a constructive, if not an actual, use of Refuge lands that abut the easement.”

***Response:** Construction and maintenance of the dunes began before the Refuge was established and has continued ever since. These dunes are an integral part of the historic landscape. The dunes are not a part of the project, but a part of NC 12 maintenance occurring today and needed in some form until all phases of the project can be built. The impact of maintenance activities prior to the completion of all phases of the project is discussed in Section 4.7.8 of the FEIS. FHWA and NCDOT disagree that the continuation of maintenance activities until all phases of the project are complete would result in substantial impairment of the activities, features, or attributes that qualify the Refuge as a Section 4(f) resource. NC 12 has coexisted with the Refuge for decades and maintenance of NC 12 and maintenance of the dunes has been conducted throughout that period of time.*

25. **Comment:** “The Section 4(f) Evaluation similarly fails to adequately assess as a potential constructive use of the Refuge the impacts from significantly restricting access. The Section 4(f) analysis concedes, for example, that the Phased Approach would “limit access to the Refuge to two locations” (FEIS at 5-51) and would cause loss of access “to the Refuge Visitor Center, headquarters, and North Pond Trail with the Preferred Alternative [Phased Approach/Rodanthe Bridge].” FEIS at 5-30. A restriction in access which substantially diminishes the utility of a significant publicly owned land is a constructive use. However, NCDOT dismissed this proximity impact because the restriction in access “would not eliminate the Refuge’s ability to function.” FEIS at 5-51. NCDOT misstates the applicable standard and fails to adequately assess the potential constructive use caused by the Phased Approach, which will cut off most access to the Refuge.”

***Response:** Access restrictions are addressed in Section 5.5.13 and on page 5-51 of the original Final Section 4(f) Evaluation. NCDOT and FHWA published a Revised*

Final Section 4(f) Evaluation on October 9, 2009. The Revised Final Section 4(f) Evaluation concluded that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Refuge.

26. **Comment:** “Finally, the Section 4(f) Evaluation fails to acknowledge or assess the use of the Refuge that will result from retaining the terminal groin, which does not lie within the existing NC 12 easement. The retention of the terminal groin is an essential part of the Phased Approach that will require NCDOT to secure a new permit to retain it in its existing location on the Refuge, as discussed in section VI, *infra*. Although the Section 4(f) Evaluation mentions the terminal groin as it relates to the Coast Guard Station, concluding that the Pamlico Sound alternatives will adversely affect the Coast Guard Station by reason of removal of the terminal groin (FEIS at 5-20), the Evaluation does not analyze the extent of use and environmental impacts on the Refuge posed by permitting and retaining the terminal groin.”

Response: *Retaining the terminal groin would not require a Section 4(f) approval for the use of the Refuge. The terminal groin is an existing feature constructed in cooperation between USDOJ, USACE, and NCDOT. It was found compatible with the purposes of the Refuge when constructed, and its existence has never been determined incompatible.*

NCDOT and FHWA have considered the effects of retaining the terminal groin on the Refuge. The FEIS presumes the continued presence of the terminal groin in its shoreline forecast modeling (FEIS Section 3.6.3) and its assessment of cultural, coastal, and natural resource impacts (FEIS Sections 4.4, 4.6, and 4.7, respectively). However, the extent of those effects, in comparison with removal of the groin, would not be significant based on previously published environmental analysis and documentation required by NEPA, the Endangered Species Act and the National Wildlife Refuge System Improvement Act of 1997 and the substantial change to the shoreline that would result from removing the groin, as discussed in the FEIS beginning on page 3-65. Additional environmental analysis of the terminal groin needed to meet USFWS permit requirements by NCDOT and USFWS is ongoing.

27. **Comment:**

- III. “The FEIS does not adequately assess the environmental impacts from the Phased Approach.
- A) To comply with NEPA, the FEIS must thoroughly and objectively analyze the environmental consequences of the alternatives.
 - B) The Phased Approach environmental impacts analysis is inadequate.
 - C) The FEIS fails to identify a preferred alternative and instead writes a blank check without adequate review of all the foreseeable environmental impacts.
 - D) The FEIS fails to evaluate the ecological needs of the Refuge and the manner in which the Phased Approach interferes with the beneficial processes of this dynamic shoreline.
 - 1. Shoreline erosion, inlet formation, and ocean overwash.

2. Endangered and threatened species.
3. Wetlands.”

Response: *FHWA and NCDOT do not agree with the general comment that the FEIS does not adequately address the environmental impacts of the Phased Approach. The FEIS provides extensive analysis of each category of environmental impact and fully complies with NEPA requirements. The responses to the specific comments below provide further detail in addressing this general comment.*

28. **Comment:** “The FEIS fails to analyze the reasonably foreseeable impacts to the Refuge from temporary or “emergency” measures taken to protect a phased bridge under construction or an area that is not slated for construction until decades after the threat.”

Response: *FHWA and NCDOT disagree with this comment. The characteristics and impacts associated with storm-related maintenance prior to the implementation of each phase of the project are addressed in Sections 4.6.8.6 and 4.7.8 of the FEIS. As discussed in Section 2.10.2.5 of the FEIS under “Phasing Timing and Minimizing Impacts of NC 12 Maintenance,” one intent of the monitoring program is to time future phases so as to minimize future storm-related NC 12 maintenance.*

29. **Comment:** “Finally, the final outcome of the Phased Approach is a bridge in the Atlantic Ocean. The placement of a bridge of this length and size on a dynamic shoreline raises many concerns. ... The FEIS fails to take a “hard look” at the adverse impacts from placing a transportation corridor within such a dynamic system. The Phased Approach instead avoids a hard look by proposing a monitoring program and by stating without evaluating that the future phases of the Phased Approach may incorporate any portion of any of the Parallel Bridge alternatives.”

Response: *NCDOT and FHWA disagree with the commenter’s position. FEIS Section 4.6.8 includes substantial detail on off-shore coastal processes with the Phased Approach alternatives. FEIS Section 4.7.6 discusses the potential impacts of the Phased Approach alternatives on wildlife and fish habitat. In addition, the bridges would be designed taking into account hurricanes.*

A “hard look” was taken using appropriate data and analyses. The monitoring program is an essential component of prudent long-term project implementation. In addition, the impacts presented for the Parallel Bridge Corridor alternatives in the FEIS and this EA consider the environmental consequences of the full project and reflect the reasonably foreseeable range of impacts for the various phases of the NC 12 Transportation Management Plan Alternative (Preferred).

30. **Comment:** “The FEIS does not adequately analyze the effects of shoreline erosion, inlet creation, and ocean overwash on the proposed project area. Rather, the FEIS neglects the beneficial impacts to the environment, as well as the ways in which these processes make the Phased Approach an inappropriate solution.”

Response: *FHWA and NCDOT disagree with this comment. FEIS Section 4.7.7 discusses the expected positive benefits of allowing natural barrier island change, including shoreline erosion, inlet creation, and ocean overwash. Section 4.6.8 discusses in detail the affect of the Phased Approach alternatives on off-shore coastal*

processes. Section 4.6 discusses the affect of the detailed study alternatives in general on coastal conditions.

31. **Comment:** “The authors have also penned a more detailed report entitled “NC Coasts in Crisis: A Case Study,” which is scheduled for publication by the U.S. Geological Survey. One of the authors, Dr. Stan Riggs, has written a third paper entitled, “Eye of a Human Hurricane: Pea Island, Oregon Inlet, and Bodie Island, Northern Outer Banks, NC,” which is scheduled to be published as part of a book by the Geological Society of America. Both papers offer greater technical and scientific detail on the inappropriateness of the Phased Approach in light of dynamic barrier island geography, climate change, and the predicted associated sea level rise. These two papers are scheduled for publication in 2009, and we ask that you refrain from issuing any Record of Decision until you have had a chance to receive and review them.”

Response: *NCDOT has reviewed the report “North Carolina’s Coasts in Crisis: A Vision for the Future,” which was Attachment A to the Southern Environmental Law Center’s comment letter and the recently published “Eye of a Human Hurricane: Pea Island, Oregon Inlet, and Bodie Island, Northern Outer Banks, NC” report. One of the authors of both items, Dr. Stanley Riggs, was a member of the expert panel that NCDOT convened during completion of the 2005 SDEIS in order to analyze the potential for a storm to open an island breach in the project area (see FEIS pages 3-61 and 4-56). Dr. Riggs was also a member of a Peer Exchange workshop that FHWA sponsored during completion of the FEIS in order to seek to incorporate recent scientific research on global climate change effects and accelerated sea-level rise into the previous shoreline analysis for the project (see FEIS pages 3-59 and 4-54). The section of the report “North Carolina’s Coasts in Crisis: A Vision for the Future” on page 11 titled “Why are North Carolina’s Coasts in Crisis?” discusses gradual changes from sea level rise and rapid change caused by storms (hurricanes and nor’easters). “Eye of a Human Hurricane: Pea Island, Oregon Inlet, and Bodie Island, Northern Outer Banks, NC” discusses the importance of considering sea level rise as a part of future planning for the Outer Banks. NCDOT acknowledges that these issues are important factors to consider for the proposed project and has adequately taken them into account through the expert panels discussed above, as well as through detailed coastal engineering analyses that were completed during the preparation of the 2005 SDEIS, the 2007 SSDEIS, and the FEIS. FEIS Section 3.6, which discusses coastal conditions in terms of the “Affected Environment” (i.e., FEIS Chapter 3 issues), includes a discussion of the evolution of the coast in the project area and how the coastal system works (e.g., inlet migration, shoreline erosion, etc.) similar to what is discussed in the report referenced by the commenter. In addition, FEIS Section 4.6, which discusses coastal conditions-related “Environmental Consequences” (i.e., FEIS Chapter 4 issues), documents the results of the coastal engineering analyses, including discussions of sea level rise and potential island breaching.*

In the “Adaption Alternatives” section of the “North Carolina’s Coasts in Crisis: A Vision for the Future” referenced by the commenter, it offers a vision of the future different from building the proposed project, the report states “If we withdrew from some of the coastal highways and terminated the construction of barrier dune ridges, the islands would begin their natural rebirth as inlet and overwash dynamics would once more rebuild them. The eventual result would likely be a barrier island system with eight Ocracoke-style destination villages.” This vision would not serve the

purpose and need of the project or the residents and visitors to Hatteras Island. This vision is that of those who prepared the report and not that of Dare County or the State of North Carolina. The Parallel Bridge Corridor alternatives, with the exception of those involving nourishment, would allow natural barrier island processes to resume.

“Eye of a Human Hurricane: Pea Island, Oregon Inlet, and Bodie Island, Northern Outer Banks, NC” concludes with “For the long-term health and, indeed, survival of our dynamic coastal system, we must develop new approaches to coastal management that blend the development, utilization, and maintenance of the economic infrastructure with the natural dynamics of climate change, including sea-level rise, increased storm frequency, shoreline recession, and habitat evolution and migration.” NCDOT agrees with this statement and believes that the NC 12 Transportation Management Plan Alternative (Preferred) provides an opportunity to do just this within the context future Outer Banks management planning.

32. **Comment:** “The FEIS, by utilizing historic annual average erosion rates, may underestimate the amount of erosion that will occur and the projected shoreline movement through 2060 may be substantially conservative. In addition, sea level rise is also predicted to increase erosion rates. Finally, by utilizing an average erosion rate as a prediction tool for the shoreline, the FEIS fails to analyze adequately the importance of large or severe storm events in shaping the proposed project area.”

***Response:** The “average rate” used by the project’s coastal engineers (see listing for FDH Engineering on page 6-8 of the FEIS) includes both times of past limited erosion and severe erosion. Further, as indicated in FEIS Section 3.6.3.1, a “high erosion” scenario was assumed, which assumes a future erosion rate higher than the 58-year period from 1946 to 2004. The potential affect of accelerated sea level rise is addressed in Sections 3.6.3.3 and 4.6.6 of the FEIS. Finally, recognizing that the shoreline could evolve differently than assessed, NCDOT has committed to the shoreline monitoring program described in FEIS Section 2.10.2.5 and EA section 2.3.2.2 so that the unexpected can be taken into consideration in the implementation of project phases. The need to consider the unexpected also is reflected in the identification of the NC 12 Transportation Management Plan Alternative as the Preferred Alternative in this EA.*

33. **Comment:** “The FEIS ignores, however, the beneficial impacts to the environment of natural inlet creation, migration, and closure. ... The FEIS does not analyze the environmental benefits from removing the transportation corridor and allowing ocean overwash.”

***Response:** FHWA and NCDOT disagree with this comment. FEIS Section 4.7.7 discusses the positive benefits of allowing natural barrier island change, including inlet creation and ocean overwash.*

34. **Comment:** “While the FEIS states that a parallel bridge corridor is likely to adversely affect these species (endangered and threatened species), the Pamlico Sound Bridge alternative is not likely to adversely affect any federally protected species. FEIS at 4-138. The reasonable and prudent measures are not adequate to prevent impacts of a long-term construction schedule, as is proposed in the Phased Approach, required long term nourishment, or any combination thereof.”

Response: FHWA and NCDOT disagree with this comment. The reasonable and prudent measures for minimizing impacts to protected species under the Phased Approach/Rodanthe Bridge Alternative were agreed to with USFWS during Section 7 consultation.

35. **Comment:** “The Phased Approach impermissibly interferes with the Fish and Wildlife Service’s ability to manage the Refuge for the benefit of these species.”

Response: FHWA and NCDOT disagree with this comment. The reasonable and prudent measures for conserving species and critical habitat were agreed to with USFWS during Section 7 consultation. Further, USFWS, in its April 30, 2009 letter to FHWA, indicates that all management activities in the Pea Island National Wildlife Refuge Comprehensive Conservation Plan can be carried out with or without the highway.

36. **Comment:** “It is of particular concern that the FEIS proposes any mix and match of short bridge construction, beach renourishment, and dune building. Each of these will have specific impacts on protected species, such as the piping plover and sea turtles, as well as impacts to the natural biota. Moreover, overwash is part of ecologically important inlet creation, migration and closure and over time, helps to create new moist sand intertidal feeding areas on the sound side.”

Response: FHWA and NCDOT recognize the importance of overwash and the impacts of the alternatives on protected species, but disagree with this comment. As future phases of the project are finalized taking into consideration changed conditions in the project area, Section 7 consultation with USFWS would be reinitiated. The planning of future phases would continue to recognize and address these concerns.

37. **Comment:** “The Phased Approach would impact 3.1 acres of wetlands, including 0.3 acres of CAMA coastal wetlands. FEIS at 4-96. This lower wetland impact appears to be based on the assumption that sand movement will naturally fill wetlands prior to implementing “phases” that include wetlands that currently exist. FEIS at 4-97. This assumption fails to consider the impacts from construction of the phases and the timing of the phases. Construction impacts from the Phased Approach include constructing a service road that will be in service for decades. Also, when and where wetlands are naturally filled may or may not be within the same time frame as construction of the Phased Approach. Therefore, the FEIS may underestimate the wetland impacts by assuming that the Phased Approach will occur in coordination with the natural erosion and overwash cycle. Furthermore, if overwash occurs before a planned construction phase, the NC DOT will push back any sand to recreate dunes and to stabilize NC 12. This action prevents the natural filling of wetlands in the right of way, making it more likely that the actual construction of the Phased Approach will require the fill of jurisdictional wetlands. Again, these assumptions may underestimate the actual impact to wetlands from the Phased Approach.”

Response: The wetland impacts documented in the FEIS were assessed using current wetlands. There is no assumption that those impacts would be less in future phases, although that is possible. At the time future phases are implemented, the actual conditions would be assessed and all environmental requirements complied with. The temporary service road would be built during bridge construction to

maintain traffic and would be removed when bridge construction is complete. It will not be in service for decades.

38. **Comment:** “Furthermore, the total temporary and permanent biotic impacts (which include wetland impacts) from construction of either of the phased approaches are not insignificant (48.5 acres temporary biotic impact, FEIS at 4-91). The Pamlico Sound Bridge is a practicable alternative with the least impact on aquatic ecosystems and wetlands, and is the only alternative assessed in the FEIS that may be fully permitted under Section 404.”

***Response:** Section 404 addresses impacts to jurisdictional wetlands. During the Project’s NEPA/Section 404 Merger Process, USACE agreed with the LEDPA, which indicates that a phased project in the Parallel Bridge Corridor is theoretically permissible, though not necessarily guaranteed as indicated in the NEPA/Section 404 Merger Process LEDPA agreement. The LEDPA also indicates that the Pamlico Sound Bridge Corridor is not practicable.*

39. **Comment:**

IV. “The Phased Approach fails to address public access to the Refuge.”

***Response:** FHWA and NCDOT disagree with this comment. The response to the specific comment below provides further detail in addressing this general comment.*

40. **Comment:** “The Phased Approach, however, will not provide compatible access and will severely limit or eliminate fishing, surfing, birding, and other resource dependent activities. Because the Phased Approach eliminates Refuge resources that create the need for adequate access, it is not a viable alternative.”

***Response:** Access changes in the Pea Island National Wildlife Refuge with the detailed study alternatives and their impact on recreational opportunities in the Refuge are discussed in Section 4.5.3 of the FEIS. Access to recreational opportunities within the Refuge is the responsibility of the Refuge and NPS, although NC 12 has made a substantial contribution to the accessibility of Refuge recreational opportunities for many years. USFWS, as well as the commenter, have consistently indicated a preference for the Pamlico Sound Bridge Corridor, which would eliminate all NC 12 access to the Refuge.*

41. **Comment:**

V. “The Phased Approach may not be able to be funded or comply with state or federal legal requirements.”

***Response:** FHWA and NCDOT disagree with this comment. Responses to the specific comments below provide further detail in addressing this general comment.*

42. **Comment:** “The FEIS fails to identify a preferred alternative. Instead, NCDOT proposes to move forward with an initial phase—build a bridge substantially similar to the existing Bonner Bridge—and then monitor, evaluate, and implement additional phases on an indeterminate timeline. The initial phase standing alone cannot be legally permitted because it violates federal and state laws including NEPA and the National Wildlife Refuge Improvement Act. NCDOT and FHWA attempt to evade this legal hurdle by proposing

additional phases, but fail to provide adequate specificity to analyze the alternatives or adequate legal assurances that any additional phases could be built. The FEIS explicitly states that the construction of future phases is dependent on funding, results of a shoreline monitoring program (currently undeveloped), and whether future phases can be permitted pursuant to federal and state law. Thus, future phases could be dramatically different or may not occur at all. Because this is a carte blanche approach, the NEPA analysis is inadequate and the Phased Approach does not meet legal requirements.”

Response: *NCDOT and FHWA disagree with the commenter’s position. The FEIS studied a very long corridor in order to consider alternatives that would both cross Oregon Inlet and bypass all of the “hot spots” on northern Hatteras Island with a single 17.5 mile bridge. These long bridge alternatives were ultimately found not to be feasible and prudent, as discussed in Appendix G of the Revised Final Section 4(f) Evaluation. The selection of the Phased Approach/Rodanthe Bridge Alternative as the preferred alternative, since replaced by the NC 12 Transportation Management Plan Alternative, fully comply with NEPA and are expected to be determined in compliance with the National Wildlife Refuge System Improvement Act.*

Section 2.10.2.5 of the FEIS describes how NCDOT would implement an assumed four phase program. As stated on page 2-127 of the FEIS: “Availability of funds recognizes that future funding analyses indicate that funding availability would continue to limit how much can be built at one time and the need for phasing.” The monitoring program is an essential component of prudent long-term project implementation. Further, the implementation of all project phases would be done within the requirements of NEPA and all other applicable environmental laws.

43. **Comment:** “The FEIS and the merger process acknowledge the legal uncertainties surrounding future phases. NCDOT’s summary of the merger process which identified phase I of the Phased Approach as the least environmentally damaging practical alternative state, “[t]he agencies concur, based on information available today, they cannot conclusively say that permits or approvals will or will not be granted for these additional phases.” The FEIS also admits the permitting difficulties for additional phases (“Phases II to IV present **substantial** challenges to obtaining permit approvals.”). By choosing the Phased Approach, NCDOT and FHWA have locked in place a transportation corridor that will need significant management for the life of the project and this management may not be permitted pursuant to federal or state law. To evade this legal box, NCDOT simply states that additional phases may or may not be built. This approach, however, ignores the natural environment of Hatteras Island—once phase I is built, NCDOT must continue the expensive and uncertain maintenance of NC 12. Whatever future measures are selected, NCDOT will be left with only options that either cannot meet applicable legal requirements or those that systematically destroy the Refuge.”

Response: *NCDOT and FHWA disagree with the commenter’s position. NC 12 has existed for many years and the maintenance activities necessary to keep the road open for public travel have never been found to violate any federal or state law. The NEPA/Section 404 Merger Process LEDPA agreement does acknowledge substantial challenges to obtaining permit approvals, but it is NCDOT and FHWA’s intent to meet those challenges. Further, USFWS in its April 30, 2009 letter to FHWA indicates that all management activities in the Pea Island National Wildlife Refuge Comprehensive Conservation Plan can be carried out with or without the highway.*

44. **Comment:**

- VI. “Because the terminal groin is an essential component of the Phased Approach, the effects from its removal or retention must be addressed in the FEIS and a compatibility determination is required.
- A) The FEIS is inadequate because the terminal groin is an essential part of the Phased Approach and the effects from either retaining it or removing it must be analyzed.
- B) The Section 4(f) Evaluation is incomplete because it fails to analyze the Refuge use and impacts resulting from retention of the terminal groin under the Phased Approach alternative.
- C) FWS must complete a compatibility determination for either retaining or removing the terminal groin and it is unlikely that retaining the terminal groin could be found to be compatible.”

Response: *The terminal groin is an existing feature constructed in cooperation between USDOJ, USACE, and NCDOT. NCDOT and FHWA have considered the effects of retaining the terminal groin on the Refuge. The FEIS presumes the continued presence of the terminal groin in its shoreline forecast modeling (FEIS Section 3.6.3) and its assessment of cultural, coastal, and natural resource impacts (FEIS Sections 4.4, 4.6, and 4.7, respectively). Additional environmental analysis of the terminal groin needed to meet USFWS permit requirements by NCDOT and USFWS is ongoing. Retaining the terminal groin would not require a Section 4(f) approval for the use of the Refuge. USFWS will determine whether a new compatibility determination is required to retain the terminal groin. The construction of the groin was compatible with the purposes of the Refuge and its existence has not been found incompatible.*

45. **Comment:** “The CEQ Guidelines are clear: “proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.” ... Breaking such actions “into small component parts” to avoid reviewing them together “is to engage in illegal ‘segmentation.’”

A hallmark of segmentation is an initial proposed action involving “such a large and irretrievable commitment of resources that it may virtually force a larger or related project to go forward notwithstanding the environmental consequences.” *Id.* Building the Parallel Bridge is one such “irretrievable commitment of resources” that will inevitably force later projects, even though their environmental effects are not analyzed in the FEIS. These later projects include the re-permitting of the terminal groin, as well as beach nourishment and relocation of NC 12 outside of the easement in response to storm events, if later phases are not funded and cannot be implemented, as appears to be likely.”

Response: *FHWA and NCDOT do not propose to segment the Bonner Bridge Replacement Project but rather build the improvements expected to be needed over the fifty year period in phases. The impacts presented for the Parallel Bridge Corridor alternatives consider the environmental consequences of the full project and reflect the reasonably foreseeable range of impacts for the various phases of the NC 12 Transportation Management Plan Alternative (Preferred). The past history of funding available for highway and bridge improvements in NCDOT’s Division 1*

indicates that future phases can be built as needed. The planned monitoring program will allow for funding to be included in the State Transportation Improvement Program when needed.

The NC 12 Transportation Management Plan Alternative (Preferred) includes commitments to assess environmental impacts and to consider mitigation opportunities associated with specific future environmental conditions prior to making final decisions on the characteristics of future phases. If the final outcome of that decision-making is that improvements must remain within the existing NC 12 easement, then FHWA and NCDOT are prepared to do so as indicated in the FEIS, including implementation of the Phased Approach/Rodanthe Bridge Alternative.

The FEIS presumes the re-permitting of the terminal groin in its shoreline forecast modeling (FEIS Section 3.6.3) and its assessment of cultural, coastal, and natural resource impacts (FEIS Sections 4.4, 4.6, and 4.7, respectively).

46. **Comment:** “Indeed, we understand that the FHWA agrees that the terminal groin is an essential part of the Phased Approach Parallel Bridge and will not let federal funding for any part of the project until a new permit is issued to retain the groin. If this is true, however, FHWA has apparently been persuaded by NCDOT to segment the NEPA analysis for the groin retention. If so, FHWA should reconsider this position as it constitutes an acknowledged and unlawful segmentation of the NEPA analysis.”

***Response:** NCDOT and FHWA disagree with the commenter’s position. The FEIS presumes the re-permitting of the terminal groin in its shoreline forecast modeling (FEIS Section 3.6.3) and its assessment of cultural, coastal, and natural resource impacts (FEIS Sections 4.4, 4.6, and 4.7, respectively). The notable change in the shoreline that would result from removing the groin is discussed in the FEIS beginning on page 3-65. NCDOT and FHWA are currently discussing possible conditions required for a new groin permit with USFWS.*

47. **Comment:** “As discussed in more detail above, federal regulations related to wildlife refuges have changed since the terminal groin was initially permitted. Congress passed the National Wildlife Refuge Improvement Act (Act) in 1997. The Act prohibits permitting a “new use of a refuge or expand[ing], renew[ing], or extend[ing] an existing use of a refuge,” without a compatibility determination. 16 U.S.C. § 668ee. Because permitting the terminal groin is a part of the proposed use of the Refuge for a bridge built in phases to eventually replace most of NC 12 through the Refuge, the compatibility determination must assess both the permitting of the terminal groin and the phased bridge construction through the Refuge. In order for the terminal groin to be retained, the compatibility determination must conclude that the long-term impacts associated with the terminal groin and the connected replacement of the Bonner Bridge “will not materially interfere with or detract from the fulfillment of the mission of the **System** or the purpose of the refuge.” 16 U.S.C. 668ee. The compatibility determination must be issued before a new permit and must fully consider the impact on wildlife habitat, including the recently designated piping plover critical habitat.

Retention of the terminal groin will also result in adverse modification of designated piping plover critical habitat. The existing terminal groin occupies intertidal habitat that is important to wintering piping plovers. Removal of the groin as required by the permit if no longer necessary to protect the existing Bonner Bridge will make this habitat available. Retention of the groin to protect a new Parallel Bridge will result in adverse modification of critical

habitat. In addition, retention of the terminal groin will interfere with natural inlet processes that create habitat conditions that are beneficial to piping plovers.”

Response: *The requirement to determine compatibility of Refuge roads is located in 16 U.S.C. 668dd(d)(1)(B) which has been in effect since 1966 and was not amended in 1997. The legislative history of the 1997 National Wildlife Refuge Improvement Act amendments specifically notes that existing rights-of-ways on refuges are not to be changed, restricted, or eliminated, and that the standards for determining what is a compatible use had been established years before and were not intended to be altered by the 1997 amendments. NCDOT has been consulting with USFWS about compatibility and will submit an application for a compatibility determination at the appropriate time if necessary. FHWA will not authorize the expenditure of federal highway funds for the construction of any phase of the project that USFWS determines is incompatible with the purposes of the Refuge.*

As discussed in Section 3.6.3.5 of the FEIS, the short-term impact of removal of the terminal groin would be migration of the inlet up to 2,000 feet south, which would eliminate the bulk of the recently designated piping plover habitat on Hatteras Island. Much of this habitat is within the groin area and it formed following the completion of the terminal groin. The groin does not occupy this habitat but rather maintains it. Thus, it is the removal of the groin and not the retention of the terminal groin that would result in an adverse modification of designated piping plover habitat.

WildLaw

1. **Comment:** “WildLaw supports the proposed alternative (parallel bridge with phased approach/Rodanthe Bridge). We feel that the unique character of the North Carolina Outer Banks, the Cape Hatteras National Seashore, and the Pea Island National Wildlife Refuge (PINW) require a compromise approach that allows for all values, environmental, cultural, recreation, economic, etc., to be enjoyed, weighed, and considered. We feel the preferred alternative [Phased Approach/Rodanthe Bridge] best approaches this appropriate level of compromise and consideration of values.

While true that the Pamlico Sound all-bridge alternative would on the surface appear to reduce impacts to PINW, such a wildly expensive alternative would have significant impacts of its own. The likelihood of implementation at a scale this large diminishes, and the Bonner Bridge certainly has existing safety issues that demand immediate attention.

The direct impacts to wetland resources appear to roughly equivalent to the preferred alternative, and increased impacts to submerged biotic communities from the increased need for dredging with the all-bridge alternative are troublesome and should not be underestimated.

Further, the all-bridge alternative appears fill 7.9 acres (3.2 hectares), the phased approach alternatives (including the preferred alternative) would fill 3.0 acres (1.2 hectares), and the nourishment alternative would fill 2.9 acres (1.2 hectares). This significant additional fill to jurisdictional wetlands in an area where wetland impacts are magnified is worrisome.

Although not ideal, the Parallel Bridge Corridor alternatives (including the Preferred Alternative) also generally would allow long-term natural shoreline movement except for the

retention of the terminal groin. Shoreward migration is an issue constantly facing residents and projects planned for barrier islands such as the North Carolina Outer Banks.”

Response: *Position acknowledged.*

2. **Comment:** “We would also urge FHWA and NCDOT to reach out to the Department of Interior, specifically the Assistant Secretary for Fish and Wildlife and Parks. It appears there is some genuine and potentially valid concern at that agency about the compatibility of the preferred alternative [Phased Approach/Rodanthe Bridge] with DOI policy and regulation as well as legislative language dealing with PINW. WildLaw encourages an active outreach effort to educate, inform, and demonstrate to the DOI the relative merits of each alternative, as well as the reality that the all bridge alternative would be so prohibitively expensive that pursuit of that approach would essentially doom this project to failure. Simply determining that a "finding of compatibility" is not necessary (FEIS Summary p. xxx) is not a sufficient analysis of the issue, and may provide a legal "hook" for anyone opposing the construction of the preferred alternative.”

Response: *Comments noted. FHWA and NCDOT will continue to coordinate with USDO I to make sure that all applicable compatibility requirements are met.*

Appendix C

**Amended Description of
Parallel Bridge Corridor
Alternatives with NC 12
Maintenance Selected for
Detailed Study**

C. Amended Description of Parallel Bridge Corridor Alternatives with NC 12 Maintenance Selected for Detailed Study

This section amends Sections 2.10.1 and 2.10.2 of the Final Environmental Impact Statement (FEIS). These amendments reflect changes in the detailed study alternatives that were an outcome of the additional alternatives studies described in Section 2.0. The Preferred Alternative is shown in Figure C-1. The locations of the detailed study alternatives are illustrated in Figure C-2 to Figure C-5.

C.1 Oregon Inlet Bridge (Phase I) Characteristics

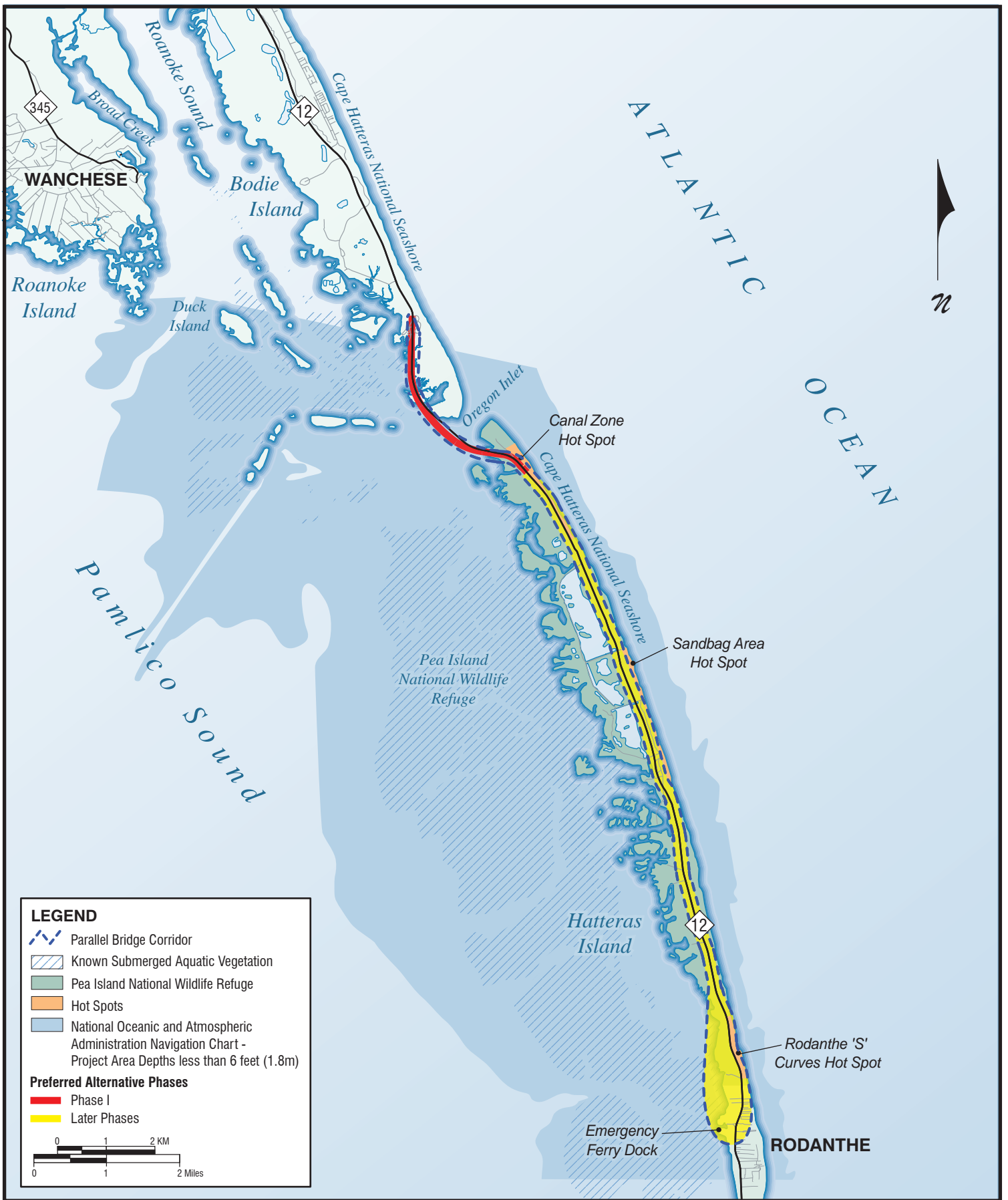
The proposed Oregon Inlet bridge (Phase I) would be approximately 2.6 to 3.2 miles (4.2 to 5.1 kilometers) in length. This length is longer than the 2.4 to 2.7 miles (3.9 to 4.3 kilometers) for the Oregon Inlet bridge in the FEIS. This is because the southern terminus of the bridge was extended in order to account for sound-side erosion occurring on the north end of Hatteras Island. The location of the proposed Oregon Inlet bridge was illustrated in Figure 2-6 in the main body of this EA. The proposed bridge would:

- Begin approximately 2,900 to 3,600 feet (883.9 to 1,097.3 meters) south of the southern terminus of Bonner Bridge. With the Nourishment and Phased Approach alternatives, the bridge would terminate within the existing NC 12 easement on Hatteras Island. With the Road North/Bridge South Alternative, it would enter Hatteras Island approximately 260 feet (79.2 meters) west of Bonner Bridge. With the All Bridge alternative, it would enter Hatteras Island approximately 350 feet (106.7 meters) west of Bonner Bridge.

At a site visit on July 15, 2009, US Fish and Wildlife Service (USFWS) representatives identified an additional conceptual design option that would be a minor variation of Phase I of the Phased Approach alternatives because it would be immediately adjacent to the western edge of the existing NC 12 easement within which the Phased Approach alternatives would be built. A variation of that proposal is considered in this Environmental Assessment (EA) as Phase I of the NC 12 Transportation Management Plan Alternative (Preferred). It would enter Hatteras Island approximately 212 feet (64.6 meters) west of Bonner Bridge instead of in the existing easement.

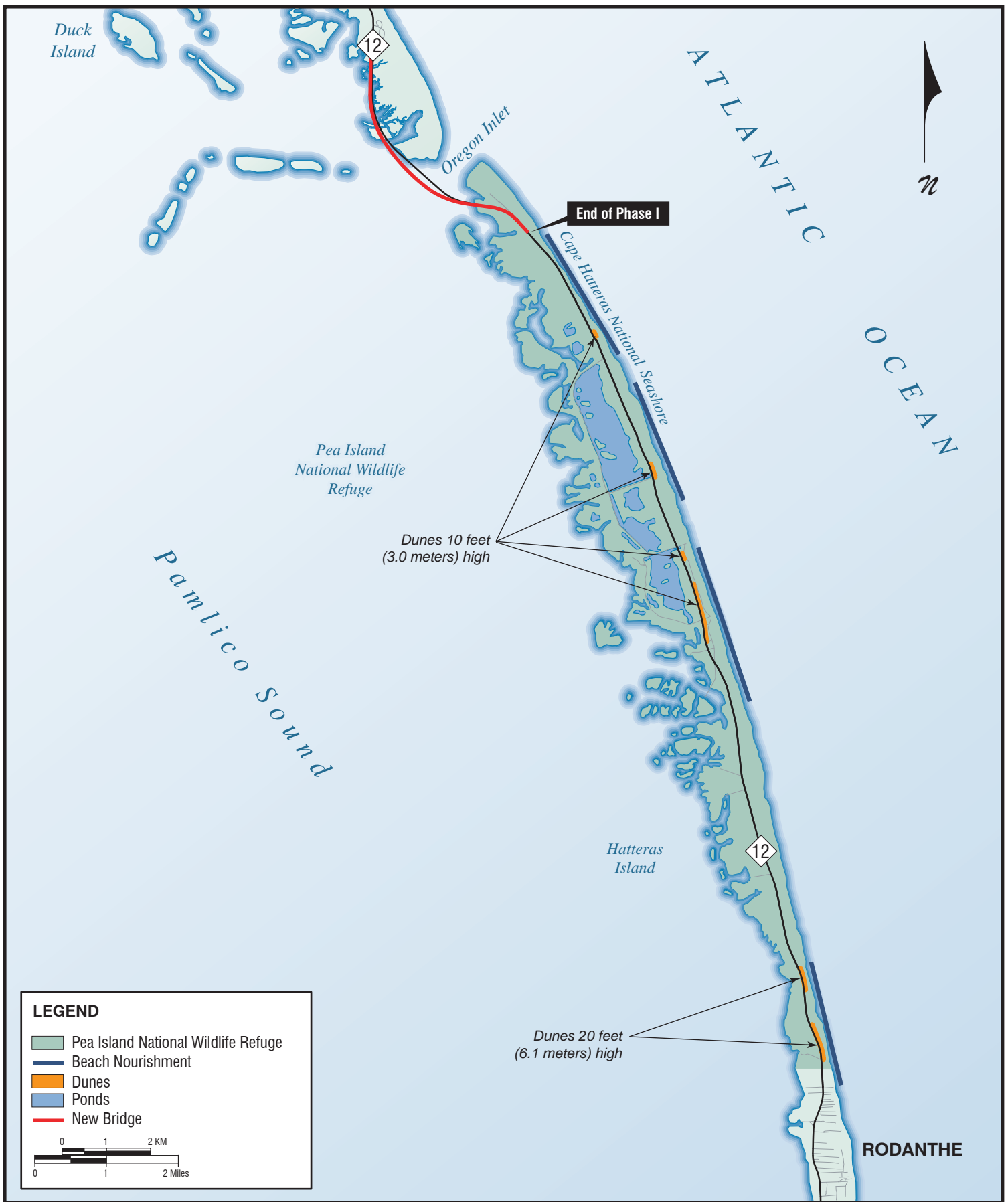
The four alternative termini discussed here for the southern end of the proposed Oregon Inlet bridge are representative of the range of possible termini, but could change in the context of additional coordination with the USFWS.

- Follow a curved alignment immediately west of Bonner Bridge. The bridge would cross the existing navigation channel for vessels using Oregon Inlet approximately 500 feet (152.4 meters) west of Bonner Bridge. The bridge would cross Bridge to Old House Channel, commonly known as “the crack” where the channel closely parallels Bonner Bridge.



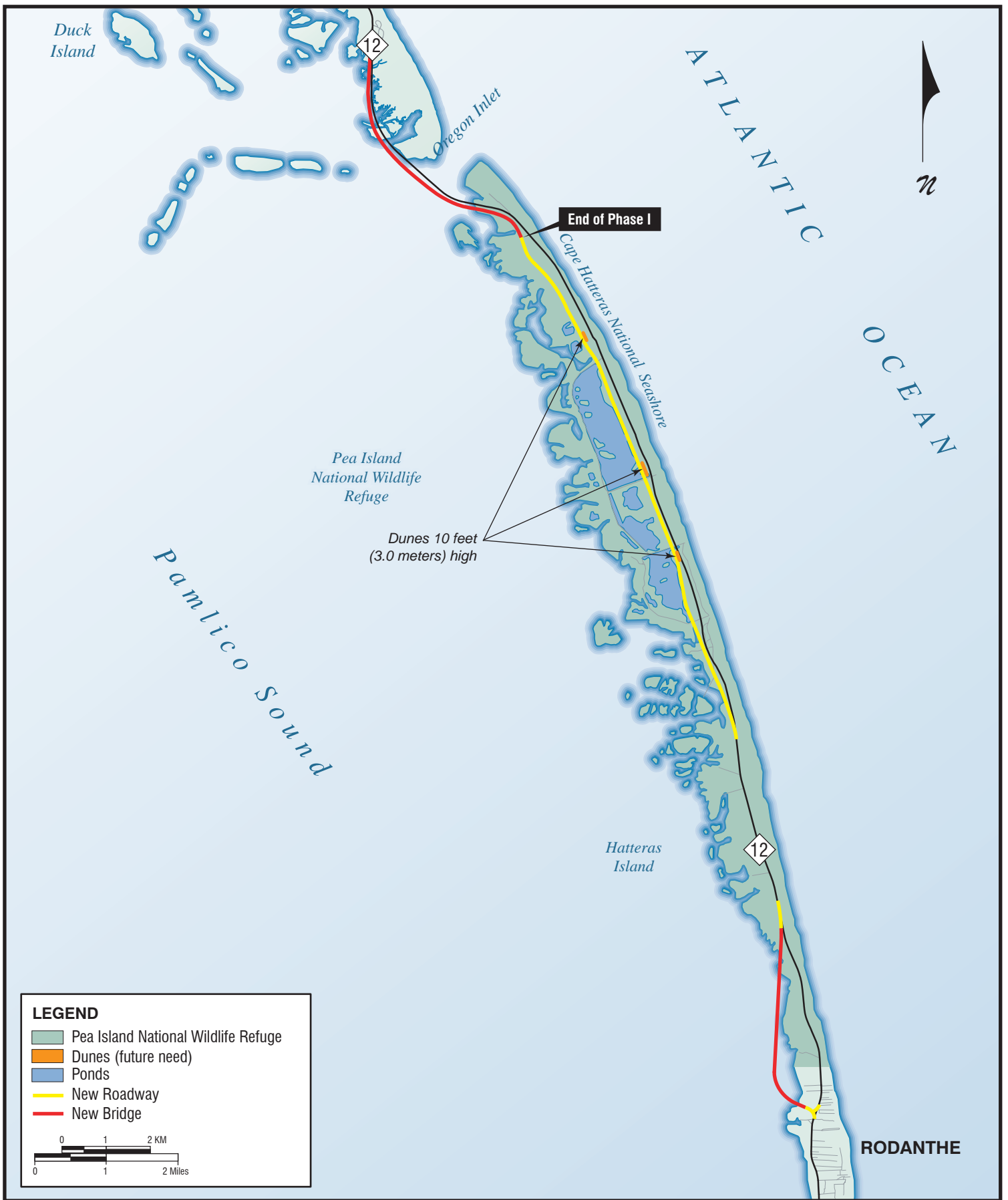
PREFERRED ALTERNATIVE

Figure
C-1



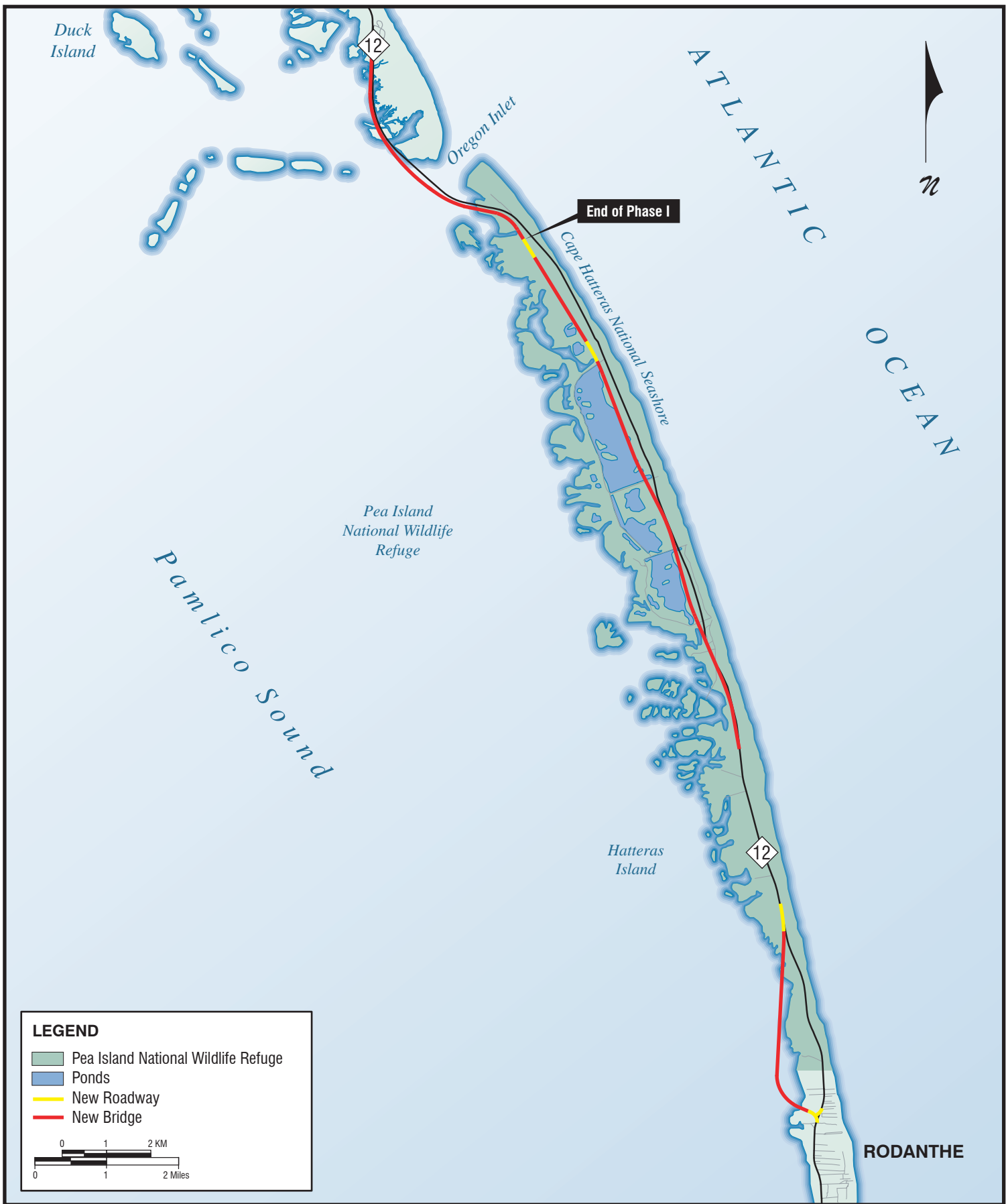
PARALLEL BRIDGE CORRIDOR WITH NOURISHMENT

Figure
C-2



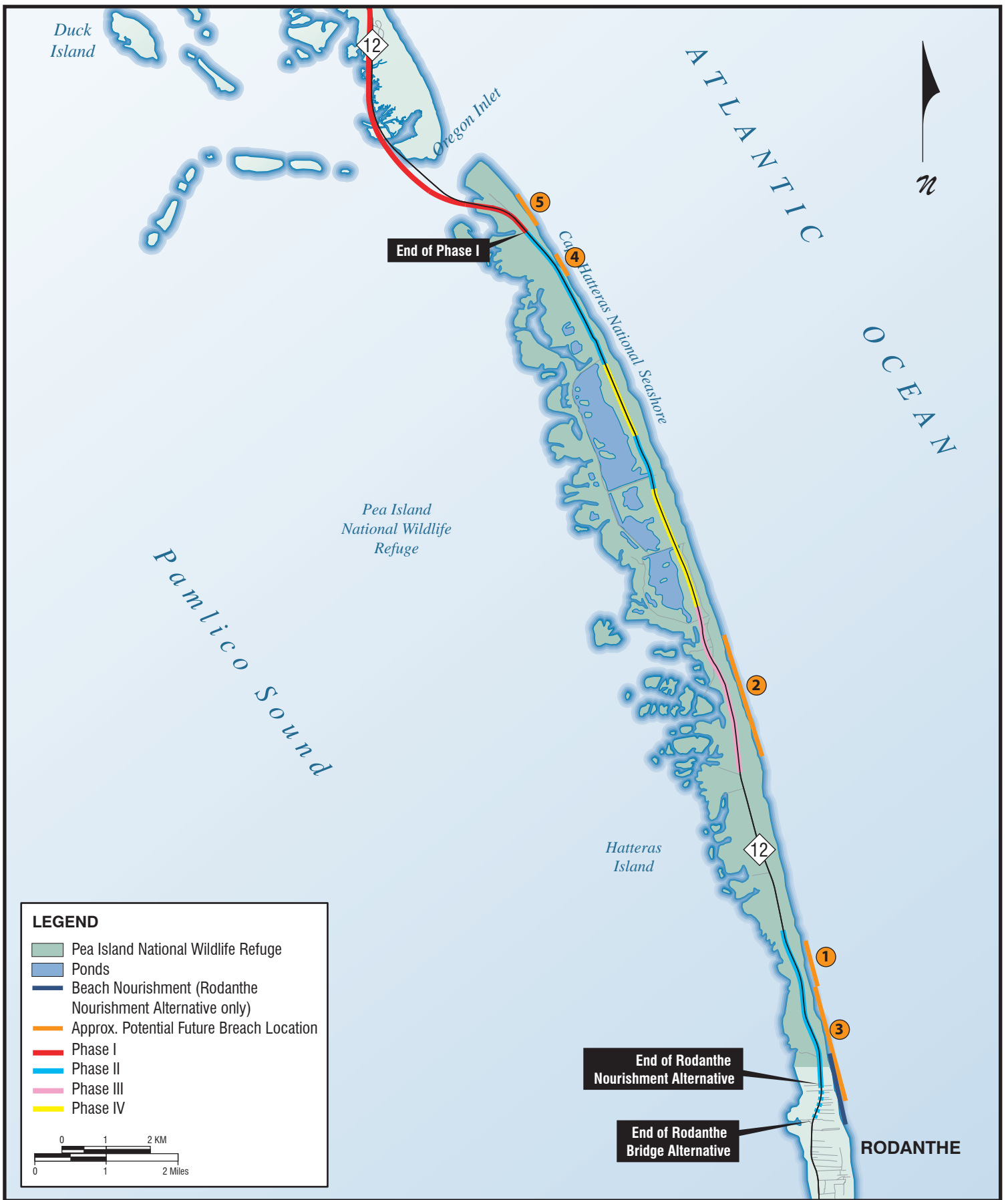
**PARALLEL BRIDGE CORRIDOR WITH NC 12
RELOCATION ON ROAD NORTH/BRIDGE SOUTH**

Figure
C-3



**PARALLEL BRIDGE CORRIDOR WITH NC 12 RELOCATION
ON ALL BRIDGE**

Figure
C-4



PARALLEL BRIDGE CORRIDOR WITH PHASED APPROACH

Figure C-5

- Terminate at the Bonner Bridge terminus on Bodie Island and follow a route between Bonner Bridge and the parking lot for the Oregon Inlet Marina and Fishing Center.

C.1.1 Horizontal Alignment

The Oregon Inlet bridge (Phase I) would consist of a southern approach roadway, a southern approach bridge, main bridge, a northern approach bridge, and a northern approach roadway. These components as assessed in the FEIS and this EA would be the following lengths:

	<u>Nourishment</u>	<u>Road North/Bridge South</u>	<u>All Bridge</u>	<u>Phased Approach</u>	<u>NC 12 Transportation Management Plan (Preferred)</u>
Southern Approach Roadway	2,270 feet (992 meters)—including frontage roads that overlap most of the approach bridge	514 feet (157 meters)	600 feet (183 meters)	2,270 feet (992 meters)—including frontage roads that overlap most of the approach bridge	1,460 feet (487 meters)
Southern Approach Bridge	2,000 feet (667 meters)	2,410 feet (735 meters)	3,070 feet (936 meters)	2,000 feet (667 meters)	800 feet (267 meters)
Main Bridge	9,995 feet (3,332 meters)	9,987 feet (3,044 meters)	9,987 feet (3,044 meters)	9,995 feet (3,332 meters)	9,987 feet (3,044 meters)
Northern Approach Bridge	3,730 feet (1,137 meters)	3,730 feet (1,137 meters)	3,730 feet (1,137 meters)	3,730 feet (1,137 meters)	3,730 feet (1,137 meters)
Northern Approach Roadway	3,295 feet (1,004 meters)	3,295 feet (1,004 meters)	3,295 feet (1,004 meters)	3,295 feet (1,004 meters)	3,295 feet (1,004 meters)

The approach fills (pile of soil upon which the approach roadway is built) as assessed in the FEIS and this EA would be between the natural ground and a point where the bottom of the bridge girder can be a minimum of 3 to 6 feet (0.9 to 1.8 meters) above the ground. This distance between the ground and the bottom of the girder is needed for maintenance access under the bridge, so girder support bearings are kept above the ground.

C.1.2 Design Characteristics

This section discusses key Oregon Inlet bridge (Phase I) design characteristics related to navigational clearances and access to recreation opportunities. All other Oregon Inlet bridge design characteristics identified in the FEIS remain valid with the changes being assessed in this

EA. Unless specified, the design characteristics of the Oregon Inlet bridge would accommodate all the NC 12 Maintenance alternatives.

C.1.2.1 Navigation Clearances

A new bridge across Oregon Inlet must take into account the migratory nature of the navigational channel. Thus, the bridge should provide the required navigational clearances at spans within the range of probable channel locations. The proposed bridge would include a series of navigational spans across Oregon Inlet, a distance up to 3,300 feet [1,006 meters]), with a minimum vertical clearance of 75 feet (22.9 meters). Spans in the navigation zone would have a minimum of 200 feet (60.1 meters) of horizontal clearance.

Coordination with the US Coast Guard (USCG) and the US Army Corps of Engineers (USACE) would facilitate the establishment of location(s) for navigation spans, channels, and clearances. The location(s) of the navigation span(s) would be considered when designing for potential vessel collision.

C.1.2.2 Access to Recreation Opportunities

A connection from NC 12 to the unpaved beach access road, which is south of the Oregon Inlet Campground on Bodie Island, would be provided.

Access to the existing fishing parking lot immediately south of Oregon Inlet and the (former) Oregon Inlet US Coast Guard Station would be provided.

Bonner Bridge has catwalks that are used by fishermen. For safety reasons, access via catwalks on a new bridge in this corridor is not assumed because the height of the new bridge would put the catwalks at least 33.5 feet (10.2 meters) above the water. The height would increase the likelihood of serious, if not fatal, injuries resulting from falls.

Opposition to discontinued fishing access was expressed at the public hearings because fishing is a popular tourist recreational activity on this part of Hatteras Island. The National Park Service (NPS) and USFWS have indicated that their objective is to provide for fishing access at the north end of Hatteras Island at Oregon Inlet, but such access does not have to be provided from catwalks mounted on the new bridge. One viable approach (except with the Nourishment and Phased Approach alternatives) appears to be leaving a portion of existing Bonner Bridge for fishing. A “boardwalk” under and around the new bridge also is a possible option with all of the Parallel Bridge Corridor alternatives. A boardwalk would be on top of the riprap that currently blankets the northern shore of Hatteras Island.

With the Phased Approach and Nourishment alternatives only, it is assumed that a temporary bridge approximately 2,600 feet (793 meters) long would be built east of Bonner Bridge to maintain NC 12 traffic during construction of the southern end of the new Oregon Inlet bridge. Once construction of the new Oregon Inlet bridge is completed, a portion of the temporary traffic maintenance bridge could be retained as a fishing pier to replace the fishing catwalks on Bonner Bridge. The new fishing pier would be much wider than the existing catwalks (26 feet [7.9 meters] versus 4.5 feet [1.4 meters]), providing fishermen with more room to move about than on the current catwalks.

Widening a short section of the new structure to provide pedestrian access, separated from traffic by a barrier, is also a possible option for providing fishing access. Accommodating fishing from

the terminal groin is not considered a viable option. Fishing from the groin is considered dangerous because of the rapid currents adjacent to the groin and the uneven surface of the groin.

The type of access provided will be determined during the final design of Phase I; however, NCDOT is committed to restoring access to fishing at the northern end of Hatteras Island once construction of Phase I is complete. The existing catwalks will remain open to the public during construction as long as it is safely viable.

In whatever way fishing is accommodated, some government body or non-governmental organization would have to take responsibility for fishing pier or “boardwalk” operation, maintenance, and liability.

C.2 NC 12 Maintenance Alternatives

C.2.1 Nourishment Alternative

The characteristics and description of this alternative along NC 12 remain as presented in Section 2.10.2.1 of the FEIS. The location of improvements is illustrated in Figure C-2.

C.2.2 Road North/Bridge South Alternative

With this alternative, NC 12 would be placed on a bridge west of Hatteras Island that would begin with a sweeping curve that connects the bridge directly with NC 12 in Rodanthe, between Sea Oats Drive and the northern boundary of the Rodanthe Historic District (see Figure 2-1 in the EA). Users of the bridge going to/from the south on NC 12 would not have to make a turn to enter onto or exit the bridge. The bridge west of Hatteras Island would continue to the north through Pamlico Sound, then cross into the Refuge and intersect with existing NC 12 at a point approximately 2 miles (3.2 kilometers) north of the Refuge’s southern boundary. This part of the island is expected to remain stable with respect to NC 12 through the year 2060; therefore, the alignment of NC 12 would remain unchanged for 2.6 miles (4.2 kilometers). Beginning at a point approximately 1.3 miles (2.1 kilometers) south of the Refuge ponds, NC 12 would be relocated to a point 230 feet (70.1 meters) west of the forecast 2060 high erosion shoreline. This relocation would continue approximately 6.8 miles (10.9 kilometers) north until the relocated NC 12 would meet the Oregon Inlet bridge (Phase I). The location of improvements is illustrated in Figure C-3.

The existing dunes along the oceanside of NC 12 would not be re-built, but would be allowed to erode naturally. Not re-building the dunes would support Refuge and Seashore policies to let natural processes take their course. However, three 10-foot-high (3-meter-high) dunes, totaling 2,100 feet (640 meters) in length would be built east of and near the new road in the future, as conditions warrant. They would be built as the shoreline erodes toward the relocated road and approaches a distance of 230 feet (70.1 meters) from the pavement. The first dune is expected to be built by 2030.

The typical section, right-of-way, elevation, design speed, and traffic operation characteristics of the Road North/Bridge South alternative remain as defined in Section 2.10.2.2 of the FEIS.

C.2.3 All Bridge Alternative

This alternative would include the same bridge in the Rodanthe area as described above for the Road North/Bridge South Alternative. However, instead of relocating NC 12 as a roadway in the central and northern part of the Refuge, NC 12 would be relocated on a bridge. Two road segments would be included in this relocation, one near Oregon Inlet and one just north of the Refuge ponds where access from NC 12 to the Refuge would be provided. Access to the Refuge also would be available in a 1.8-mile (2.9-kilometer) section of NC 12 that would be left unchanged between the Rodanthe area bridge and the beginning of the next bridge south of the ponds. The bridges associated with this alternative would span the five potential breach locations described in Section 2.6.2.3 of the FEIS and would be at least 230 feet (70.1 meters) west of the forecast 2060 high erosion shoreline. The location of improvements is illustrated in Figure C-4.

The bridges in the central and northern part of the Refuge would begin approximately 1.7 miles (2.7 kilometers) south of the Refuge ponds. A bridge would continue north for 5.2 miles (8.4 kilometers) to the northern dike of the northern-most pond where a 1,000-foot (305-meter) section of roadway would be placed. At this location, the Refuge could provide access to the beach and hiking trails along the perimeter of the northernmost pond. NC 12 would then continue an additional 1.4 miles (2.3 kilometers) on bridge to a second 1,000-foot (305-meter) section of roadway. Here, the relocated NC 12 would be connected to the existing roadway, which would be retained from this point north to the parking lot just south of Oregon Inlet. North of this second short roadway section, NC 12 would continue northward 0.3 mile (0.5 kilometer) on bridge to meet the Oregon Inlet bridge (Phase I).

The existing dunes along the oceanside of NC 12 would not be re-built, but would be allowed to erode naturally. Not re-building the dunes would support Refuge and Seashore policies to let natural processes take their course.

The typical section, right-of-way, elevation, design speed, and traffic operation characteristics of the All Bridge alternative remain as defined in the discussion of the Road North/Bridge South Alternative in Section 2.10.2.2 of the FEIS.

C.2.4 Phased Approach Alternative

Two NC 12 maintenance alternatives are under consideration with the Phased Approach Alternative (see Figure C-5). They are identical until their southern end within Rodanthe. They are:

- Phased Approach/Rodanthe Bridge Alternative; and
- Phased Approach/Rodanthe Nourishment Alternative.

C.2.4.1 Characteristics of Phased Approach/Rodanthe Bridge Alternative

This alternative proposes maintenance of NC 12 in the existing easement by building bridges as needed. The total constructed length of the Phased Approach/Rodanthe Bridge Alternative would be 13.7 miles (22.0 kilometers). It would begin in Rodanthe just north of the northern boundary of the Rodanthe Historic District (see Figure 2-1 in this EA), extend to the north through the Refuge and across Oregon Inlet, and end on the southern end of Bodie Island approximately 0.2 mile (0.3 kilometer) north of the Oregon Inlet Campground driveway. The total length of the alternative between the two termini is approximately 15.8 miles (25.4 kilometers), but the

constructed length is only 13.7 miles (22.0 kilometers) because of a 2.1-mile (3.4-kilometer) section of NC 12 in the southern half of the Refuge that would remain because it is not expected to be threatened by erosion prior to 2060. The bridge would extend a total of approximately 0.8 mile (1.3 kilometers) south of the Refuge boundary into Rodanthe. Drivers would enter and leave the bridge via a ramp on the west side of the bridge. Access to properties adjacent to the bridge in Rodanthe would be provided by a one-lane, one-way frontage road on each side of the NC 12 bridge. The two frontage roads would merge back into NC 12 just north of the Rodanthe Historic District. Crossovers to provide access between the two frontage roads underneath the NC 12 bridge were assumed to be provided in three locations: just south of the Refuge boundary; across from SR 1445 (Cross of Honor Way); and just north of America Drive. The frontage roads, ramp down to NC 12, and a typical crossover are illustrated in Figure 2-3 in this EA.

The main bridge would end at a point approximately 420 feet (128.0 meters) north of the district. The southern end of this bridge would not be brought down to grade; instead, traffic would access the bridge via a two-lane ramp on the west side of the bridge, which would extend from the northern district boundary to Cross of Honor Way. The reasons for this configuration are presented in Section 2.1 of this EA. NC 12 traffic would be at-grade as it passes through the historic district.

New right-of-way would be required in Rodanthe along most of the length of this alternative to accommodate the two frontage roads and the exit ramp. From between the northern district boundary to Cross of Honor Way, the right-of-way width would generally increase from 100 feet (30.5 meters) to generally 144 feet (43.9 meters), with most of the new right-of-way purchased on the west side of the existing right-of-way. North of Cross Honor Way, the right-of-way width would increase to 107 feet (32.6 meters). A temporary construction easement approximately 5 feet (1.5 meters) wide might be needed on both sides of NC 12 for most of the length of the alternative through Rodanthe.

C.2.4.2 Characteristics of Phased Approach/Rodanthe Nourishment Alternative

The Phased Approach/Rodanthe Nourishment Alternative would be the same as the Phased Approach/Rodanthe Bridge Alternative with one exception. The southern end of this alternative would only extend a total of approximately 0.3 mile (0.5 kilometer) south of the Refuge boundary into Rodanthe. Because it is substantially shorter than the Rodanthe Bridge Alternative, only one crossover between the one-way frontage roads would be provided and would be immediately south of the Refuge boundary.

The same minor amount of additional right-of-way (i.e., approximately 7 feet [2.1 meters]) would be required along most of the length of this alternative in Rodanthe, with a maximum width of approximately 147 feet (44.8 meters) required for a short distance at the intersection of the frontage roads with existing NC 12. The same approximately 5-foot-wide (1.5-meter-wide) temporary construction easement might be needed on both sides of NC 12 for most of the length of this alternative in Rodanthe.

South of the bridge, NC 12 in Rodanthe would be protected through 2060 by beach nourishment. The total required beach nourishment length would be approximately 6,000 feet (1,829 meters), including 500-foot-long (152.4-meter-long) tapers on each end. Nourishment would extend approximately 1,500 feet (457 meters) into the Refuge, including the taper of 500 feet (152.4 meters). As with the Nourishment Alternative, it was assumed that nourishment would be needed every four years. The estimated amount of sand needed for the Phased Approach/Rodanthe Nourishment Alternative is 2.3 million cubic yards (1.8 million cubic meters) for the first cycle of

nourishment, and 1.5 million cubic yards (1.1 million cubic meters) every four years throughout the life of the project (through 2060).

C.2.4.3 Design Features of Both Phased Approach Alternatives

The design features presented in the section titled “Design Features of Both Phased Approach Alternatives” beginning on page 2-121 of the FEIS are unchanged.

C.2.4.4 Refuge and (Former) Oregon Inlet US Coast Guard Station Access

The FEIS and this EA assume that four one-lane ramps would be built with the Phased Approach alternatives to provide vehicular access to and from the parking lot currently used to access the fishing catwalks on the existing Bonner Bridge and the (former) Oregon Inlet US Coast Guard Station, accommodating all directions of travel. The ramps would have 12-foot (3.6-meter) lanes and a 6-foot (1.8-meter) shoulder. One pair of ramps would terminate at the fishing access driveway, and the other pair would terminate near the road to the (former) Oregon Inlet US Coast Guard Station. Frontage roads on either side of the bridge and within the existing NC 12 easement would connect the two pairs of ramps. The Phased Approach alternatives would have a second point of access into the Refuge, within the 2.1-mile (3.4-kilometer) section of NC 12 in the southern half of the Refuge that would not be threatened by erosion prior to 2060.

C.2.4.5 Construction within the Existing Easement of Pea Island National Wildlife Refuge

The construction description presented in the section titled “Construction within the Existing Easement of Pea Island National Wildlife Refuge” beginning on page 2-123 of the FEIS is unchanged.

C.2.5 NC 12 Transportation Management Plan Alternative (Preferred)

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I (described in Section C.1 and shown on Figure C-1). Section 2.3.2.2 of this EA presents a detailed description of how later phases of this alternative would be finalized.

C.3 Conclusion

The amended description of the study alternatives presented in the above section is not anticipated to create any new, significant impacts not previously identified in the FEIS.

Appendix B

**Revised Final Section 4(f)
Evaluation**

Federal Highway Administration
North Carolina Division
Administrative Action

Revised Final Section 4(f) Evaluation

NC 12 Replacement of Herbert C. Bonner Bridge

(Bridge No. 11) over Oregon Inlet
Federal-Aid No. BRS-2358(15)
NCDOT Project Definition: 32635
TIP Project No. B-2500
Dare County, North Carolina

10/9/09

Clarence W. Coleman, Jr.

Date

for John F. Sullivan III, P.E.
Division Administrator
Federal Highway Administration

10/8/2009

Gregory J. Thorpe

Date

for Gregory J. Thorpe, Ph.D.
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The proposed project is the construction of a bridge to replace Herbert C. Bonner Bridge in Dare County, the demolition and removal of Bonner Bridge, and improvements to NC 12 between the community of Rodanthe and Oregon Inlet. This Revised Final Section 4(f) Evaluation revises the Final Section 4(f) Evaluation contained in the September 17, 2008, Final Environmental Impact Statement.

Table of Contents

SECTION 4(F) EVALUATION	3
Introduction.....	3
What Do We Propose?.....	3
What Work Has Been Completed Previously?	3
What Progress Has Been Made Since the FEIS/Final Section 4(f) Evaluation?	4
What is the Purpose of This Revised Final Section 4(f) Evaluation?	5
What is the New Preferred Alternative?	5
Is the Parallel Bridge Corridor with NC 12 Transportation Management Plan a Completely New Alternative?.....	6
Identification of Section 4(f) Properties.....	7
What Did the FEIS/Final Section 4(f) Evaluation Find?	7
What Has Changed?.....	7
Applicability of Section 4(f) to Properties within the Project Area	7
What Did the FEIS/Final Section 4(f) Evaluation Find?	7
What Has Changed?.....	8
Constructive Use.....	16
Summary of Revised Section 4(f) "Use" Determinations.....	18
Avoidance Alternatives	19
What Did the FEIS/Final Section 4(f) Evaluation Find?	20
What Has Changed?.....	20
Least Overall Harm Analysis	21
All Possible Planning to Minimize Harm	27
Conclusion	34

Appendix A: FEIS/Final Section 4(f) Evaluation Comments	
Appendix B: Road/Pea Island National Wildlife Refuge/Cape Hatteras National Seashore Timeline	
Appendix C: Historic-Related Conceptual Design Modifications	
Appendix D: Merger Team Meeting Minutes Since FEIS	
Appendix E: New Preferred Alternative	
Appendix F: Draft Section 106 Programmatic Agreement	
Appendix G: Evaluation of the Pamlico Sound Bridge Corridor Alternative as a Feasible and Prudent Avoidance Alternative Under Section 4(f) of the Department of Transportation Act	
Appendix H: Draft Partnership Agreement	
Appendix I: Phase I Hatteras Island Termini for Parallel Bridge Corridor Alternatives	

List of Tables

Table 1: Section 4(f) Applicability (Use) from the FEIS/Final Section 4(f) Evaluation (September 17, 2008).....	8
Table 2: Revised and New Section 4(f) "Use" Determinations	8
Table 3: Revised Section 4(f) "Use" Determinations.....	19
Table 4: Total Highway Cost of the Alternatives Through 2060.....	26
Table 5: Phase I Estimated Construction Cost to Replace Bonner Bridge.....	27

Section 4(f) Evaluation

Introduction

Section 4(f) of the Department of Transportation Act of 1966, as amended (49 U.S.C. 303 and 23 U.S.C. 138), states that the U.S. Department of Transportation (USDOT) may not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site, unless a determination is made that the project will have a *de minimis* impact or unless a determination is made that:

1. there is no feasible and prudent avoidance alternative, as defined in 23 CFR 774.17, to the use of land from the property; and
2. the action includes all possible planning, as defined in 23 CFR 774.17, to minimize harm to the property resulting from such use.

If the Section 4(f) Evaluation concludes that there is no feasible and prudent avoidance alternative, then the USDOT may approve only the alternative that causes the least overall harm in light of the statute's preservation purpose. The analysis for a Section 4(f) Evaluation comprises the following steps:

- identify properties in the study area that are protected by Section 4(f);
- determine applicability (i.e., would any of the alternatives use Section 4(f) properties?);
- if there is a use, identify any avoidance alternatives; and
- if there are no avoidance alternatives, determine the overall least harm alternative.

The Federal Highway Administration (FHWA) must comply with Section 4(f) for all projects funded with Federal-Aid Highway program funds (as this project is). FHWA issued a Final Environmental Impact Statement (FEIS) and Final Section 4(f) Evaluation on September 17, 2008. This document revises the Final Section 4(f) Evaluation.

What Do We Propose?

FHWA and the North Carolina Department of Transportation (NCDOT) propose to replace the Herbert C. Bonner Bridge across Oregon Inlet in Dare County. Bonner Bridge, built in 1962, is approaching the end of its reasonable service life and is structurally deficient. Bonner Bridge is a part of NC 12 and provides the only highway connection between Hatteras Island and Bodie Island. The replacement structure would serve the same function. The project also includes NC 12 between Oregon Inlet and the community of Rodanthe, an area that is at risk because of shoreline erosion and major storms. This project proposes to provide a long-term approach to minimizing that risk through 2060.

What Work Has Been Completed Previously?

In 1990, FHWA and NCDOT began studying replacement alternatives for Bonner Bridge (TIP No. B-2500) to address problems with deterioration of the reinforcing steel and concrete supporting structures, scour (erosive force of moving water) of a depth great enough to affect the bridge piles' ability to support the superstructure, and channel migration. In addition, the bridge's vulnerability to ship collision became apparent when a hopper dredge used to maintain Oregon Inlet's channel struck Bonner Bridge and demolished several spans. FHWA issued a Draft Environmental Impact Statement (DEIS) in November 1993. The DEIS suggested a single Preferred Alternative--the Parallel Bridge Corridor across Oregon Inlet. After the release of the DEIS, comments were received regarding the DEIS from the public and from Federal, state, and local agencies. A preliminary FEIS was prepared in 1996; however, it was never signed because formal consultation with the U.S. Fish & Wildlife Service (USFWS) under Section 7 of the Endangered Species Act was not completed.

Because it had been more than seven years since completion of the DEIS, a re-evaluation was conducted in 2001 to determine if the preliminary FEIS remained a valid assessment of project impacts. A decision was made in 2001 to prepare a Supplemental DEIS. By this time, NC 12 had begun to be regularly threatened by shoreline erosion and overwash. Three areas on NC 12, or "hot spots," between Oregon Inlet and Rodanthe are especially

vulnerable. To address these “hot spots”, the study area was expanded south to encompass NC 12 to Rodanthe and new alternatives were developed that addressed these “hot spots”.

The SDEIS was completed and signed in September 2005. The SDEIS assessed five alternatives in two corridors, the Pamlico Sound Bridge Corridor and the Parallel Bridge Corridor. A proposal made during the comment period following the release of the SDEIS led to the development of two additional Parallel Bridge Corridor alternatives. These alternatives were assessed in the Supplement to the SDEIS (SSDEIS), which was issued in February 2007.

The FEIS/Final Section 4(f) Evaluation (ncdot.org/projects/bonnerbridgerepairs/newsupdates/#suplimental) identified the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge as the Preferred Alternative and addressed comments received on the SDEIS and SSDEIS. Substantial comments on the FEIS/Final Section 4(f) Evaluation were received from several jurisdictional agencies and from a non-governmental organization. The comments are included in Appendix A of this Revised Final Section 4(f) Evaluation.

What Progress Has Been Made Since the FEIS/Final Section 4(f) Evaluation?

In the year since publication of the FEIS/Final Section 4(f) Evaluation, FHWA and NCDOT have collected new information regarding the history of vehicular transportation across Bodie and Hatteras Islands, and the development of the Cape Hatteras National Seashore (Seashore) and the Pea Island National Wildlife Refuge (Refuge). This information was summarized in a reference timeline (Appendix B) and shared with the USFWS in March 2009 and all Merger Team representatives¹ in May 2009.

The NCDOT and FHWA have been working with the State Historic Preservation Officer (SHPO), the Advisory Council for Historic Preservation (ACHP), and other consulting parties to modify conceptual project designs (Appendix C) to lessen effects to the Rodanthe Historic District and the Chicamacomico Life Saving Station. The parties also worked together to re-evaluate the effects on those historic properties as required under Section 106 of the National Historic Preservation Act.

NCDOT and FHWA have also worked with Federal and State regulatory and resource agencies to address the comments and concerns expressed in response to the FEIS/Final Section 4(f) Evaluation. While the coordination and consultation often involved a single agency or several agencies with interest in a particular resource, meetings of the entire Merger Team of involved agencies took place in November 2008, March 2009, May 2009 and September 2009. Minutes of the Merger Team meetings that led to the new Preferred Alternative are located in Appendix D.

The November 2008 Merger Team meeting focused on developing design parameters for Phase I. This included a decision that the Oregon Inlet bridge terminus on Hatteras Island with the Parallel Bridge Corridor with Phased Approach (Phase I) Alternative should be extended to the south by approximately 2,000 feet (610 meters) in order to account for potential sound-side erosion at the north end of Hatteras Island. This decision was also applied to the Parallel Bridge Corridor with Nourishment and Parallel Bridge Corridor with Road North/Bridge South Alternatives. At the meeting, the USFWS and the National Marine Fisheries Service again expressed a preference for a 17.5 mile-long bridge through the Pamlico Sound instead of a parallel crossing of the Oregon Inlet. FHWA committed to reconsider the Pamlico Sound Bridge corridor, the results of which are

¹ Merger is a process to streamline the project development and permitting processes, agreed to by the USACE, NCDENR, FHWA and NCDOT and supported by other stakeholder agencies and local units of government. To this effect, the Merger process provides a forum for appropriate agency representatives to discuss and reach consensus on ways to facilitate meeting the regulatory requirements of Section 404 of the Clean Water Act during the NEPA/SEPA decision-making phase of transportation projects. The Merger Process allows agency representatives to work more efficiently (quicker and comprehensive evaluation and resolution of issues) by providing a common forum for them to discuss and find ways to comply with key elements of their agency's mission. The merger process helps to document how competing agency mandates are balanced during a shared decision-making process, which results in agency representatives reaching a "compromise based decision" to the regulatory and individual agency mandates.

discussed later in this Revised Final Section 4(f) Evaluation. At the March 2009 meeting, NCDOT and FHWA presented information that had been gathered in response to some of the comments received on the FEIS/Final Section 4(f) Evaluation and FHWA committed to revise the Final Section 4(f) Evaluation. The Merger Team discussed whether the FEIS-Preferred Alternative should be changed but there was no consensus.

The May 2009 meeting was to discuss selecting a new Preferred Alternative (possibly the Parallel Bridge Corridor with Road North/Bridge South Alternative). Additional alignment options developed for the Parallel Bridge Corridor with Road North/Bridge South Alternative by NCDOT to minimize harm to the historic features of the Refuge were considered but not adopted. Feedback from a majority of the Merger Team agencies at this Merger Meeting indicated a strong opinion that this alternative (including several possible design options in the vicinity of the ponds) should not be selected. Instead, the Merger Team decided that NCDOT should develop a modification of the FEIS/Final Section 4(f) Evaluation Preferred Alternative that was proposed by the U.S. Environmental Protection Agency (EPA) representative. This new alternative would replace the structurally deficient Bonner Bridge soon by combining the Phase I portion (the new bridge over Oregon Inlet) of the FEIS/Final Section 4(f) Evaluation Preferred Alternative with a deferred, fifty-year long decision-making process for the southernmost eleven miles of the project on Hatteras Island. These later phases could consist of, but would not be limited to, one or more components of any of the alternatives already studied as part of the environmental review process (including a No Action Alternative), as required by the National Environmental Policy Act (NEPA). Decision-making was postponed for the later phases because while the shoreline erosion is a significant issue and new inlets are likely to form, exact locations and timing are unknown. Future major storms are likely to affect NC 12. Likewise, those future major storms are also likely to affect the context and quality of resources in the area as well. The new Preferred Alternative would allow all agencies to minimize risks by building what is needed now, and managing the rest of the project area on an as needed basis. The Parallel Bridge Corridor with NC 12 Transportation Management Plan approach would allow parties to take advantage of likely future scientific and engineering advances, including new data, analysis, and technology.

EPA's proposal became the new Preferred Alternative – the “Parallel Bridge Corridor with NC 12 Transportation Management Plan” Alternative that is the primary subject of this Revised Section 4(f) Evaluation. The proposed new Preferred Alternative described in Appendix E was discussed at the September 2009 meeting, along with possible measures to minimize and mitigate impacts to wetlands and submerged aquatic vegetation. There was agreement among the Merger Team representatives present that a new merger process concurrence form will be drafted. The concurrence form will recognize the Review Board's agreement to proceed with Phase I as soon as possible and will explain why the team agreed that decisions on the later phases of the project should be postponed. The Merger Team is scheduled to act on the concurrence form on October 15, 2009.

What is the Purpose of This Revised Final Section 4(f) Evaluation?

The purpose of this Revised Final Section 4(f) Evaluation is to:

- change several determinations contained in the previous Final Section 4(f) Evaluation;
- analyze a new Preferred Alternative that evolved through additional coordination and communication with Federal and State resource agencies;
- analyze the feasibility and prudence of the Pamlico Sound Bridge Corridor alternatives; and
- reconsider the least overall harm determination in light of the development of a new Preferred Alternative.

FHWA is circulating this Revised Section 4(f) Evaluation to provide the resource agencies and the public an opportunity to review and comment. All comments received will be reviewed and taken into account prior to the approval of the use of any Section 4(f) property in the Record of Decision (ROD).

What is the New Preferred Alternative?

FHWA and NCDOT propose a new Preferred Alternative, described as the “Parallel Bridge Corridor with NC 12 Transportation Management Plan.” This alternative would replace the current Herbert C. Bonner Bridge

with a new bridge located to the west of the existing bridge (Phase I). The replacement bridge location in the Refuge is limited to the area necessary to safely construct and tie-in the new bridge to NC 12. Under the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, later phases of actions to manage NC 12 through 2060 would be decided based on actual conditions existing on Hatteras Island at the point in time that additional action becomes necessary. These later phases could consist of, but would not be limited to, one or more components of any of the alternatives already studied as part of the environmental review process (including the No Action Alternative, as required by NEPA). A description of the new Preferred Alternative and maps are included in Appendix E.

Is the Parallel Bridge Corridor with NC 12 Transportation Management Plan a Completely New Alternative?

No. Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan is very similar to the other Parallel Bridge Corridor alternatives identified in the FEIS. On Bodie Island and over the Oregon Inlet, this alternative is essentially identical. For the remainder of this alternative, it is a structured variation of the “mixing and matching” of the five Parallel Bridge Corridor alternatives, with the decision-making for the later phases delayed until the future conditions of the barrier island and the transportation infrastructure are known. The mixing and matching concept, as stated in the FEIS (page 2-96) is explained as follows:

“Although the NC 12 Maintenance alternatives are described and addressed in this FEIS as five separate alternatives, their components could be mixed and matched geographically along the length of NC 12 to create other variations. For example, NC 12 could be relocated on a road immediately south of a new Oregon Inlet bridge and relocated on a bridge in the area of the large ponds within the Refuge and at Rodanthe. NC 12 also could be protected by beach nourishment in the northern part of the Refuge and relocated on a bridge in the Rodanthe area. The Bridge South component of the Road North/Bridge South Alternative could be used in place of the Phased Approach alternatives’ components at the south end of the Refuge and at Rodanthe. Other combinations are also possible. As such, the assessment of the five NC 12 Maintenance alternatives is representative of all possible combinations of their components.”

The SSDEIS first introduced the “mixing and matching” concept of the five Parallel Bridge Corridor alternatives and the FEIS continued this concept. At a Sea Level Rise Peer Exchange workshop hosted by NCDOT and FHWA in May 2008, FHWA and NCDOT hosted a panel of national experts to provide sea-level rise information for the agencies to consider as the project developed. Objectives of the workshop included identifying recent scientific research on global climate change effects and to relate how that research can help inform the development of the Bonner Bridge Replacement Project. The outcome of the workshop was to identify analytical gaps, if any, between the NC 12 vulnerability analysis and shoreline erosion forecast conducted for the project compared to recent and relevant research on global climate change. Panelists generally agreed that the project’s worst case analysis of shoreline erosion may account for a portion of sea level rise caused by future changes in climate. There was consensus that the current global sea level analytical models are not fully developed to predict local effects and that the wide range of future sea level rise information considered in the workshop illustrates the uncertainty associated with estimating future sea levels and shoreline locations. The new Preferred Alternative is consistent with the approach suggested by the panelists because it gives the project sponsors the opportunity to review and incorporate new analysis prior to commencement of each phase.

While the Parallel Bridge with NC 12 Transportation Management Plan is not a completely new alternative, the alternative was not specifically evaluated under the FEIS/Final Section 4(f) Evaluation. Therefore, this Revised Final Section 4(f) Evaluation includes analysis of this alternative.

Identification of Section 4(f) Properties

What Did the FEIS/Final Section 4(f) Evaluation Find?

Section 5.1 of the FEIS/Final Section 4(f) Evaluation identified the following Section 4(f) properties within the project area:

- Cape Hatteras National Seashore (recreational area);
- Pea Island National Wildlife Refuge (wildlife refuge);
- Pea Island National Wildlife Refuge (historic property);
- (former) Oregon Inlet US Coast Guard Station (historic property);
- Rodanthe Historic District (historic property); and
- Chicamacomico Life Saving Station (historic property).

What Has Changed?

No additional Section 4(f) properties have been identified in this Revised Final Section 4(f) Evaluation. Therefore, there are no changes to this section from the FEIS/Final Section 4(f) Evaluation (September 17, 2008).

Applicability of Section 4(f) to Properties within the Project Area

Section 4(f) applies when FHWA determines that an alternative would “use” one or more properties protected by Section 4(f). Except as set forth in 23 CFR 774.11 and 774.13, a use of Section 4(f) property occurs:

1. When land is permanently incorporated into a transportation facility;
2. When there is a temporary occupancy of land that is adverse in terms of the statute’s preservation purpose as determined by the criteria in 23 CFR 774.13(d); or
3. When there is a constructive use of Section 4(f) property as determined by the criteria within 23 CFR 774.15.

In the ensuing analysis, if a “use” determination is made, then the “use” determination means that the property is afforded Section 4(f) protection.

What Did the FEIS/Final Section 4(f) Evaluation Find?

Chapter 2 of the FEIS/Final Section 4(f) Evaluation identified the following detailed study alternatives:

- Parallel Bridge Corridor
 - With Phased Approach/Rodanthe Bridge;
 - With All Bridge;
 - With Nourishment;
 - With Road North/Bridge South; and
 - With Phased Approach/Rodanthe Nourishment.
- Pamlico Sound Bridge Corridor
 - With Curved Rodanthe Terminus; and
 - With Intersection Rodanthe Terminus.

The FEIS/Final Section 4(f) Evaluation determined that each detailed study alternative used Section 4(f) property in the project area (Table 1), and therefore concluded that Section 4(f) was applicable to all alternatives.

Table 1: Section 4(f) Applicability (Use) from the FEIS/Final Section 4(f) Evaluation (September 17, 2008)

Section 4(f) Properties	Parallel Bridge Corridor Alternatives					Pamlico Sound Bridge Corridor Alternatives	
	Nourishment	Road North/ Bridge South	All Bridge	Phased Approach/ Rodanthe Bridge	Phased Approach/ Rodanthe Nourishment	Curved Rodanthe Terminus	Intersection Rodanthe Terminus
Cape Hatteras National Seashore	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pea Island National Wildlife Refuge	Yes	Yes	Yes	No	Yes	No	No
(former) Oregon Inlet US Coast Guard Station (historic)	No	No	No	No	No	No	No
Rodanthe Historic District (historic)	No	Yes	Yes	No	No	No	No
Chicamacomico Life Saving Station (historic)	No	Yes	Yes	No	No	No	No

What Has Changed?

Table 1 indicates, for each alternative, whether the Final Section 4(f) Evaluation determined there would or would not be a “use” of each of the protected properties as defined by Section 4(f). Based on comments received on the FEIS/Final Section 4(f) Evaluation, newly obtained information, additional consultation and new analysis some of the determinations have changed. In Table 2, the determinations that have been revised are shaded and in a larger font size. In addition, determinations have been made for the new Preferred Alternative (Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative). The determinations for this new alternative are shown in bold, italics with a larger font size in Table 2. A comparison of Tables 1, 2 and 3 illustrates the changes that have been made to the Final Section 4(f) “use” determinations. Analysis supporting the revised and new determinations follows.

Table 2: Revised and New Section 4(f) "Use" Determinations

Section 4(f) Properties	Parallel Bridge Corridor Alternatives						Pamlico Sound Bridge Corridor Alternatives	
	Nourishment	Road North/ Bridge South	All Bridge	Phased Approach/ Rodanthe Bridge	Phased Approach/ Rodanthe Nourishment	<i>New: NC 12 Transportation Management Plan</i>	Curved Rodanthe Terminus	Intersection Rodanthe Terminus
Cape Hatteras National Seashore	No	No	No	No	No	No	No	No
Pea Island National Wildlife Refuge*	Yes	Yes	Yes	Yes	Yes	Yes	No	No
(former) Oregon Inlet US Coast Guard Station	No	No	No	No	No	No	No	No
Rodanthe Historic District	No	No	No	No	No	No	No	No
Chicamacomico Life Saving Station	No	No	No	No	No	No	No	No

*Refuge as a historic property

Cape Hatteras National Seashore

As identified in Table 1, the FEIS/Final Section 4(f) Evaluation found that all alternatives would “use” the Seashore because the existing road would be relocated from its current alignment. However, newly obtained information shows that a public vehicular thoroughfare existed prior to the establishment of the Seashore, and the Seashore and road were concurrently and jointly planned and developed. FHWA and NCDOT have considered historical right-of-way information compiled after the FEIS/Final Section 4(f) Evaluation that is relevant to the impacts under Section 4(f). A timeline of related events can be found in Appendix B. FHWA and NCDOT acknowledge that while a large volume of historical material was found, not all documents that one would expect to have existed could be located. This information was provided to the Merger Team members in May 2009 (the National Park Service (NPS), as part of the U.S. Department of the Interior (USDO), as the official with jurisdiction, is a member of the Merger Team).

When there is such concurrent and joint planning and development between a Section 4(f) property and a transportation facility, the requirements of Section 4(f) do not apply to the subsequent use of the area for transportation. The applicable FHWA regulations regarding Section 4(f), 23 CFR 774.11(h)& (i) state:
“(h) When a property formally reserved for a future transportation facility temporarily functions for park, recreation, or wildlife and waterfowl refuge purposes in the interim, the interim activity, regardless of duration, will not subject the property to Section 4(f).

(i) When a property is formally reserved for a future transportation facility before or at the same time a park, recreation area, or wildlife and waterfowl refuge is established and concurrent or joint planning or development of the transportation facility and the Section 4(f) resource occurs, then any resulting impacts of the transportation facility will not be considered a use as defined in Sec. 774.17. Examples of such concurrent or joint planning or development include, but are not limited to:

(1) Designation or donation of property for the specific purpose of such concurrent development by the entity with jurisdiction or ownership of the property for both the potential transportation facility and the Section 4(f) property; or

(2) Designation, donation, planning, or development of property by two or more governmental agencies with jurisdiction for the potential transportation facility and the Section 4(f) property, in consultation with each other.”

Concurrent and joint planning and development between the NPS (on behalf of the Seashore) and the State of North Carolina (on behalf of the transportation facility) is evident based on the following historical information.

The Seashore was authorized under an Act of Congress approved August 17, 1937 and established in 1953. The NPS was to oversee the Seashore and was empowered to accept lands, through gifts or donations, within the boundaries established by Congress.

Since the NPS could only accept donations of land for the Seashore, the North Carolina General Assembly established (Chapter 257, Public Laws of North Carolina) the North Carolina Cape Hatteras National Seashore Commission (Commission) in 1939. This Commission was authorized, empowered and directed to acquire title in the name of the State of North Carolina for lands required for the Seashore. Once acquired by the Commission, the lands were to be transferred to the United States for the creation of the first National Seashore in history.

The 1939 North Carolina Session Law provided that the transfer of lands acquired by North Carolina would be subject to several conditions. One of these conditions was that North Carolina would retain the right to operate any existing roadways and to establish other highways and roads as deemed necessary by the State of North Carolina. North Carolina also retained the right to condemn properties and levy taxes.²

The Commission proceeded with acquiring a number of parcels for eventual transfer to the U.S. Government.

² Chapter 257, 1939 North Carolina Session Law.

The Commission and the Governor entered into extensive conversations with the NPS regarding funding for the acquisition of land for the Seashore and which agency should be responsible for land acquisition. The NPS proposed to raise \$618,000 in private donations and sought to have North Carolina match those funds. In June 1952, North Carolina agreed to provide the funding (an additional \$200,000 was later sought and approved in 1958). A memorandum of agreement (MOA) was signed on July 15, 1952 between the Commission and the NPS³.

The MOA resulted in the NPS now being responsible for land acquisition (rather than the Commission). Another aspect of the MOA was that the parties agreed that wherever possible, condemnation proceedings were to take place in Federal courts. Also as part of the MOA, the State conveyed lands to the United States (for example deeds dated December 22, 1952, July 10, 1953⁴, and May 26, 1955⁵). All of these deeds conveyed the property subject to the conditions and reservations recited in Chapter 257 of the North Carolina Public Law of 1939 and each contained the following language:

“... upon the further condition that the State of North Carolina and its subdivisions expressly retain title to and control of all public roads and highways now laid out or established over and upon the said lands, and the further right to lay out and establish over and upon said lands such other highways and roads as shall be deemed necessary by the State of North Carolina and political subdivisions thereof; and to such end the said land shall be subject to condemnation proceedings in the same manner and to the same extent as if said lands were privately owned.”

In addition to the lands referenced above, on May 20, 1954, the State granted a Quitclaim deed to the United States for all interest that it had on the Refuge (also part of the Seashore), except a previously granted 100 foot permanent easement for right-of-way to operate and maintain the recently constructed road⁶ (the newly built road was completed on July 23, 1954).

Some time after these conveyances, the United States realized that it had failed to acquire all of the lands within the boundaries designated as the Seashore. Specifically, the lands located between the low and high tide water lines as well as submerged land in the Oregon Inlet and several islands all of which belonged to North Carolina⁷. Therefore, by deed dated August 7, 1958⁸, North Carolina conveyed these lands to the United States and again expressly reserved the right to operate and maintain the roadway as the State deemed necessary:

“...[T]he State of North Carolina and its subdivisions expressly retain title to and control of all public roads and highways now laid out or established over and upon said lands, and the further right to lay out and establish over and upon said lands such other highways and roads as shall be deemed necessary by the State of North Carolina...”

The parties also recognized that erosion was a concern. Therefore, the Deed also provided that in the event that the parties were unable to determine the original markers due to a shift in the original lands conveyed, it was their intent that the land belong to the United States for the purposes of operating the Seashore.

Therefore, it is evident that while assembling properties to be incorporated into the Seashore, the State of North Carolina and the U.S. Government concurrently and jointly planned on future transportation uses within the Seashore.

Regarding transportation, prior to the creation of the Seashore, the only means of transportation between villages on Bodie Island and Hatteras Island was via a tug and barge service across Oregon Inlet (privately

³ “The Creation and Establishment of the Cape Hatteras National Seashore (NPS 2007), p. 102.

⁴ Deed Book 47, Page 481, Dare County.

⁵ Deed Book 61, Page 438, Dare County.

⁶ Quitclaim deed dated May 20, 1954 between the State Highway and Public Works Commission and the United States of America.

⁷ For a more detailed description of the lands, see letter from USDOJ dated April 23, 1958.

⁸ Deed Book 79, Page 548, Dare County.

operated by Captain J.B. Tillet since the 1920s). Once across the inlet, motorist traveled Hatteras Island via sand pathways. By 1934, the North Carolina Highway Commission had begun to subsidize Captain Tillet's Ferry Service⁹.

In 1938, the North Carolina State Highway and Public Works Commission (in conjunction with the Federal Works Agency Public Roads Administration) published a map of Dare County which depicts an "unimproved road" extending from Bodie Island to Rodanthe and points further south. A note on this map states "'*Off-road culture not shown. Map includes only official roads and important suburban entrance roads not subject to public maintenance.*" (source: North Carolina State Archives, "Dare County, North Carolina (State Highway and Public Works Commission), 1938").

In the late 1940s, paved roads were constructed to link villages on Hatteras Island. In 1952, a paved road was constructed through Hatteras Island to the village of Hatteras.

During the establishment of the Seashore, the State of North Carolina and the NPS coordinated and collaborated on providing transportation infrastructure within the Seashore. As early as May 1953, the state-contracted operator of a two-car ferry at Hatteras Inlet opened a toll ferry with improved facilities to carry several cars. The major problem was the bottleneck at Oregon Inlet where a fast-growing volume of visitors quickly overran the existing state ferry operation. To alleviate the bottleneck, the NPS contacted the Department of Defense to secure the service of a surplus Landing Craft Utility (LCU), a WWII-era landing craft, for use as a civilian ferry. The Navy agreed and in April 1953, it provided an LCU to the North Carolina State Highway Department for use at Oregon Inlet. The new ferry began service on May 1, 1953. Shortly after opening, this new ferry also proved inadequate to meet increased need. Two more ferries were thus obtained through the help of the NPS and put to work by the summer of 1954 (these LCUs were subsequently christened in honor of North Carolina governors William B. Umstead and R. Gregg Cherry, and NPS Director Conrad L. Wirth).¹⁰

The NPS had also undertaken a campaign referred to as "Mission 66." "Mission 66" began in the mid- to late-1950s and was a project to update NPS facilities by 1966, the 50th Anniversary of the NPS. Construction of modern roads was a key element of the program. A specific briefing paper was prepared for Mission 66 as it applied to the Seashore and the Refuge. The briefing paper spoke of the current road system and referred to the State's plan to have a highway system throughout the length of the entire Outer Banks. The paper also referenced the State's "optimistic Plan" for a bridge to span Oregon Inlet.

As a result of the increase in visitors and a desire to draw more people to the Seashore and the Refuge, in 1962 the state began construction of a bridge over Oregon Inlet with the help of a \$500,000 appropriation from Congress¹¹. This \$500,000 contribution from the NPS was from an appropriation from Congress under the "Mission 66" program.

As the result of a severe storm in March 1962, a portion of NC 12 on the Refuge washed away. North Carolina coordinated with the USDOJ to relocate the road and on October 1, 1963, the United States conveyed a Deed of Easement to the State for the relocated portion of NC 12¹². The road relocation was completed on August 8, 1969.

In 1963, ferry service ceased with the opening of the Herbert C. Bonner Bridge over Oregon Inlet. In addition to the funding provided by the NPS, the State coordinated the construction of the bridge with the NPS¹³.

⁹ Pea Island National Wildlife Refuge, Comprehensive Conservation Plan, page 7.

¹⁰ "The Creation and Establishment of Cape Hatteras National Seashore" (NPS, 2007) pp. 131-132

¹¹ Public Law 87-799, 10/11/62, Congress authorized the Secretary of the Interior to spend \$500,000 toward the construction of a bridge across Oregon Inlet. This was part of the NPS Mission 66 Restoration Program.

¹² Deed Book 116, Page 201, Dare County, North Carolina.

¹³ USDOJ, NPS Special Use Permit No. CAHA-3-63 dated 7/31/83.

From 1966 to present North Carolina has coordinated with the USFWS on multiple occasions to relocate or rehabilitate sections of the road through the Refuge portion of the Seashore. The roadway has been relocated outside of the original 100 foot easement location on at least four occasions with the consent and coordination of the USFWS. Even the NPS (Director Wirth) acknowledged that “...*North Carolina was responsible for protecting its roads through the park and that meant going beyond the basic right-of-way...*”¹⁴

According to “The Creation and Establishment of Cape Hatteras National Seashore” (NPS, 2007), there were numerous other instances where the NPS acknowledged the need for, and planned for, transportation infrastructure within the Seashore.

Conclusion

After consideration of the facts discussed above and in Appendix B, the history demonstrates that the Federal and State governments preserved the Seashore on Bodie Island and Hatteras Island with an understanding that vehicular passage would be accommodated; and that the vehicular passage has not been fixed to one location. Rather, the vehicular passage has evolved in response to advances in highway construction and in response to the forces of nature. Further, the history indicates that the Seashore and the transportation facility were concurrently and jointly planned and developed by the Federal and State governments *working together* to preserve the land for wildlife while maintaining a means for safe and efficient vehicular transportation. In consideration of this substantial history of concurrent and joint planning and development for the co-existence of the Seashore and the roadway, *it is FHWA’s revised determination that Section 4(f) is not applicable to the Seashore, as the impacts resulting from relocating NC 12 from its current alignment through the Seashore would not be considered a use as defined in 23 CFR 774.17.* This determination does not mean that the replacement project will not be designed to minimize impacts to the Seashore, it simply means that FHWA is not required to make a specific Section 4(f) approval for use prior to approving the project. FHWA and NCDOT will continue to consult and coordinate with the NPS throughout the final design engineering process in order ensure that all harm to the Seashore is minimized and mitigated. A draft Partnership Agreement that would guide this process through 2060 is included in Appendix H.

Pea Island National Wildlife Refuge (as a Refuge)

As identified in Table 1, the FEIS/Final Section 4(f) Evaluation found that all Pamlico Sound Bridge Corridor alternatives and all Parallel Bridge Corridor alternatives, except the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative, would “use” the Refuge because the existing road would be relocated from its current alignment. However, newly obtained information shows that a public vehicular thoroughfare existed prior to establishment of the Refuge and the Refuge and road were concurrently and jointly planned and developed. FHWA and NCDOT have considered historical right-of-way information compiled after the FEIS/Final Section 4(f) Evaluation was published that is relevant to the impacts under Section 4(f). A timeline of related events can be found in Appendix B. FHWA and NCDOT acknowledge that while a large volume of historical material was found, not all documents that one would expect to have existed could be located. In March 2009, FHWA and NCDOT met with the USFWS and provided the information in Appendix B to the USFWS for comment. This information was also provided to the Merger Team members in May 2009.

When there is such concurrent or joint planning or development between a Section 4(f) property and a transportation facility, the requirements of Section 4(f) do not apply to the subsequent use of the area for transportation. Concurrent or joint planning and development between the transportation facility and the Refuge is evident based on the following historical information.

Located on one of North Carolina’s barrier islands, the Refuge was established by Executive Order 7864 on April 8, 1938, as a refuge and breeding ground for migratory birds and other wildlife. Presidential Proclamation 2284 closed a 25,700-acre area encompassing the Refuge and a portion of the Pamlico Sound west of and adjacent to the Refuge to migratory bird hunting. The Refuge falls within the geographical boundaries of the Seashore. While both entities fall under the purview of the USDO, the Seashore is managed by the NPS, while

¹⁴ “The Creation and Establishment of Cape Hatteras National Seashore” (NPS, 2007).

the Refuge is managed by the USFWS pursuant to a Memorandum of Understanding with the NPS. The Refuge originally covered 5,915 acres of land. Over time, that area has been reduced by erosion to approximately 5,000 acres¹⁵.

Prior to the creation of the Refuge, residents lived in the villages to the south of the Refuge. The only means of transportation to these villages was via a tug and barge service across Oregon Inlet that had been privately operated by Captain J.B. Tillet since the 1920s. Once across the inlet, motorists traveled along Hatteras Island via sand pathways¹⁶.

By 1934, the North Carolina Highway Commission had begun to subsidize Captain Tillet's Ferry Service¹⁷. In 1938, the US Secretary of Agriculture acquired the land for the Refuge through condemnation actions¹⁸. These acquisitions did not include existing public highways and public utility easements across the island¹⁹. By this time, the North Carolina State Highway and Public Works Commission (in conjunction with the Federal Works Agency Public Roads Commission) published a map of Dare County which depicts an "unimproved road" extending from Bodie Island to Rodanthe and points further south. A note on this map states "'Off-road culture not shown. Map includes only official roads and important suburban entrance roads not subject to public maintenance.'" (source: North Carolina State Archives, "Dare County, North Carolina (State Highway and Public Works Commission, 1938)").

North Carolina had begun to provide full reimbursement to Captain Tillet as early as 1942 for the Ferry Service, thereby eliminating the need for residents to pay a toll to cross Oregon Inlet²⁰. By 1950, Captain Tillet had sold his ferry business to the State of North Carolina. During this same time period, the State had begun plans to construct a hard surface road in place of the sand roadway that traversed the Refuge. Toward this end, Congress passed Public Law 229 on October 29, 1951, that authorized the Secretary of the Interior:

*"...to convey to the State of North Carolina a permanent easement for the construction of a public road (together with rights for such other uses as may be customary or necessary in the State of North Carolina in connection with the construction or operation of such a road) through the Pea Island National Wildlife Refuge in Dare County, North Carolina, and to accept in return therefore the conveyance of any rights-of-way, easements, or other rights in or claims to land owned by the State of North Carolina not needed for use in the construction or operation of such road."*²¹

On May 20, 1954, the State granted a Quitclaim deed to the United States for all interest that it had on the Refuge, except a previously granted 100 foot permanent easement for right-of-way to operate and maintain the recently constructed road²² (the newly built road was completed on July 23, 1954).

On July 21, 1954, the USDOJ conveyed a permanent easement in two parcels of land for the construction, operations, and maintenance of a public road across the Refuge. The easement to the State described a parcel of land as a strip of land measuring 100 feet wide, being 50 feet on both sides of a referenced center line. The easement also stated that nothing within the document was to limit or impair the right of the United States to continue to use the property for its intended purposes "*not inconsistent with the construction, operation, and maintenance of a public highway thereon.*"²³ The easement also provided for the construction, operation, and maintenance of a parking area and facilities for a ferry landing to be used in connection with the public road.

¹⁵ Pea Island National Wildlife Refuge, Comprehensive Conservation Plan, Supra.

¹⁶ Pea Island National Wildlife Refuge, Comprehensive Conservation Plan, Supra.

¹⁷ Pea Island National Wildlife Refuge, Comprehensive Conservation Plan, Supra.

¹⁸ Deed Book 19, Page 451, Dare County, North Carolina; Deed Book 21, Page 81, Dare County, North Carolina.

¹⁹ Id.

²⁰ Pea Island National Wildlife Refuge, Comprehensive Conservation Plan, Supra.

²¹ 65 Stat. 662 (October 29, 1951)

²² Quitclaim deed dated May 20, 1954 between the State Highway and Public Works Commission and the United States of America.

²³ Deed Book 56, Page 208, Dare County, North Carolina.

As part of the creation of the Seashore, the United States then realized that it had failed to acquire all of the lands within the boundaries designated as the Seashore (including the Refuge area). Specifically, the lands located between the low and high tide water lines as well as submerged land in the Oregon Inlet and several islands all of which belonged to North Carolina²⁴. Therefore, by deed dated August 7, 1958, North Carolina conveyed these lands to the United States and again expressly reserved the right to operate and maintain the roadway as the State deemed necessary:²⁵

“...[T]he State of North Carolina and its subdivisions expressly retain title to and control of all public roads and highways now laid out or established over and upon said lands, and the further right to lay out and establish over and upon said lands such other highways and roads as shall be deemed necessary by the State of North Carolina...”

The State of North Carolina and the USDOJ coordinated and collaborated on providing transportation infrastructure within the Refuge (as part of the Seashore). Relevant historical information describing this coordination and collaboration is described in more detail in the analysis for the Seashore (previous section) and is not repeated here.

From 1966 to the present, North Carolina has coordinated with the USFWS on multiple occasions to relocate or rehabilitate sections of the road through the Refuge. The roadway has been relocated outside of the original 100 foot easement location on at least four occasions (Appendix B) with the consent and coordination of the USFWS. The approximate length of these four road relocations is six miles. This represents approximately half of the eleven mile distance NC 12 traverses within the Pea Island National Wildlife Refuge.

According to “The Creation and Establishment of Cape Hatteras National Seashore” (NPS, 2007), there were numerous other instances where the USDOJ acknowledged the need for, and planned for, transportation infrastructure within the Refuge (as part of the Seashore). Even the NPS (Director Wirth) acknowledged that *“...North Carolina was responsible for protecting its roads through the park and that meant going beyond the basic right-of-way...”*²⁶

Conclusion

After consideration of the facts discussed above and based on information located in Appendix B, the history demonstrates that the Federal and State governments preserved the Hatteras Island area with an understanding that vehicular passage would be accommodated, and that the vehicular passage has not been fixed to one location. Rather, the vehicular passage has evolved in response to advances in highway construction and in response to the forces of nature. Further, the history indicates that the Refuge, transportation facility and existing Bonner Bridge were concurrently and jointly planned and developed by the Federal and State governments *working together* to preserve the land for wildlife while maintaining a means for safe and efficient vehicular transportation. In consideration of this substantial history of concurrent and joint planning and development for the co-existence of the Refuge and the roadway, *it is FHWA’s revised determination that Section 4(f) is not applicable to the Refuge (as a refuge), as the impacts resulting from relocating NC 12 from its current alignment through the Refuge would not be considered a use as defined in 23 CFR 774.17.* This determination does not mean that the replacement project will not be designed to minimize impacts to the Refuge, it simply means that FHWA is not required to make a specific Section 4(f) approval for use prior to approving the project.

The USFWS has expressed a concern that FHWA’s determination regarding Section 4(f) applicability to the Refuge (as a refuge) should not be read to absolve NCDOT from complying with all other applicable federal environmental laws. FHWA agrees with the USFWS in this regard. The determination only applies to FHWA’s Section 4(f) approval. FHWA and NCDOT will continue to consult and coordinate with the USFWS throughout the final design engineering process in order ensure that all harm to the Refuge is minimized and

²⁴ “The Creation and Establishment of Cape Hatteras National Seashore” (NPS, 2007).

²⁵ Deed Book 79, Page 548, Dare County, North Carolina.

²⁶ “The Creation and Establishment of Cape Hatteras National Seashore” (NPS, 2007).

mitigated. A draft Partnership Agreement that would guide this process through 2060 is included in Appendix H.

Pea Island National Wildlife Refuge (as a Historic Property)

The FEIS/Final Section 4(f) Evaluation found there would be neither a permanent incorporation of land from the Refuge (as a historic property) into a transportation facility nor a temporary occupancy of land that is adverse in terms of the statute's preservation purpose for the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative. However, FHWA has revised its constructive use analysis for this property, which resulted in a determination that the alternative would use the Pea Island National Wildlife Refuge (as a historic property). The constructive use analysis is located later in this Revised Final Section 4(f) Evaluation.

NCDOT has coordinated with, and continues to coordinate with the USFWS regarding the location of Phase I of the Parallel Corridor with NC 12 Transportation Management Plan Alternative. This alternative would require the use of approximately 3.08 acres of the Pea Island National Wildlife Refuge (as a historic property) for Phase I. This use is depicted in Appendix E. For the later phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, additional use of the Pea Island National Wildlife Refuge (as a historic property) could be necessary for some or all alternative actions. Any such additional use would be assessed under Section 4(f) prior to approving the future action. The analysis would be based upon the actual future shoreline conditions as they exist in the future. Additional information about the assessment of future impacts caused by future actions in the vicinity of the historic Pea Island National Wildlife Refuge property is included in the draft Section 106 Programmatic Agreement located in Appendix F.

(former) Oregon Inlet US Coast Guard Station

The use determinations in the Final Section 4(f) Evaluation for the historic (former) Oregon Inlet US Coast Guard Station property have not changed. None of the alternatives would use this property.

Phase I of the new Preferred Alternative (Parallel Bridge Corridor with NC 12 Transportation Management Plan) would also avoid using the historic (former) Oregon Inlet US Coast Guard Station. There would be no permanent incorporation of property, as depicted in the conceptual design drawing for Phase I included in Appendix E. As depicted, it is currently estimated that approximately 7.04 acres of the property would be temporarily needed for construction staging. The Section 4(f) regulations (23 CFR 771.13(d)) provide that such temporary occupancies are not considered a "use" of property under Section 4(f) when "(1) the duration would be temporary and there would be no change in ownership of the land (2) the scope of work would be minor (3) no permanent adverse physical impacts are anticipated and there would be no interference with the protected activities, features, or attributes of the property (4) the land would be fully restored and (5) the official with jurisdiction over the Section 4(f) resource agrees with the above conditions". Because all five conditions would be satisfied, the temporary occupancy of the portion of the historic (former) Oregon Inlet US Coast Guard Station depicted in Appendix E is not considered a use of Section 4(f) property. Additional documentation concerning this property and the Preferred Alternative is included in the draft Section 106 Programmatic Agreement located in Appendix F. Later phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would not use the (former) Oregon Inlet US Coast Guard Station because this property is located adjacent to Phase I.

Rodanthe Historic District and Chicamacomico Life Saving Station

The use determinations in the Final Section 4(f) Evaluation for the Rodanthe Historic District and Chicamacomico Life Saving Station properties have changed for the Parallel Bridge Corridor with Road North/Bridge South and All Bridge Alternatives. The use determinations for the other Parallel Bridge Corridor alternatives have not changed. NCDOT and FHWA modified the conceptual designs for the Parallel Bridge Corridor with Phased Approach/ Rodanthe Bridge, Parallel Bridge Corridor with Road North/ Bridge South, and Parallel Bridge Corridor with All Bridge Alternatives, which moved the southern terminus of all Parallel Bridge Corridor bridging alternatives outside the historic district. These modifications were made due to comments received on the FEIS/Final Section 4(f) Evaluation explained below in the "Constructive Use" section. Additional information is located in Appendix C. After re-initiating consultation with the SHPO, the ACHP and

consulting parties to present these modifications, a determination of “no adverse effect” was concluded for all of the Parallel Bridge Corridor bridging alternatives on the Rodanthe Historic District and the Chicamacomico Life Saving Station. Therefore, none of the Parallel Bridge Corridor alternatives would use these properties.

Phase I of the new preferred Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would also avoid using the Rodanthe Historic District and Chicamacomico Life Saving Station properties. However, a use of the Rodanthe Historic District and Chicamacomico Life Saving Station could be necessary for some or all alternative actions that may be evaluated in the future for the later phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative. Any such proposed use would be assessed under Section 4(f) (as well as all other applicable environmental laws) prior to FHWA approval of the future action. The analysis would be based on the future shoreline and historic property conditions as they exist in the future. Additional information about the assessment of future impacts caused by future actions in the vicinity of the Rodanthe Historic District and Chicamacomico Life Saving Station properties is included in the draft Section 106 Programmatic Agreement located in Appendix F.

Constructive Use

The preceding analysis focused on a direct, physical use of Section 4(f) properties in the project area. FHWA must also evaluate whether the alternatives have such severe proximity impacts that a constructive use would result, as defined in the Section 4(f) regulations. The FEIS/Final Section 4(f) Evaluation determined that none of the alternatives would constructively use any of the Section 4(f) properties. However, the SHPO, the USDOJ and the Southern Environmental Law Center provided comments suggesting that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Refuge. In addition, the SHPO commented that the alternative would also constructively use the Rodanthe Historic District and the Chicamacomico Life Saving Station. Based on these comments and further evaluation, FHWA has determined that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Refuge as a historic property. In regards to the Rodanthe Historic District and Chicamacomico Life Saving Station, the NCDOT and FHWA worked with the SHPO, ACHP and consulting parties to develop conceptual design modifications to lessen proximity impacts to those resources to the extent that there would no longer be an adverse effect on either property. These conceptual design modifications were also applied to the two other Parallel Bridge Corridor alternatives that originally proposed work in the Rodanthe area as described in Appendix C. Thus, consistent with the FEIS/Section 4(f) Evaluation, FHWA determines that none of the Parallel Bridge Corridor alternatives would constructively use the Rodanthe Historic District and the Chicamacomico Life Saving Station historic properties. The constructive use analysis and determinations follow.

Pea Island National Wildlife Refuge (as a Historic Property)

The FEIS/Final Section 4(f) Evaluation did not make constructive use determinations for any of the detailed study alternatives for the Refuge. The only change in the constructive use determination involves the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative. The SHPO, in their comments on the FEIS/Final Section 4(f) Evaluation (dated October 28, 2008), stated their belief that this alternative would constructively use the Refuge (as a historic property). They state:

"...In the case of Pea Island Wildlife Refuge, the construction of a ten-mile long bridge, elevated thirty feet above ground level and topped with a nearly five-foot railing (and perhaps with an additional six-foot high, chain-link fence as suggested by the Refuge during the Section 106 consultation), will introduce a substantial visual intrusion that is antithetical to the historic landscape...Retaining its key original elements and integrity of location, setting, materials, feeling and association, the Refuge as a historic landscape will not only be adversely affected, it will be substantially, visually impaired by the presence of a bridge of the height and length proposed with the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge (preferred). While the bridge may not eliminate the Refuge's ability to function as a wildlife refuge, it will destroy its integrity as a historic landscape..."

In response to this comment, the FHWA Federal Preservation Officer was consulted and additional discussions with the SHPO, ACHP, USFWS and NCDOT Historic Architecture Staff occurred. FHWA reviewed the

available documentation pertaining to why the Refuge is eligible for the National Register; its significance; what elements of the historic landscape were constructed by the Civilian Conservation Corps (CCC) and where; the extent to which those elements still exist and have not been altered; and the proximity of the alternative to the significant elements of the historic landscape that are still extant. FHWA also considered the extent to which the visual impact of the alternative could be lessened through mitigation measures, such as by requiring careful attention to the design details of the bridge structure, or through landscaping. FHWA found that the historic landscape of the Refuge is a rare example of its type; it is nationally significant; a number of contributing elements are extant and in fair condition; that although threatened by weather, the historic landscape is protected from development due to its location within the National Seashore and Refuge; that the introduction of a bridge structure up to 33 feet in height across the entire length of the Refuge, in a location nearly adjacent to most of the significant contributing elements that still exist, would be a substantial visual intrusion for which little mitigation is possible. Thus the proximity impacts from this alternative would be so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) would be substantially impaired. Therefore, *we now find that the Parallel Bridge Corridor with Phased Approach/ Rodanthe Bridge Alternative would constructively use the Refuge (as a historic property).*

Earlier in this analysis, FHWA found that the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would permanently incorporate land from the Refuge into a transportation facility. Because of this determination, there cannot also be a constructive use of this property from this alternative.

(former) Oregon Inlet US Coast Guard Station

The FEIS/Final Section 4(f) Evaluation found that none of the alternatives would constructively use this property.

Phase I of the new preferred Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would also not constructively use the historic (former) Oregon Inlet US Coast Guard Station because it would not have proximity impacts severe enough to substantially impair the protected features, activities, and attributes of the property. The property is unoccupied and as such has no noise-sensitive activities. Access to the property via SR 1257 and NC 12 would continue to be provided. While the alternative would have an adverse visual effect on the property due to the replacement bridge being approximately 17 feet higher than the existing Bonner Bridge as it enters Hatteras Island and extending approximately 2,000 feet farther as it returns to grade, this slight change in the viewshed would not rise to the level of a substantial impairment. Later phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would not be expected to constructively use the (former) Oregon Inlet US Coast Guard Station because this property is located adjacent to Phase I.

Rodanthe Historic District and Chicamacomico Life Saving Station

The FEIS/Final Section 4(f) Evaluation did not find a constructive use of either property from any alternative. These determinations have not changed, but some alternatives have been modified to reduce proximity impacts.

In the FEIS, three alternatives (Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge, Parallel Bridge Corridor with Road North/Bridge South, and Parallel Bridge Corridor with All Bridge) were originally determined to have an “adverse effect” (pursuant to Section 106 of the National Historic Preservation Act) on these properties. The SHPO, in their comments on the FEIS/Final Section 4(f) Evaluation (dated October 28, 2008), stated their belief that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would constructively use the Rodanthe Historic District and Chicamacomico Life Saving Station:

“...Given the serious access problems and visual impacts caused by the proposed bridge, we believe that the Preferred Alternative [Phased Approach/Rodanthe Bridge] substantially impairs the functions, features and attributes of the Rodanthe Historic District and Chicamacomico Life Saving Station and, thereby, constitutes a constructive use of the historic properties.”

In response to this concern, FHWA and NCDOT have modified conceptual project designs in the Rodanthe area to bring NC 12 down to grade (ground level) prior to entering the Rodanthe Historic District. The modified concept designs apply to the following alternatives:

- Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge;
- Parallel Bridge Corridor with Road North/Bridge South; and
- Parallel Bridge Corridor with All Bridge.

After re-initiating consultation with the SHPO, the ACHP, and consulting parties, a determination of "no adverse effect" was concluded for these three alternatives on these historic properties. As a result of the design changes and the additional coordination, the *original FEIS/Final Section 4(f) Evaluation determination (that these three alternatives would not constructively use these properties) remains valid and therefore has not changed.*

Phase I of the new preferred Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would not constructively use the Rodanthe Historic District and Chicamacomico Life Saving Station properties because it includes no action in the vicinity of these properties. Further, it is anticipated that any future action during a later phase would not constructively use the Rodanthe Historic District and Chicamacomico Life Saving Station properties because the conceptual design modifications that were implemented for the other Parallel Bridge Corridor alternatives could presumably be implemented for the later phase of the Parallel Corridor with NC 12 Transportation Management Plan Alternative as well. If, however, a use of the Rodanthe Historic District and Chicamacomico Life Saving Station is necessary for any alternative action that may be evaluated in the future for the later phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, then the proximity impacts of the proposed use would be assessed under Section 4(f) for possible constructive use prior to FHWA approval of the future action. The analysis would be based on the future shoreline and historic property conditions as they exist in the future. Additional information about the assessment of future impacts caused by future actions in the vicinity of the Rodanthe Historic District and Chicamacomico Life Saving Station properties is included in the draft Section 106 Programmatic Agreement located in Appendix F.

Summary of Revised Section 4(f) "Use" Determinations

In summary, this Revised Section 4(f) Evaluation has changed FHWA's determinations of the proposed "use" of property under Section 4(f) for the Cape Hatteras National Seashore for all alternatives evaluated in the FEIS. This revised Section 4(f) Evaluation has also changed FHWA's determination of the proposed "use" of property under Section 4(f) for the Pea Island National Wildlife Refuge for the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative. For the new Preferred Alternative (Parallel Corridor with NC 12 Transportation Management Plan), this revised Section 4(f) Evaluation has determined that there would be a use of approximately 3.08 acres of the Pea Island National Wildlife Refuge. A summary of use and applicability determinations is presented in Table 3.

Table 3: Revised Section 4(f) "Use" Determinations

4(f) Resource	Nourishment	Road North/ Bridge South	All Bridge	Phased Approach/ Rodanthe Bridge	Phased Approach/ Rodanthe Nourishment	NC 12 Transportation Management Plan (Phase I)	PSB: Curved Rodanthe Terminus	PSB: Intersection Rodanthe Terminus
Cape Hatteras National Seashore (public recreation area)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)
Pea Island National Wildlife Refuge (as a refuge)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)	NA (joint planning)
Pea Island National Wildlife Refuge (as a historic property)	P:Yes T:No C:No	P:Yes T:No C:No	P:Yes T:No C:No	P:No T:No C:Yes	P:Yes T:No C:No	P:Yes T:No C:No	P:No T:No C:No	P:No T:No C:No
(former) Oregon Inlet US Coast Guard Station (historic)	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No
Rodanthe Historic District (historic)	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No
Chicamacomico Life Saving Station (historic)	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No	P:No T:No C:No
Key: P = Permanent, T = Temporary, C = Constructive, NA = Not Applicable								

Avoidance Alternatives

The intent of the Section 4(f) statute and the policy of the USDOT is to prohibit the use of significant publicly owned parks, recreation areas, wildlife and waterfowl refuges, and historic sites as part of a project, unless there is no feasible and prudent alternative to the use of such land. Therefore, FHWA cannot approve the use of a Section 4(f) property if there is a feasible and prudent avoidance alternative available. A feasible and prudent avoidance alternative is one that avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property.

In order to demonstrate that there is no feasible and prudent alternative to the use of 4(f) land, a Section 4(f) Evaluation must address both location alternatives and design shifts that totally would avoid using the 4(f) land. The Section 4(f) regulations (23 CFR 774.17) define feasible and prudent avoidance alternatives as follows:

“(1) A feasible and prudent avoidance alternative avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. In assessing the importance of protecting the Section 4(f) property, it is appropriate to consider the relative value of the resource to the preservation purpose of the statute.

(2) An alternative is not feasible if it cannot be built as a matter of sound engineering judgment.

(3) An alternative is not prudent if:

(i) It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;

- (ii) *It results in unacceptable safety or operational problems;*
- (iii) *After reasonable mitigation, it still causes:*
 - (A) *Severe social, economic, or environmental impacts;*
 - (B) *Severe disruption to established communities;*
 - (C) *Severe disproportionate impacts to minority or low income populations; or*
 - (D) *Severe impacts to environmental resources protected under other Federal statutes;*
- (iv) *It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;*
- (v) *It causes other unique problems or unusual factors; or*
- (vi) *It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.”*

The first test under Section 4(f) is to determine whether or not there is an avoidance alternative that is feasible. Based on 23 CFR 774.17(2) (see above), an alternative is feasible if it is technically possible to design and build. The second part of the standard involves determining whether or not an alternative is prudent. An alternative is prudent if it does not cause the adverse impacts discussed above in 23 CFR 774.17(3). Where sufficient analysis demonstrates that a particular alternative is not feasible and prudent, the analysis or consideration of that alternative as a viable alternative comes to an end.

What Did the FEIS/Final Section 4(f) Evaluation Find?

Due to the large Section 4(f) properties covering nearly all of Bodie and Hatteras Islands in the project area, the FEIS/Final Section 4(f) Evaluation did not find any feasible and prudent avoidance alternatives. All of the alternatives identified in Chapter 2 of the FEIS either did not meet the Purpose and Need of the project or used Section 4(f) property. By definition, an alternative that uses Section 4(f) property is not an avoidance alternative.

In their comments on the FEIS/Final Section 4(f) Evaluation, the USDOJ did not agree with this determination. USDOJ believed that the Pamlico Sound Bridge Corridor alternatives would appear to be feasible and prudent and would minimize harm to the Refuge. Further, USDOJ commented that NCDOT has previously demonstrated that the Pamlico Sound Bridge Corridor presents feasible alternatives from an engineering standpoint.

What Has Changed?

FHWA did not consider the Pamlico Sound Bridge Corridor as an avoidance alternative in the Final Section 4(f) Evaluation because, at that time, FHWA found the Pamlico Sound Bridge Corridor used land from the Cape Hatteras National Seashore (a Section 4(f) property). The preceding section of this Revised Final Section 4(f) Evaluation documented newly obtained information showing that the road pre-dates the establishment of the Seashore and both were concurrently and jointly planned and developed to co-exist—information which led FHWA to revise its use determinations for the Seashore. Thus, the Pamlico Sound Bridge Corridor must be analyzed as a feasible and prudent avoidance alternative under Section 4(f).

FHWA completed a feasible and prudent analysis for the Pamlico Sound Bridge Corridor and considered the factors suggested by the USDOJ in their FEIS comments. This evaluation of the Pamlico Sound Bridge Corridor as a Feasible and Prudent Avoidance Alternative under Section 4(f) of the Department of Transportation Act is located in Appendix G.

FHWA determined that the Pamlico Sound Bridge Corridor is not a feasible and prudent avoidance alternative to using the Refuge because the cost of all of the Pamlico Sound Bridge Corridor alternatives would be of extraordinary magnitude in consideration of the funding available to the NCDOT to operate, improve and maintain its State highway system. To summarize the detailed analysis contained in Appendix G, implementation of any of the Pamlico Sound Bridge Corridor alternatives would require a single construction phase costing between \$942.9 million and \$1.441 billion (2006 dollars). The project could not be financed by phasing construction over a fifty year period because it consists of a single, 17.5 mile long bridge that would

have to be built in one phase. Funding a 17.5-mile bridge would create a unique maintenance problem of extraordinary magnitude for NCDOT as it would have to defer much needed improvements on the remainder of the State highway system in North Carolina for a significant period of time. The Pamlico Sound Bridge Corridor would also have severe adverse impacts to the public's access to the Refuge. Important in this determination is the historical record that shows that throughout the history of the Seashore and Refuge, NC 12 has been operated and maintained in the Seashore and the Refuge while at the same time protecting the important historic features and attributes of the Refuge. Therefore, in this evaluation, the Pamlico Sound Bridge Corridor alternatives are not carried forward as detailed study alternatives because they are not feasible and prudent avoidance alternatives.

Conclusion

Based on the analysis and determinations from the DEIS, SDEIS, SSDEIS, FEIS/Final Section 4(f) Evaluation, and this Revised Final Section 4(f) Evaluation, there is no feasible and prudent avoidance alternative to the use of the Section 4(f) property needed to construct the proposed action.

Least Overall Harm Analysis

The FEIS/Final Section 4(f) Evaluation established that, due to the extensive size and location of properties protected by Section 4(f) in the Bonner Bridge project area, all feasible and prudent alternatives would use Section 4(f) property. There is no feasible and prudent avoidance alternative for this project. In response to comments from the USDOJ on the Final Section 4(f) Evaluation, FHWA reconsidered whether the Pamlico Sound Bridge Corridor is a feasible and prudent avoidance alternative but found that it is not (See Appendix G and earlier discussion above). When FHWA determines there is no feasible and prudent avoidance alternative, the Section 4(f) regulations require FHWA to identify, from among the remaining alternatives using Section 4(f) property, the alternative that causes the "least overall harm." The Section 4(f) regulations, 23 CFR 774.3(c), specify that the alternative that causes the least overall harm is determined by balancing seven specific factors. These factors are as follows:

1. the ability of the alternatives to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
2. the relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
3. the relative significance of each Section 4(f) property;
4. the views of the official(s) with jurisdiction over each Section 4(f) property;
5. the degree to which each alternative meets the purpose and need for the project;
6. after reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
7. substantial differences in costs among the alternatives.

What Did the FEIS/Final Section 4(f) Evaluation Find?

The FEIS/Final Section 4(f) Evaluation contained a least overall harm analysis that considered each of the factors listed above for every alternative. The analysis considered the Pea Island National Wildlife Refuge to be the most significant of the various Section 4(f) properties within the project area because of its multiple functions as a wildlife refuge, as a historic property and as part of the Cape Hatteras National Seashore. After balancing the various factors, the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative was the alternative identified as causing the least overall harm.

The Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative was thought to cause the least overall harm because it would elevate NC 12 from an at-grade road onto a high structure at all of the locations (totaling approximately eleven miles) where future shoreline erosion is predicted to threaten the road by 2060 -- thereby staying within the existing road easement. In some locations this meant that NCDOT would be building bridges expected to be standing in the Atlantic Ocean by 2060.

Since staying within the existing road easement would avoid a physical take of additional Refuge property; would not be subject to a compatibility determination under the National Wildlife Refuge System Administration Act; and would allow natural shoreline processes to take place, the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative was thought not to substantially impair any of the important activities, features, or attributes of the Refuge. Thus, based upon the information at that time, the Final Section 4(f) Evaluation concluded that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would cause the least overall harm.

How Do the Changes Described in this Revised Final Section 4(f) Evaluation Affect the Least Overall Harm Analysis?

Several changes previously explained in this Section 4(f) Evaluation are relevant to the least overall harm analysis:

- The Pamlico Sound Bridge Corridor was determined not to be a feasible and prudent avoidance alternative. Therefore, the revised least overall harm analysis does not include the Pamlico Sound Bridge Corridor.
- New information was uncovered about historical vehicular access across the project area and the concurrent and joint planning and development of the road, Seashore and Refuge. This information led FHWA to reconsider its previous emphasis on staying within the current road easement above all other considerations.
- Adverse comments submitted in response to the FEIS/Final Section 4(f) Evaluation and subsequent additional consultation with the officials with jurisdiction indicated that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge did not avoid adverse impacts to the Refuge. The comments and additional consultation led NCDOT and FHWA to reconsider the effect on the Refuge of building lengthy, elevated ocean bridges.
- Modifications to several alternatives were implemented in response to comments received on the Final Section 4(f) Evaluation that lessen the adverse impacts to the Rodanthe Historic District and the Chicamacomico Life Saving Station. With the harm minimization modifications at these properties, there is now no difference in impacts expected to these two historic properties. The Parallel Bridge Corridor alternatives are now substantially equal with respect to these properties.
- Additional consultation with the project Merger Team led NCDOT and FHWA to reconsider the need to make final decisions now, based on long-range predictions of storms and shoreline erosion, for all future phases of the project. This was due to the uncertainty as to when the later construction phases would be needed. A proposal by EPA to only commit to taking the immediately needed action at this time—replacement of the structurally deficient Bonner Bridge, with a phased decision-making process for assessing and approving later actions in the project area—minimizes harm to the Refuge by giving the project sponsors the opportunity to review and incorporate new analysis prior to commencement of each phase.

These changes affect FHWA's analysis of several of the least overall harm factors, and result in a new conclusion. Discussion is contained in the sections below to address each of the factors and provide the basis for the revised determination of the alternative that causes least overall harm.

Factor #1: The ability of the alternatives to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property)

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative was developed in response to a proposal from EPA to delay the decision-making for the later phases of this fifty-year long project until a future point in time when coastal conditions affecting NC 12 are better known. Although the future conditions have been predicted using the best available scientific models, there is inherent uncertainty involved in predicting the exact timing and location of shoreline changes of a coastal barrier island in the future. Because the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative includes firm commitments to study and mitigate the future environmental conditions prior to making decisions for the later phases, it provides the best opportunity to mitigate the impacts to the Section 4(f) properties in the project area.

With respect to Phase I, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would have substantially equal impacts after mitigation as the other Parallel Bridge Corridor alternatives. Phase I of the current Preferred Alternative (Parallel Bridge Corridor with NC 12 Transportation Management Plan) and Phase I of all other Parallel Bridge Corridor alternatives are very similar. At the northern end of the project, on Bodie Island, the alternatives are identical. They remain identical over the Oregon Inlet channel. Upon entering Hatteras Island, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative is located approximately 216.5 feet further west of NC 12. The Oregon Inlet termini for the various Phase I alternatives are depicted in Appendix I.

The following alternatives all have their southern termini located just south of SR 1257: the Preferred Alternative, both Parallel Bridge Corridor with Phased Approach Alternatives and the Parallel Bridge Corridor with Nourishment Alternative. The Parallel Bridge Corridor with Road North/Bridge South and the Parallel Bridge Corridor with All Bridge Alternatives enter Hatteras Island farther west than the Preferred Alternative, requiring the use of more property from the Refuge. The Parallel Bridge Corridor with Road North/Bridge South and Parallel Bridge Corridor with All Bridge Alternatives would also require a longer extension into the Refuge before tying into the existing easement. All alternatives have Phase I returning to ground level and tie-in to the existing road alignment at grade.

The approximately 216.5 foot shift west with the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative would relocate approximately 2.91 acres of the existing road easement to an adjacent area of the Refuge, which is considered a use under Section 4(f). An additional approximately 0.17 acre area would be required in order to maintain safe vehicular access to the Refuge parking lot that provides parking for Refuge visitors participating in recreational fishing activities offered at Oregon Inlet. Maps depicting these impacts are included in Appendix E. For comparison, Phase I of the Parallel Bridge Corridor with Road North/Bridge South Alternative would use approximately 5.3 acres of the Refuge and Phase I of the Parallel Bridge Corridor with All Bridge Alternative would use approximately 6.1 acres of the Refuge. While Phase I of the Parallel Bridge Corridor with Phased Approach and Nourishment Alternatives would be built within the existing easement, these alternatives would have such severe proximity impacts on the historic landscape that there would be a constructive use of the Refuge.

Phase I of the Preferred Alternative impacts an area that includes relatively lower-quality wetlands. The additional wetland impacts would be mitigated as required by the environmental permitting process. The impacted area does not contain habitat used by any of the endangered species known to exist on the Refuge. The additional use of Refuge property would be minimized through conditions and/or stipulations that will be negotiated with the USFWS and incorporated into the new road easement. These may include measures such as contract specifications, research assistance, the return of easement land to the Refuge, capital improvements on the Refuge or any other reasonable measures that would benefit the Refuge. The Parallel Bridge Corridor with Road North/Bridge South and the Parallel Bridge Corridor with All Bridge Alternatives would impact more wetland and higher quality wetlands than the Preferred Alternative.

Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative also minimizes harm as compared to the other Parallel Bridge Corridor alternatives because it allows NCDOT to preserve public fishing access at Oregon Inlet, a recreational activity currently provided by the Refuge that was determined to be compatible with the Refuge mission in 2006. Because the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative can be constructed without building a temporary traffic maintenance bridge, NCDOT can commit to providing public fishing access both during and after construction (assuming the USFWS continues to permit recreational fishing). While the exact parameters of such access is a detail that could not be finalized prior to the final design engineering process, a general commitment would be included in the ROD to design the project in a manner that provides public fishing access. During construction, the contractor would be responsible for maintaining reasonable public access for fishing, with temporary limitations allowed when necessary to protect the safety of the public and/or the construction workers.

Another important benefit of avoiding a temporary traffic maintenance bridge is that traffic conditions during the construction period would be safer for the 5,400 to 10,900 vehicles that cross Bonner Bridge each day (FEIS p.1-4). This option would provide an approximately 220 foot separation between the existing Bonner Bridge and the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative. In addition, avoiding the need to construct the temporary traffic maintenance bridge would result in fewer temporary impacts to the Refuge from the temporary bridge.

Factor #2: The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection.

The only Section 4(f) property that would be used by any alternative is the Refuge (as a historic property). The harm to the Refuge (as a historic property) that would remain after mitigation is minimized is described below. The other Section 4(f) properties in the project area would incur proximity impacts from various alternatives, but would not be used within the meaning of Section 4(f).

Through the consultation process required by Section 106 of the National Historic Preservation Act, FHWA determined that all of the Parallel Bridge Corridor alternatives except for the Parallel Bridge Corridor with Nourishment Alternative would have an adverse effect on the Refuge. The SHPO concurred in the determination. The adverse effect determination is based in part on the alternatives requiring a bridge height of up to 33 feet in various portions of the historic landscape that would alter the naturalized setting enhanced by the Civilian Conservation Corps in the 1930s, and also due to impacts on specific elements of the constructed landscape such as the historic ponds (as a result of possible road relocations). The adverse effects are mitigated through the measures documented in the draft Programmatic Agreement located in Appendix F. While the Parallel Bridge Corridor with Nourishment Alternative would avoid the adverse effect on the Refuge, it would have a use of Refuge property under Section 4(f) due to the placement of sand on the beaches.

It is not possible to precisely quantify or qualify the extent of remaining adverse effects to the Refuge after mitigation, due to the deferred decision-making for later phases of the project with the preferred Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative. These uncertainties are accounted for through a draft Programmatic Agreement pursuant to Section 106 of the National Historic Preservation Act (see Appendix F). The purpose of the Programmatic Agreement is to set forth the agreed upon treatment and mitigation of harm for Phase I, and the agreed upon process for evaluating, treating, and mitigating harm prior to FHWA's approval of later phases of action. Although the Section 106 regulations permit a Programmatic Agreement to defer the identification of historic properties for future phases of a project, in this case NCDOT has completed the identification of properties protected under Section 4(f) for the entire project area. Because the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative includes firm commitments to study and mitigate the future environmental conditions prior to making decisions for the later phases, it provides the best opportunity to mitigate the impacts to the Section 4(f) properties in the project area.

Factor #3: The relative significance of each Section 4(f) property

The FEIS/Final Section 4(f) Evaluation identified the Refuge/Seashore on Hatteras Island as the most significant Section 4(f) properties. Due to the determination of concurrent and joint planning and development between the Seashore and the transportation infrastructure, coupled with the determination that the Refuge (as a historic property) is the only Section 4(f) property that will be used, the Refuge remains the most significant Section 4(f) property affected by this project.

Factor #4: The views of the official(s) with jurisdiction over each Section 4(f) property

As described above, following the FEIS/Final Section 4(f) Evaluation, additional comments were received and additional consultation occurred with the officials with jurisdiction over the Section 4(f) properties in the project area. The SHPO indicated its opinion that the formerly preferred Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative would substantially impair the integrity of the historic Refuge. This opinion was directly tied to the extensive high bridging proposed with this alternative.

As part of the Merger Team, the SHPO actively participated in the discussions over the past year that led to the development of the preferred Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative. As a result, the SHPO is expected to sign an amended Concurrence Point #3 (selection of Preferred Alternative/Least Environmentally Damaging Practicable Alternative) identifying the Parallel Bridge Corridor with NC 12 Transportation Management Plan as the Preferred Alternative/Least Environmentally Damaging Practicable Alternative. Furthermore the SHPO and the ACHP have been consulted on the new Preferred Alternative and are expected to sign the draft Programmatic Agreement included in Appendix F to resolve its adverse effects pursuant to Section 106 of the National Historic Preservation Act. The draft Programmatic Agreement will be finalized prior to the ROD.

There are two Federal agencies (USFWS & NPS) under the USDOJ that manage Federal lands along the project corridor. The USFWS has indicated that it has concerns with the Draft Partnership Agreement (Appendix H) and is in the process of developing comments and suggesting revisions. The NPS has indicated that an amended Merger Team concurrence form is the appropriate mechanism for documenting the apparent decision at the May 2009 meeting to move forward with Phase I of the project. NPS also stated they see potential value for developing an interagency agreement in the future, if there are coordination functions that cannot be satisfactorily addressed under the Merger Team process. An important feature with the Parallel Bridge Corridor with NC 12 Transportation Management Plan is that it meets the criteria identified in former Secretary of Interior Dirk Kempthorne's July 2006 letter, which states "*I believe that the best way to proceed would be to separate the replacement of the Bonner Bridge ...from the more difficult and less urgent issues of the realignment of the road...*".²⁷ Prior to the ROD, NCDOT and FHWA will continue to consult and coordinate with the USFWS and NPS to address their concerns.

FHWA is circulating this Revised Final Section 4(f) Evaluation to provide the resource agencies and the public an opportunity to review and comment. All comments received will be reviewed and taken into account prior to the approval of the use of any Section 4(f) property in the ROD.

Factor #5: The degree to which each alternative meets the purpose and need for the project

There is no change in the analysis of this factor. All of the alternatives being compared in this least overall harm analysis, including the new Preferred Alternative, would meet the purpose and need for the project.

Factor #6: After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f)

The Final Section 4(f) Evaluation highlighted relocations, economic impacts, and visual impacts, and incorporated other impact discussions within the FEIS by reference. The Parallel Bridge Corridor alternatives that included nourishment were thought to be favored by this factor, with the remaining alternatives being substantially equal. This determination was primarily due to visual impacts in Rodanthe that have since been minimized through design modifications. Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan is expected to have similar impacts to resources not protected by Section 4(f) as the other Parallel Bridge Corridor alternatives. It is not possible to precisely quantify or qualify the extent of adverse impacts to resources not protected by Section 4(f) for the later phases of the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative; however, Because the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative includes firm commitments to study and mitigate the future environmental conditions prior to making decisions for the later phases, it provides the best opportunity to mitigate the impacts to the Section 4(f) properties in the project area.

²⁷ FHWA, Final Environmental Impact Statement and Final Section 4(f) Evaluation, NC 12 Replacement of the Herbert C. Bonner Bridge, Volume 2, September 17, 2008, Appendix A

Factor #7: Substantial Differences in Costs among the Alternatives

The estimated cost of the new Preferred Alternative in comparison to the other alternatives is shown in Table 4 (Total Highway Cost of the Alternatives Through 2060) and in Table 5 (Phase I Estimated Cost to Replace Bonner Bridge).

Table 4 shows that the total highway, end-to-end, cost of the project through 2060 ranges from \$602 million to \$1.171 billion for the low estimate to \$740 million to \$1.524 billion for the high estimate (costs are presented in 2006 dollars). The least expensive end-to-end alternative is the Road North/Bridge South Alternative, with the Phased Approach/Rodanthe Nourishment being the most expensive. The Preferred Alternative, Parallel Bridge Corridor with NC 12 Transportation Management Plan, incorporates costs from all the Parallel Bridge Corridor Alternatives since this alternative does not make a decision about the future phases at this time. Hence, there is less certainty in the total end-to-end cost estimate for this alternative compared to the others.

Table 5 provides cost estimates for Phase I of each alternative. The Parallel Bridge Corridor with NC 12 Transportation Management Plan (Preferred Alternative) has the lowest estimated cost range, from a low of \$265 million to a high of \$315 million. This is due to the following reasons:

- Phase I of the Preferred Alternative is less expensive than the Parallel Bridge Corridor with Road North/Bridge South and the Parallel Bridge Corridor with All Bridge Alternatives because these two alternatives are located up to 500 feet west of the existing easement. A connection would be required to tie the end of the Phase I bridge to the roadway within the existing easement. This connection would extend further south than the tie-in for the Preferred Alternative.
- Phase I of the Preferred Alternative is less expensive than the Parallel Bridge Corridor with Phased Approach Alternatives as well as the Parallel Bridge Corridor with Nourishment Alternative because it would not require the construction of a temporary bridge, ramps on Hatteras Island, and other maintenance of traffic costs. These additional costs are necessary to since all work would be confine the existing 100-foot easement.

Therefore, the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative is the least expensive alternative for Phase I, and (along with the Parallel Bridge Corridor with Road North/Bridge South and the Parallel Bridge Corridor with All Bridge Alternatives) provides better maintenance of traffic during construction than both Phased Approach Alternatives and the Nourishment Alternative.

Table 4: Total Highway Cost of the Alternatives Through 2060

Alternative (in 2006 dollars)	Low Estimate	High Estimate
Nourishment	\$672 million	\$970 million
Road North/Bridge South	\$602 million	\$740 million
All Bridge	\$1.108 billion	\$1.435 billion
Phased Approach/Rodanthe Bridge	\$1.171 billion	\$1.497 billion
Phased Approach/Rodanthe Nourishment	\$1.149 billion	\$1.524 billion
NC 12 Transportation Management Plan*	\$602 million	\$1.524 billion

*The costs shown for the NC 12 Transportation Management Plan Alternative incorporate the lower and upper limits of total cost for the other Parallel Bridge Corridor Alternatives in order to provide a reasonable prediction of possible costs for the future phases of action. Since this alternative does not make a decision about the future phases at this time, there is less certainty in the total cost estimate for this alternative compared to the others.

Table 5: Phase I Estimated Construction Cost to Replace Bonner Bridge

Alternatives (in 2006 dollars)	Low Estimate	High Estimate
Nourishment	\$312 million	\$368 million
Road North/Bridge South	\$284 million	\$346 million
All Bridge	\$285 million	\$347 million
Phased Approach/Rodanthe Bridge	\$312 million	\$368 million
Phased Approach/Rodanthe Nourishment	\$312 million	\$368 million
NC 12 Transportation Management Plan (Preferred)	\$265 million	\$315 million

Conclusion

Based on a consideration and balancing of the seven factors above, FHWA and NCDOT have determined that the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (the Preferred Alternative) is the alternative that causes the least overall harm. The major factor in determining that the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative causes the least overall harm is the flexibility it allows in determining future phases. The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative recognizes that the project area is complex and that the shoreline is constantly changing. It also recognizes that the ability to predict the effect of future storms on the project area is extremely difficult to quantify, and that the various alternatives may need to be reassessed in the future as the shoreline and other landscape features change between 2009 and 2060. FHWA and NCDOT will coordinate with the officials with jurisdiction over the Section 4(f) properties in the project area and with the Merger Team agencies to determine the best solution to address future actions along the project corridor. This interagency collaboration will lead to FHWA and NCDOT implementing actions that will cause the least overall harm to Section 4(f) resources for future phases of this project.

All Possible Planning to Minimize Harm

Under 23 CFR 774.3(c)(2), the alternative selected as causing the least overall harm must also include “all possible planning...to minimize harm to Section 4(f) property.” According to 23 CFR 774.17, all possible planning may include design modifications, replacement, or monetary compensation for parks, recreation areas, or wildlife refuges. Common to all Section 4(f) properties, the Merger Process and the Partnership Agreement are intended to serve as a framework for decision-making for the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative. They also serve as a framework for identifying all possible planning to minimize harm. This framework will utilize coastal and natural resource monitoring of area conditions to identify specific issues, involving relevant stakeholders in identifying the optimal solutions. As a result, this alternative, more so than any other alternative, allows for implementation of strategies that will minimize harm to the Section 4(f) resources. Other property-specific minimization of harm efforts include:

Cape Hatteras National Seashore:

- Related to the need for Seashore property on Bodie Island (approximately 6.3 acres [2.6 hectares]), FHWA and DOT would restore and return the 6.3 acres (2.6 hectares) of Seashore currently used by Bonner Bridge. After mitigation, the Seashore would not lose any net area with the Preferred Alternative.
- The NPS has been engaged in the development of the new Preferred Alternative through participation as a Merger Team member.
- The NPS is identified as a signatory to the proposed Partnership Agreement (Appendix H). Their participation (through the Partnership Agreement and/or through participation on the Merger Team) will assist in future decision-making that lessens harm to the Seashore.
- Access to Seashore facilities on Bodie Island will be maintained during construction. The details will be worked out with the NPS during the design process.

- Construction specifications to minimize impacts to the campgrounds and the Oregon Inlet Fishing Center during construction will be developed with the NPS during final design.
- The NPS has requested²⁸ NCDOT to consider wetland mitigation related to highway alignment changes north of the current Bonner Bridge. Specifically, the NPS has requested wetland enhancement that would include control of exotic plants in wetlands on Bodie Island. As suggested in the NPS letter, NCDOT will work with the NPS to develop an agreed-upon Wetland Mitigation Plan prior to implementation of mitigation.
- Greensheet Commitment #2. *“Bicycle Accommodations. The Seashore management plan supports the use of bicycles along NC 12. All bridges in both replacement bridge corridors (including the Preferred Alternative) would have 8-foot (2.4-meter) wide shoulders that would be safer for bicycle and pedestrian traffic than Bonner Bridge’s 2-foot (0.6-meter) wide shoulders. In addition, a bicycle-safe bridge rail on the bridges also would provide increased safety for bicyclists. New roadway would have 4-foot (1.2-meter) paved shoulders, which would be safer for use by bicycle and pedestrian traffic than existing NC 12’s unpaved shoulders.”*
- Greensheet Commitment #9. *“Disposal of Dredged Material. Prior to construction, during the USACE permit preparation process, the FHWA and the NCDOT would work with appropriate environmental resource and regulatory agencies to identify the characteristics of dredged material from bridge construction in open water and develop a disposal plan that would minimize harm to natural resources. The appropriate location for dredged material disposal would be determined based on the character of the materials dredged, the availability of disposal sites, and coastal conditions near the time of construction. In addition, the terms and conditions outlined in the Biological and Conference Opinions (USFWS, 2008) related to piping plovers specify that “all dredge spoil excavated for construction barge access must be used to augment either existing dredge-material islands or to create new dredge-material islands for use by foraging plovers. This must be accomplished as per the specifications of the North Carolina Wildlife Resources Commission.”*

Pea Island National Wildlife Refuge:

- The conceptual design for Phase I maintains access to the Refuge parking lot and maintains access for public fishing opportunities.
- Approximately 3.27 acres of the existing easement is potentially available to be returned to the USFWS. Additional coordination will occur to determine if the USFWS wants this land to be returned.
- The USFWS has been engaged in the development of the new Preferred Alternative through participation as a Merger Team member.
- The USFWS is identified as a signatory to the Partnership Agreement (Appendix H). Their participation (through the Partnership Agreement and/or through participation on the Merger Team) will assist in future decision-making that lessens harm to the Refuge.
- Greensheet Commitment # 4. *“Sedimentation and Erosion Control. All waters in the project area are classified as SA waters (Class A salt waters) with a supplemental classification of High Quality Waters (HQW). The most stringent application of the Best Management Practices (BMPs) is expected where highway projects affect receiving waters of special designation, such as HQW. Also, impacts to adjacent areas of SAV and/or wetlands should be minimized. Therefore, sedimentation and erosion control measures shall adhere to the Design Standards in Sensitive Watersheds [15A NCAC 04B.0124(b)-(e)]. Prior to construction, the design-build contractor will submit the proposed sediment and erosion control plans for each stage of construction to the NCDOT and permitting agencies for review.”*
- Greensheet Commitment #9. *Disposal of Dredged Material. Prior to construction, during the USACE permit preparation process, the FHWA and the NCDOT would work with appropriate environmental resource and regulatory agencies to identify the characteristics of dredged material from bridge construction in open water and develop a disposal plan that would minimize harm to natural resources. The appropriate location for dredged material disposal would be determined based on the character of the materials dredged, the availability of disposal sites, and coastal conditions near the time of*

²⁸ Letter dated September 16, 2009 from NPS to NCDOT

construction. In addition, the terms and conditions outlined in the Biological and Conference Opinions (USFWS, 2008) related to piping plovers specify that “all dredge spoil excavated for construction barge access must be used to augment either existing dredge-material islands or to create new dredge-material islands for use by foraging plovers. This must be accomplished as per the specifications of the North Carolina Wildlife Resources Commission.”

- Greensheet Commitment #23. “Seabeach Amaranth. Since the favored habitat of the seabeach amaranth is highly ephemeral, a survey of the project area would be conducted for the habitat of this species at least one year prior to initiating bridge construction activities. It would occur as needed for each construction phase of the Phased Approach/Rodanthe Bridge Alternative (Preferred).”
- Greensheet Commitment #24. “Piping Plover. The NCDOT will implement the following nondiscretionary measures that include the terms and conditions outlined in the Biological and Conference Opinions (USFWS, 2008):
 - a. All construction equipment and personnel must avoid all bird closure areas within the Seashore and Refuge. All future routine maintenance activities of bridge structures that would occur within or adjacent to current or future plover nesting areas must occur outside the nesting season (April 1 to July 15).

All future repair work on bridge structures that would occur within or adjacent to current or future plover nesting areas must occur outside the nesting season (April 1 to July 15) unless emergency or human safety considerations require otherwise. In this event, the area must be surveyed for nesting plovers and avoided to the extent possible.

b. During the construction of Phases II, III and IV of the Phased Approach/Rodanthe Bridge Alternative (Preferred), keep all construction equipment and activity within the existing right-of-way.

Do not moor any construction barges within 300 feet (91.4 meters) of the following islands: Green Island, Wells Island, Parnell Island, Island MN, Island C, the small unnamed island immediately east of Island C, Island D, and Island G (see Figure 1 in the Biological and Conference Opinions in Appendix E).

c. All dredge spoil excavated for construction barge access must be used to augment either existing dredge-material islands or to create new dredge-material islands for use by foraging plovers. This must be accomplished as per the specifications of the North Carolina Wildlife Resources Commission. The point of contact is Sue Cameron at 910-325-3602. If the dredge material is used outside the current defined action area, the action area is assumed to be expanded to cover the beneficial placement of the material.

d. To the maximum extent practical, while ensuring the safety of the traveling public, limit or avoid the use of road signs or other potential predator perches adjacent to plover nesting or foraging areas. Where signs or other structures are necessary, determine if alternative designs would be less conducive for perching on by avian predators (gulls, crows, grackles, hawks, etc.). For example, minimize or avoid the use of large cantilever signs in favor of smaller and shorter designs.

In addition, the project will incorporate the most current BMPs to reduce habitat degradation from stormwater runoff pollution as a conservation measure. Phase I of the project will be built at least 125 feet (38.1 meters) farther west of the Bonner Bridge and currently occupied piping plover habitat. Temporary facilities such as haul roads that affect proposed piping plover critical habitat will be removed as soon as possible.”

- Greensheet Commitment #25. “*Sea Turtles (green sea turtle, leatherback sea turtle, and loggerhead sea turtle). The NCDOT will implement the following nondiscretionary measures that include the terms and conditions outlined in the Biological and Conference Opinions (USFWS, 2008):*
 - a. All construction equipment and personnel must avoid all marked sea turtle nests. Construction material and equipment staging areas must not be located seaward of the artificial dune.*

All future routine maintenance activities of bridge structures that would occur within or adjacent to current or future sea turtle nesting habitat, and which would require vehicles or equipment on the beach or the use of night lighting (excluding navigation lights required by the US Coast Guard), must occur outside the nesting season (May 1 to November 15).

All future repair work of bridge structures that would occur within or adjacent to current or future sea turtle nesting habitat, and which would require vehicles or equipment on the beach or the use of night lighting (excluding navigation lights required by the US Coast Guard) must occur outside the nesting season (May 1 to November 15) unless emergency or human safety considerations require otherwise. In this event, the area must be surveyed for sea turtle nests and avoided to the extent possible.

b. Provide an opportunity for the USFWS or an USFWS designee to educate construction contractor managers, supervisors, foremen and other key personnel and resident NCDOT personnel with oversight duties (division engineer, resident engineer, division environmental officer, etc.) as to adverse effects of artificial lighting on nesting sea turtles and hatchlings, and to the importance of minimizing those effects.

c. During turtle nesting season (May 1 to November 15), use the minimum number and the lowest wattage lights that are necessary for construction.

During turtle nesting season, portable construction lighting must be of the low-pressure sodium-vapor type.

During turtle nesting season, utilize directional shields on all portable construction lights, and avoid directly illuminating the turtle nesting beach at night.

During turtle nesting season, all portable construction lights must be mounted as low to the ground as possible.

During turtle nesting season, turn off all lights when not needed.

d. For Phases II, III and IV of the Phased Approach/Rodanthe Bridge Alternative (Preferred), on the ocean side, design the bridge structure in a manner which will shield the beach on the east side from direct light emanating from passenger vehicle headlights.

For the small portion of Phase I over land on Hatteras Island, retrofit the bridge structure at the time that Phase II connects with Phase I. The specific design of the bridge will be developed in consultation with the USFWS prior to re-evaluation of the environmental document for Phase II.

e. Avoid retrofitting the bridges and approach roads with permanent light fixtures in the future (excluding navigation lights required by the US Coast Guard).

In addition, NCDOT does not anticipate the use of explosives during construction or demolition of the existing bridge. The NCDOT contractor will use pipeline or clamshell dredging, rather than a hopper dredge to minimize effects to sea turtles. No permanent light fixtures will be installed on the bridge or the approaches (with the exception of navigation lights as required by the US Coast Guard).”

- A Section 106 Programmatic Agreement (Appendix F) will be signed by the FHWA, State Historic Preservation Officer, and the Advisory Council on Historic Preservation. This Programmatic Agreement (to be finalized prior to the ROD) will resolve adverse effects to this historic property through mitigation measures specified in the draft Programmatic Agreement. Excerpts from this draft Programmatic Agreement pertinent to the Refuge include:

“I. Parallel Bridge Corridor Minimization/Mitigation Measures

In order to facilitate planning and streamline development of plans for the Undertaking/Phase I, NCDOT shall, in consultation with the consulting parties, develop the following historic contexts to aid in historic planning for the parallel bridge corridor and possible heritage tourism initiatives.

A. Ethnographical Context

- 1) NCDOT will work with the USFWS, SHPO, and NPS to compile an ethnographical context of the men and women that lived and worked in the general project area during the late nineteenth and early twentieth centuries. The context will focus on the area’s watermen, fishermen, Civilian Conservation Corps, members of gun or hunting clubs, and life saving station employees. NCDOT will be responsible for the following tasks.

 - a. Gathering oral histories from surviving members of these groups or families.*
 - b. Conducting primary and secondary research regarding the activities of these groups.*
 - c. Compiling documentary materials and digitizing images.**
- 2) NCDOT will produce a digital document which contains the recorded oral histories and documentary materials. NCDOT shall afford the USFWS, SHPO, and NPS an opportunity to review and comment on the draft digital document. If no comments are received from the USFWS, SHPO, and NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the document. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments. NCDOT shall deposit copies of the documentation with USFWS, NPS, SHPO, and the Historic Architecture Group of NCDOT within three (3) years of the letting of the Phase I contract.*

B. Context for Tourism

- 1) NCDOT will work with the USFWS, SHPO, Aquariums, CHA, and NPS to compile a context for the Coast Guard and Life Saving stations, wildlife refuges, and other state and federal "outposts" on North Carolina’s Outer Banks.*
- 2) NCDOT will produce a digital document which synthesizes the histories and documentary materials associated with the various sites.*
- 3) In addition, NCDOT will prepare the artwork and text for a brochure that could be used by travelers and residents as a guidebook to locate and understand the significance of the various sites and their place in history of the Outer Banks and the state.*
- 4) NCDOT shall afford the USFWS, SHPO, Aquariums, CHA, and NPS an opportunity to review and comment on the draft brochure. If no comments are received from the USFWS, SHPO, Aquariums, CHS, and NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the brochure. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.*
- 5) NCDOT shall deposit copies of the documentation and brochure artwork and text with USFWS, SHPO, Aquariums, CHA, and NPS within three (3) years of the letting of the Phase I contract and will provide 50,000 brochures to tourism organizations such as Historic Albemarle, Coastal Guide, NC Northeast Commission, Outer Banks Visitors Bureau, and state visitor centers.*

II. Pea Island National Wildlife Refuge

A. Bridge Design

Currently, the bridge rail is proposed as a 32-inch concrete parapet with 2-bar, metal rail atop the parapet. Prior to completion of the final design for the Undertaking/Phase I bridge structure within the Pea Island National Wildlife Refuge, NCDOT shall afford the SHPO, USFWS, and NPS an opportunity to review and comment on the plans and specifications for the parapet and bridge rail for NC 12. If no comments are received from the SHPO, USFWS, or NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the proposed design. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.

B. Management of NC 12

NCDOT, in consultation with FWHA, USFWS, NPS, SHPO, and the North Carolina Coastal Geological Cooperative, will develop and implement sustainable techniques to protect NC 12 and subsequently ameliorate the adverse impacts to the Refuge and Pea Island.

C. Copies of Technical Reports

NCDOT will provide the USFWS and NPS with copies of the cultural resource technical reports previously produced by NCDOT to describe the historic architecture, historic landscape, terrestrial archaeology, and underwater archaeology investigations in the Undertaking/Phase I's Area of Potential Effects. NCDOT will deliver this information to USFWS and NPS within six (6) months of signing the PA.

D. Signs

NCDOT will provide and install signs within the Refuge, at locations coordinated with the USFWS and NPS, to direct people to the visitor's center and points of historical interest, including prominent Civilian Conservation Corps installations, within three (3) years of the letting of the Phase I contract.

E. Exhibits and Kiosks

- 1) NCDOT will provide the USFWS and NPS with information about the historic significance and structural importance of Civilian Conservation Corps' work efforts in the Refuge for use in exhibits and kiosks that will be made available to visitors.
- 2) NCDOT will design and produce a custom kiosk at a location specified by the USFWS within three (3) years of the letting of the Phase I contract. The kiosk, like the signs mentioned in Stipulation C above, will be installed or built in a manner consistent with USFWS or the Refuge's Visitor Service Facility Standards. More specifically, NCDOT will research and design the interpretive panels; design the structure, provide funding for fabrication of the kiosk, and install the kiosk at the site. Prior to fabrication of the interpretive panels and kiosk structure NCDOT shall afford the SHPO, ACHP, and USFWS an opportunity to review and comment on the panels and structure. If no comments are received from the SHPO, ACHP, or USFWS within 30 days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the proposed design. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.
- 3) Once installed by NCDOT, it is the intention of USFWS to maintain the kiosks subject to the availability of appropriated funds". and

"IV. Context Sensitive Solutions

FHWA and NCDOT commit to utilizing the best practices and measures available at the time during the construction the Parallel Bridge and when implementing activities associated with Pea Island/NC 12 Transportation Management Plan to avoid and minimize all impacts to historic properties."

(former) Oregon Inlet US Coast Guard Station:

- A Section 106 Programmatic Agreement (Appendix F) will be signed by the FHWA, State Historic Preservation Officer, and the Advisory Council on Historic Preservation. This Programmatic Agreement (to be finalized prior to the ROD) will resolve adverse effects to this historic property through mitigation measures specified in the draft Programmatic Agreement. Excerpts from this draft Programmatic Agreement pertinent to the Station include:

“I. Parallel Bridge Corridor Minimization/Mitigation Measures

In order to facilitate planning and streamline development of plans for the Undertaking/Phase I, NCDOT shall, in consultation with the consulting parties, develop the following historic contexts to aid in historic planning for the parallel bridge corridor and possible heritage tourism initiatives.

A. Ethnographical Context

- 3) NCDOT will work with the USFWS, SHPO, and NPS to compile an ethnographical context of the men and women that lived and worked in the general project area during the late nineteenth and early twentieth centuries. The context will focus on the area’s watermen, fishermen, Civilian Conservation Corps, members of gun or hunting clubs, and life saving station employees. NCDOT will be responsible for the following tasks.
 - a. Gathering oral histories from surviving members of these groups or families.*
 - b. Conducting primary and secondary research regarding the activities of these groups.*
 - c. Compiling documentary materials and digitizing images.**
- 4) NCDOT will produce a digital document which contains the recorded oral histories and documentary materials. NCDOT shall afford the USFWS, SHPO, and NPS an opportunity to review and comment on the draft digital document. If no comments are received from the USFWS, SHPO, and NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the document. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments. NCDOT shall deposit copies of the documentation with USFWS, NPS, SHPO, and the Historic Architecture Group of NCDOT within three (3) years of the letting of the Phase I contract.*

B. Context for Tourism

- 6) NCDOT will work with the USFWS, SHPO, Aquariums, CHA, and NPS to compile a context for the Coast Guard and Life Saving stations, wildlife refuges, and other state and federal "outposts" on North Carolina’s Outer Banks.*
- 7) NCDOT will produce a digital document which synthesizes the histories and documentary materials associated with the various sites.*
- 8) In addition, NCDOT will prepare the artwork and text for a brochure that could be used by travelers and residents as a guidebook to locate and understand the significance of the various sites and their place in history of the Outer Banks and the state.*
- 9) NCDOT shall afford the USFWS, SHPO, Aquariums, CHA, and NPS an opportunity to review and comment on the draft brochure. If no comments are received from the USFWS, SHPO, Aquariums, CHS, and NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the brochure. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.*
- 10) NCDOT shall deposit copies of the documentation and brochure artwork and text with USFWS, SHPO, Aquariums, CHA, and NPS within three (3) years of the letting of the Phase I contract and will provide 50,000 brochures to tourism organizations such as Historic Albemarle, Coastal Guide, NC Northeast Commission, Outer Banks Visitors Bureau, and state visitor centers.*

III. (former) Oregon Inlet US Coast Guard Station

A. Parking Lot and Access Road

- 1) NCDOT will make improvements (clearing sand and paving) to the access road (SR 1257) and parking area, if NCDOT needs these areas for staging. If and when the (former) Oregon Inlet Coast Guard Station becomes a viable facility and is open to the public, NCDOT will maintain SR 1257 to the standards of the North Carolina Secondary Road System.*

- 2) *For the purposes of this PA, staging areas are defined as (1) the storage of equipment or materials that are needed for the construction/demolition of the bridge over the Oregon Inlet and (2) the placement of temporary offices or trailers.*
- 3) *NCDOT shall insure access to the (former) Oregon Inlet Coast Guard Station during construction of the Undertaking (Phase I).*

B. Signs

NCDOT will provide and install roadside signs to direct visitors to the station from Northbound NC 12 and Southbound NC 12 within one (1) month of the replacement bridge over Oregon Inlet being open to traffic.

C. Exhibits and Kiosks

NCDOT will provide Aquariums with information about the historic significance and structural importance of the Station for use in exhibits and kiosks, which will be made available to visitors. NCDOT will design and produce a custom kiosk at a location specified by Aquariums within three (3) years of the letting of Phase I of the project.

- 1) *More specifically, NCDOT will research and design the interpretive panels; design the structure, provide funding for fabrication of the kiosk, and install the kiosk at the site.*
- 2) *Prior to fabrication of the interpretive panels and kiosk structure NCDOT shall afford the SHPO, ACHP, and Aquariums an opportunity to review and comment on the panels and structure. If no comments are received from the SHPO, ACHP, or Aquariums within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the proposed design. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.*
- 3) *Once installed by NCDOT, Aquariums will maintain the kiosks.*

IV. Context Sensitive Solutions

FHWA and NCDOT commit to utilizing the best practices and measures available at the time during the construction the Parallel Bridge and when implementing activities associated with Pea Island/NC 12 Transportation Management Plan to avoid and minimize all impacts to historic properties.”

- *The SHPO has been engaged in the development of the new Preferred Alternative through participation as a Merger Team member.*

Rodanthe Historic District and Chicamacomico Life Saving Station:

- *Conceptual design modifications (Appendix C) were developed in order to minimize harm to these historic properties. Specifically, the southern endpoint of several alternatives was moved north of the historic district, which eliminated harm to these properties.*
- *The SHPO has been engaged in the development of the new Preferred Alternative through participation as a Merger Team member.*
- *The SHPO has requested to be engaged in the Partnership Agreement. Their participation will assist in future decision-making that lessens harm to these historic properties.*

Conclusion

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative proposes to proceed with the construction of Phase I of the Parallel Bridge Corridor as soon as possible. FHWA and NCDOT propose to use approximately 3.08 acres of the Pea Island National Wildlife Refuge. This use is a best estimate that may change based on the contractor’s final design. Following a ROD, the NCDOT will award a contract to a design-build contractor. The design-build contract will determine the exact alignment and pier placement for Phase I based on engineering design, construction techniques and coordination with the NCDOT, FHWA, NPS, USFWS and other environmental resource and regulatory agencies when developing the final design for the new Oregon Inlet bridge. The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative does not include any action at this time on Hatteras Island beyond the limits of Phase I. The study and selection of future actions on Hatteras Island beyond the limits of Phase I will be undertaken as follows:

When the coastal and environmental monitoring indicates a future problem for the transportation corridor, the Merger Team will convene for purposes of identifying an appropriate response strategy. Such response strategy(ies) will be culled from the alternatives currently studied (including the “No Action” Alternative as required by NEPA), as these represent the range of possible solutions. The Section 4(f) Evaluation will be reviewed to verify the status of Section 4(f) resources, the effect(s) of the proposed response strategies on the 4(f) resources, “use” determinations and, if necessary, a revised least overall harm analysis.

If a later phase of the Preferred Alternative requires the use of Section 4(f) property, additional Section 4(f) analysis would be undertaken prior to FHWA’s approval of the later phase. Thus, if FHWA approves the Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative, an express commitment will be made in the ROD to complete additional Section 4(f) analysis before all later phases of the project are implemented, if the later phase would use additional Section 4(f) property.

In addition, FHWA and NCDOT commit to coordinate with the USFWS-Pea Island National Wildlife Refuge and the NPS to develop a Partnership Agreement (or other mutually-agreed upon mechanism) to set up protocols to follow prior to NCDOT implementing future actions beyond Phase I.

These actions address transportation management through 2060 with a plan to monitor conditions on NC 12 and the affected environment and modify management actions so as to minimize the adverse impacts to the Refuge resources while maintaining NC 12 as a viable transportation facility. Future construction actions within the project corridor would be evaluated based on future conditions of resources in the project area in cooperation with the appropriate environmental regulatory and resource agencies and the public in a process stipulated in the Partnership Agreement.

Appendix A: FEIS/Final Section 4(f) Comments

Comments included in this Appendix are those received from the US Department of the Interior, the North Carolina State Historic Preservation Office and the Southern Environmental Laws Center.

Other comments were received for the FEIS, but did not relate to Section 4(f) issues and are not included here.



United States Department of the Interior

OFFICE OF THE SECRETARY
Washington, DC 20240



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PEP/NRM

ER 07/206

Gregory J. Thorpe, Ph.D.
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

The Department of the Interior (Department) has received the Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation for the **NC-12 Replacement of Herbert C. Bonner Bridge (No. 11) over Oregon Inlet, Dare County, North Carolina**. The FEIS identifies two replacement bridge corridors, the Pamlico Sound Bridge Corridor and the Parallel Bridge Corridor. Within each corridor are various alternatives. The Preferred Alternative (the Phased Approach/Rodanthe Bridge) is among the Parallel Corridor alternatives.

The Department and the Fish and Wildlife Service (FWS) have provided detailed comments on this project throughout the planning process; raising numerous concerns about the effects of Parallel Bridge Corridor alternatives (including the Preferred Alternative) on Pea Island National Wildlife Refuge (Refuge). While the FEIS does a better job of acknowledging our previously submitted comments, concerns still remain about the project and its potential impact to the Refuge. Rather than repeat those concerns here, the purpose of this letter is to succinctly state our views regarding the proposed project. Specific comments related to the Endangered Species Act of 1973 will be provided by the Service under separate cover.

Pea Island National Wildlife Refuge

Pea Island National Wildlife Refuge encompasses 5,834 acres of barrier island beach, dune, scrub, marsh, and open water habitat which support a diverse assemblage of Federal trust fish and wildlife resources. These include federally listed sea turtles and over 300 species of migratory birds. Given its location on a barrier island in the central portion of the Atlantic Flyway, the Refuge is of particular importance as a migratory stop-over and wintering site for numerous species of shorebirds, wading birds, waterfowl, passerines, and raptors. The Refuge is also prized for the wildlife-dependent recreational opportunities it provides to over one hundred thousand visitors per year. The Refuge is extremely important on a local, regional, national, and international basis for both migratory birds as habitat and for humans who value knowing the birds have high quality feeding and breeding habitat.

Currently, with NC-12 passing through the Refuge at grade over its entire 11.8-mile length, the Refuge has a predominantly natural character (in terms of both visual and acoustic qualities). As such, the existing road represents a relatively small intrusion on the quality of the wildlife viewing and photography activities of our many visitors. Similarly, while the existing road does adversely affect the wildlife resources and ecological processes of the Refuge, the current configuration represents the lowest possible level of such effects, while maintaining a paved transportation corridor through the Refuge.

Although an elevated roadway through the Refuge would allow for westward sand migration to proceed unabated, issues such as lighting and disorientation of sea turtle hatchlings, and shading of sea turtle and migratory bird nests that require open, sun-heated sand would increase. We recommend NCDOT fully address measures or plans to off-set these new issues on the Refuge.

Section 4(f) Evaluation

Section 4(f) of the Department of Transportation Act of 1966, as amended (49 U.S.C. 303), states that the U.S. Department of Transportation may not approve the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: there is no feasible and prudent alternative to the use of land from the property; and the action includes all possible planning to minimize harm to the property resulting from such use. Even though the information presented in the FEIS and Section 4(f) Evaluation is proposing a Parallel Bridge Corridor alternative, it still demonstrates that implementation of any of the Parallel Bridge Corridor alternative may violate section 4(f) because the Pamlico Sound alternative would appear to be feasible and prudent and would minimize harm to the Refuge (a section 4(f) property).

Though all alternatives have some form of 4(f) impact, the Preferred Alternative has far greater impacts in quantity and quality on lands protected by section 4(f). Based upon section 4(f) directives, park and refuge lands should not be used whenever there are feasible and prudent alternatives that would avoid or minimize harm to those lands. The NCDOT, in previous planning documents, has clearly demonstrated that the Pamlico Sound Bridge Corridor alternatives present feasible alternatives from an engineering standpoint. This reduces the analysis to the question of prudence, which seems to be only an issue of cost and visitor access. It was our understanding that throughout the planning process NCDOT indicated that although the Pamlico Sound Bridge Corridor alternative was more expensive initially, it would be comparable to the Parallel Bridge Corridor due to the extensive maintenance cost over the life of the project. We recommend an independent economic analysis of the alternatives be conducted because of the significant environmental effects and the fluctuating economics of the project.

There appears to remain a distinct possibility that the Preferred Alternative will require activities to occur outside the existing right-of-way, which would constitute either a permanent or temporary use of 4(f) properties. More importantly, we disagree that

implementation of the Preferred Alternate as proposed in the right-of-way would not constitute a "constructive use" of 4(f) property. The 4(f) evaluation presents NCDOT's and FHWA's conclusions regarding the effects of the Preferred Alternative on the Refuge in terms of noise, visual character, access, and ecology; all section 4(f) constructive uses. In each case, it is our opinion that the analysis understates the magnitude of these effects in order to reach a conclusion (page 5-18) that "...attributes of the Refuge would not be substantially impaired, and thus would not be a constructive use of the Refuge." As stated repeatedly by the Service and the Department of the Interior throughout the planning process, in particular the noise, visual character, and access on the Refuge would be impacted by construction and operation of a bridge alternative through the Refuge. It is our opinion that these impacts rise to the level of substantial impairment as described in section 4(f) regulation 23 CFR 774.15.

Noise: Noise resulting from vehicles traversing the elevated bridges would replace wind and surf as the prevailing sounds experienced by visitors and wildlife. Vehicles travelling on elevated structures such as bridges produce more tire-to-pavement noise than they do on an at-grade roadway. Also, exhaust noise will travel farther into the Refuge from an elevated point of origin. Pea Island National Wildlife Refuge was established in 1938 under an Executive Order to further the purposes of the Migratory Bird Conservation Act, and to serve "... as a breeding ground for migratory birds and other wildlife" Increased noise levels may negatively impact bird breeding adjacent to the new bridge structure.

Visual Character: The large, concrete bridges would replace dunes and water as the predominant visual features of the Refuge. We suggest that the FEIS plainly state that the Preferred Alternative would introduce a large elevated man-made structure (bridge) through the previously open vista on the Refuge landscape; causing negative impacts to the visual characteristics of the Refuge.

Access: The Refuge offers a Visitor's Center that provides access to hiking trails and indoor and outdoor viewing areas. The Preferred Alternative would elevate NC-12 onto a series of bridges. Once completed, these bridges would traverse all but 2.1 miles of the Refuge. The FEIS places considerable emphasis on the ability of the Phased Approach to provide paved-road access to the Refuge. However, the FEIS understates the fact that the Preferred Alternative would not provide any vehicular access to the Visitor's Center or the impoundments, which are two of the major destinations for Refuge visitors. Also overlooked in the FEIS is the quality of the visitor experience that would be provided under the Preferred Alternative and the effect it would have on visitation. While the FEIS notes that respondents to surveys indicated that most would continue to visit the Refuge whether or not paved access were provided, it is unclear if the respondents understood that under the Preferred Alternative the afforded access would be very limited, and the activities they traveled to the Refuge in which to engage (bird watching, nature photography, fishing) would be occurring adjacent to or under a bridge. As a result, even though the Preferred Alternative would nominally afford access to the Refuge, the Visitor's Center would no longer be available, and we anticipate that the quality of the visitor experience would be degraded to the point that

visitation may be reduced. This would represent a substantial loss to the American public.

Ecology: Over the project's life, ocean shoreline erosion predictions will place the complex of bridges next to and over the beach habitat. The shading effect from the bridges will affect nesting, foraging, and roosting habitat quality for some migratory birds – piping plover, American oystercatcher, least tern, black skimmer, and nesting habitat quality for sea turtles.

Section 4.7.6 of the FEIS, beginning on page 4-102, falls short of presenting a comprehensive analysis of project impacts on fish and wildlife resources inhabiting or using the Refuge and project area. Through careful selection and use of literature for general discussion of certain topics relative to impacts on wildlife from the project, there is a deflection of issues and concerns. For example the FEIS selectively cites literature regarding the minor effects of road-kill on wildlife species population demographics, and ignores literature that demonstrates the major effect road-kill has on species population demographics. Another point that should have been addressed is that some shorebirds move back and forth from the ocean beach to overwash fans or mudflats in the sound on a regular basis. The more often these species must fly near a highway, the greater the probability of their becoming a road-kill statistic. Elevating the roadway to a bridge 30-40 feet above grade within these areas of prime habitat will remove the road-kill potential from an at grade road, but it fails to mention that birds perch (sometimes en-masse) on bridge abutments, and when they land and take off, they will be doing so directly into bridge traffic. Some forms of mitigation have been shown to reduce avian mortality along bridges but this type of information is not mentioned in the FEIS; we recommend it be added.

Refuge Compatibility and Policy

NCDOT states in the FEIS that the project will be contained within the existing 100-foot-wide right-of-way. If all the proposed work (staging areas, construction, and future maintenance of existing NC-12) is performed within the existing right-of-way and is in compliance with any terms and conditions contained within the easement deed, a Refuge compatibility determination will not be required.

However, we want to take this opportunity to re-express that we do not believe it will be possible to maintain the existing NC-12 corridor and construct the new bridges entirely within the existing right-of-way. We expressed this in a September 11, 2007, letter from DOI Acting Assistant Secretary for Fish and Wildlife and Parks Verhey to Governor Easley, "While the intent is to construct these new bridges within the exiting road's right-of-way, we believe the [preferred] alternative would require continued maintenance outside of the existing road's right-of-way through the Refuge until each subsequent phase of bridge construction along NC-12 is completed."

The FEIS indicates that significant NC-12 maintenance activities (other than road scraping which occurs 1 to 2 times per month) currently occur 4 to 7 times per year. Based on our records, these activities occur outside the existing right-of-way (requiring

permits from the Refuge) 2 to 4 times per year and have been increasing in frequency. These activities include dune maintenance, dune reconstruction, dune translation (moving sand from the back side of the dune to the seaward side) and sand bagging. Given the scope of these activities and based on our experience in seeing these activities implemented in the past, it is unlikely that it will be possible to conduct these activities completely within the right-of-way, while being as efficient or effective as current practices.

Also, we would like to remind you that by signing a Record of Decision on this FEIS, all previous SUPs for maintenance and repair of the existing at grade NC-12 would be nullified because the FEIS (now the National Environmental Policy Act (NEPA) document of record) clearly states NCDOT's intent to conduct all activities related to this project (including existing NC-12 maintenance and repair) within the existing right-of-way. If any work related to bridge construction, or maintenance, or existing NC-12 maintenance goes outside the existing right-of-way, you would need to re-comply with the Refuge's Appropriate Use Policy and Compatibility Policy. If the requested use is found to be appropriate and compatible, the Refuge is obligated to follow through with NEPA compliance, Section 7 Endangered Species Act compliance, and compliance with several laws relative to cultural and archaeological resources, including Section 106 of the National Historic Preservation Act.

If the NCDOT is faced with an emergency, we have the ability to accelerate everything through the administrative process under emergency declarations. However, since we can reasonably anticipate storms, planning should occur now to avoid emergencies that can be reasonably anticipated. Even if the administrative processes can be suspended for the "emergency within the right-of-way," they can only be suspended by the Refuge Manager for 30 days and all corrective measures must be completed within that time frame. Full compliance with administrative regulations must follow the corrective action.

The Terminal Groin

The Service issued an SUP in 1989 to NCDOT for construction of the terminal groin for the purpose of protecting the existing Bonner Bridge. A new or revised SUP would be required to keep the terminal groin for a different bridge or purpose. In 2003, NCDOT and the Refuge decided to separate terminal groin issues from the Bonner Bridge replacement NEPA document. As you recall, the decision in 2003, was to defer planning on the terminal groin SUP renewal or on the removal of the terminal groin until a later date.

An assumption inserted into the FEIS analysis involves the dependency of the Terminal Groin for the success of the Preferred Alternative. The discussion on page 3-65 is somewhat confusing and appears to be contradictory. First, the new parallel bridge appears to be designed (at least for this stage of planning) to have clearance for a much wider navigation zone. This would allow the Oregon Inlet channel to migrate to some extent without impacting navigation or the new bridge. The third paragraph actually states an assumption that the Corps of Engineers will terminate dredging the channel for the bridge navigation span with the implication being that the channel can move and maintain necessary depths through natural scouring and without impacting navigation.

Further down on the page (next to the last paragraph) there is a statement that removal of the terminal groin would pose new challenges for maintaining the current navigation channel. This discussion leaves us unclear as to what the Preferred Alternative will actually involve. The navigation channel, old bridge, new bridge, and terminal groin are all in such close proximity that dredging in one spot versus another is likely to precipitate changes in an adjacent site including the navigation channel underneath the bridge. Basically, it appears that more analysis with regards to inlet dynamics and coastal processes is critical to further model development. Finally we note that NCDOT has not requested a new SUP to retain the groin. As mentioned above, there are many issues related to the groin that will need to be resolved before a new SUP could be issued. The FEIS does not provide sufficient basis for decision-making regarding those issues, and additional analysis will be needed. This would appear to be an area of considerable unresolved uncertainty.

We appreciate the opportunity to provide these comments. The Department wishes to further coordinate with the NCDOT and FHWA at the earliest possible time in order to reach a solution to our issues and concerns. Coordination can be initiated by contacting Mike Bryant, Refuge Manager, Pea Island National Wildlife Refuge, at (252) 473-1131, extension 222, or Pete Benjamin, Project Leader, Raleigh Ecological Services Field Office, at (919) 856-4520, extension 11.

Sincerely,

A handwritten signature in black ink, appearing to read "Willie R. Taylor". The signature is written in a cursive style with a large initial "W".

Willie R. Taylor
Director, Office of Environmental
Policy and Compliance



North Carolina Department of Cultural Resources
State Historic Preservation Office

Peter B. Sandbeck, Administrator

Office of Archives and History
Division of Historical Resources
David Brook, Director

Michael F. Easley, Governor
Lisbeth C. Evans, Secretary
Jeffrey J. Crow, Deputy Secretary

October 27, 2008

MEMORANDUM

TO: Gregory Thorpe, Ph.D., Director
Project Development and Environmental Analysis Branch
NCDOT Division of Highways

FROM: Peter Sandbeck *Peter Sandbeck*

SUBJECT: Final Environmental Impact Statement & Section 4(f) Evaluation for the NC 12
Replacement of the Herbert C. Bonner Bridge, B-2500, Dare County, ER 90-8304

We have reviewed the Final Environmental Impact Statement (FEIS) and Section 4(f) Evaluation for the proposed undertaking and offer the following comments.

The FEIS correctly identifies the historic properties within the undertaking's Area of Potential Effects (APE) as the (former) Oregon Inlet Coast Guard Station and Chicamacomico Life Saving Station, both of which are listed in the National Register of Historic Places as having national significance, plus the Pea Island National Wildlife Refuge and Rodanthe Historic District, which have been determined eligible for listing in the National Register. The FEIS also addresses the absence of archaeological resources within the APE and commits to identifying and assessing any unanticipated archaeological discoveries encountered west of Bodie Island during construction.

The determinations of effects, on the historic properties, for the two bridge corridors and the various alternatives within each corridor are also properly noted in the sections dealing with historic properties, including the determination that the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge (Preferred) will adversely affect all of the historic properties.

Given the adverse effect determinations, the Federal Highway Administration (FHWA), North Carolina Department of Transportation (NCDOT) and State Historic Preservation Office (HPO) have entered into consultation under Section 106 of the National Preservation Act. Due to the high level of controversy regarding the recommended alternative and its potential to have substantial impacts on important historic properties, the Advisory Council on Historic Preservation (ACHP) is participating in the consultation to develop a Memorandum of Agreement (MOA) to mitigate the adverse effects of the undertaking on the historic properties. To that end the consulting and concurring parties met in Manteo on July 10, 2008 and joined in conference calls on October 10 and 20, 2008 to discuss the parties' concerns and explore mitigative measures. We understand FHWA's goal is to conclude the consultation and have a fully executed MOA to include in the December 15, 2008, Record of Decision.

Having carefully reviewed the Final Section 4(f) Evaluation, we do not concur with FHWA's finding that the proposed undertaking will not constructively use historic properties. The document notes that the Preferred Alternative will have a "Sizeable visual intrusion into the landscape of the Refuge and views in Rodanthe will be affected." It also notes that one mile of bridge in Rodanthe would bisect the community and make access more circuitous. (Table S-1, page xii).

In the case of Pea Island Wildlife Refuge, the construction of a ten-mile long bridge, elevated thirty feet above ground level and topped with a nearly five-foot railing (and perhaps with an additional six-foot high, chain-link fence as suggested by the Refuge during the Section 106 consultation), will introduce a substantial visual intrusion that is antithetical to the historic landscape. Determined eligible for listing in the National Register under Criterion A in the areas of conservation and social history, the Refuge is an outstanding example of the national wildlife refuges created in the early 20th and associated with efforts of the Civil Conservation Corps to protect and revitalize natural resources. Retaining its key original elements and integrity of location, setting, materials, feeling and association, the Refuge as a historic landscape will not only be adversely affected, it will be substantially, visually impaired by the presence of a bridge of the height and length proposed with the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge (Preferred). While the bridge may not eliminate the Refuge's ability to function as a wildlife refuge, it will destroy its integrity as a historic landscape.

Similarly, the introduction of a thirty-foot elevated bridge with flanking one-way frontage roads in the Rodanthe Historic District will not only adversely affect the historic district, it will substantially impair the characteristics which make the district eligible for listing in the National Register. The district, which is comprised of one and two-story buildings that are linked by their association with and views to the National Register-listed Chicamacomico Life Saving Station, will be completely dominated by the bridge proposed as part of the Preferred Alternative. Views to the Pamlico Sound, which are part of the historic viewshed from the station's tower and are still an important part of the visitor's experience will be destroyed as will the visual relationships between the district's contributing buildings. In an effort to minimize the degree of impairment caused by the proposed bridge, the Final Section 4(f) Evaluation suggests that modern development adjoining the district has already diminished this connection. However, the photographs in the Finding of Adverse Effect Documentation, prepared by the NCDOT Historic Architecture and Landscapes Section for the undertaking, clearly illustrate that this connection exists today and that a nearly three-story bridge will dwarf the one and two-story buildings that make up the historic district.

In addition to bisecting the historic district and making access more circuitous, the bridge will block the motorist's view of the historic district, especially the life saving station, which depends in large part on tourists' seeing the building from a distance and stopping to visit. While signage to the site will be part of the MOA for the adverse effect of the undertaking on the historic lifesaving station, the value of someone's seeing the iconic building from the road and being able to easily pull over to visit the site cannot be over-estimated. With the new bridge, the building will not be visible from either the north or south approach. Further, if a driver traveling north misses the signed turn, he will have to travel another mile north before being able to make a U-turn so as to travel back another mile to turn left onto the frontage road. Or, traveling south and missing the sign for the station, a driver will have to travel further south, turn around and travel north again to access the frontage road. Having reached the frontage road, the traveler will have to drive along the one-way road with the bridge looming on the west – hardly the setting or feeling that one associates with a lifesaving station that historically had a 360° view of its surroundings. Given the serious access problems and visual impacts caused by the proposed bridge, we believe that the Preferred Alternative substantially impairs the functions, features and attributes of the Rodanthe Historic District and Chicamacomico Life Saving Station and, thereby, constitutes a constructive use of the historic properties.

We would finally note that we understand from discussions with the Merger Team and as outlined in Section 2.15 – Preferred Alternative, that there will be an opportunity to explore possible adjustments in the alignment and specific plans for Phases II-IV in order to address changes that may occur in the project area due to its dynamic and unpredictable nature, especially in the undertaking's APE for the historic properties.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Jeffrey Crow, SHPO
Clarence Coleman, FHWA
Mary Pope Furr, NCDOT
Carol Legard, ACHP
Ken Wenberg, CHA
Rick Kanaski, USFWS
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October 27, 2008

VIA ELECTRONIC MAIL, FACSIMILE AND FIRST CLASS MAIL

Dr. Gregory J. Thorpe
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, NC 27699-1548
Fax (919) 733-9794

Re: Final Environmental Impact Statement and Section 4(f) Evaluation
NCDOT TIP Project Number B-2500, Bonner Bridge, Dare County, NC

Dear Dr. Thorpe:

The following comments on the above-referenced Final Environmental Impact Statement and Section 4(f) Evaluation ("FEIS") are submitted on behalf of the Southern Environmental Law Center, National Wildlife Refuge Association, Environmental Defense Fund, Defenders of Wildlife, The Wilderness Society, Audubon North Carolina, North Carolina Wildlife Federation, and Pamlico Tar River Foundation. After reviewing the Supplement, the SDEIS, associated scientific research and the FEIS, we continue to support the Pamlico Sound Bridge alternatives and do not agree that any of the alternatives that utilize the Parallel Bridge corridor, including the preferred alternative, the Phased Approach, are viable alternatives. Our comments are focused on our numerous concerns about the adequacy of review of the environmental impacts associated with the Phased Approach and related compliance with the National Wildlife Refuge System Improvement Act, Section 4(f) of the Department of Transportation Act of 1966, and the National Environmental Policy Act ("NEPA").

As discussed in more detail below, the FEIS is inadequate and the project cannot go forward as planned for the following reasons:

1. The Phased Approach fails to comply with the National Wildlife Refuge System Improvement Act. That Act requires NCDOT and FHWA to demonstrate that bridge replacement is compatible with the purposes of Pea Island National Wildlife Refuge. Yet, the Phased Approach cannot comply with that requirement; the Pamlico Sound Bridge alternative is the only compatible alternative.

2. The FEIS's Department of Transportation Act of 1966 section 4(f) analysis is inadequate. First, NCDOT erroneously concludes that the Phased Approach will not "use" Refuge lands because it will operate within the existing NC Highway 12 easement. As a result, NCDOT's erroneous determination that the Phased Approach will not use the Refuge impermissibly skews the evaluation of the factors in the "least overall harm" analysis. In addition, the Section 4(f) Evaluation of the Phased Approach's impacts does not provide the decisionmaker with sufficient information to engage in a meaningful least overall harm analysis required by Section 4(f).
3. The FEIS violates NEPA by failing to adequately assess the environmental impacts from the Phased Approach. To comply with NEPA, the FEIS must thoroughly and objectively analyze the environmental consequences of the alternatives, but the FEIS's analysis of the environmental impacts of the Phased Approach fails to do so. The FEIS also fails to identify a preferred alternative and instead selects a preferred alternative without adequate review of all its foreseeable environmental impacts. The FEIS also fails to evaluate the ecological needs of the Refuge and the manner in which the Phased Approach interferes with the beneficial processes of this dynamic shoreline.
4. The Phased Approach fails to address public access to the Refuge.
5. The Phased Approach may not be able to be funded or comply with state or federal legal requirements.
6. Because the terminal groin is an essential component of the Phased Approach, the effects from its removal or retention must be addressed in the FEIS, and a compatibility determination and 4(f) determination are required. The FEIS fails to do so. Moreover, it is unlikely that retention of the terminal groin could be found to be compatible.

OVERVIEW:

Pea Island National Wildlife Refuge ("Pea Island Refuge") is at the core of the debate about the Bonner Bridge replacement. Established in 1938 by Executive Order, Pea Island Refuge is a "refuge and breeding ground for migratory birds and other wildlife." Exec. Order No. 7862, 3 Fed. Reg. 734 (Apr. 12, 1938). Pea Island Refuge is separated from North Carolina's mainland by marshes and Pamlico Sound and lies on the north end of Hatteras Island. Hatteras Island and Oregon Inlet are part of a dynamic barrier island system and the Pea Island Refuge relies on this dynamic process for ecological viability. Pea Island Refuge is subject to ocean overwash, high shoreline erosion rates, inlet formation, and other impacts associated with large storm events, sea level rise, and general barrier island dynamics. While many of these natural processes are incompatible with transportation corridors, they are beneficial to the abundant wildlife and

are instrumental in creating nesting habitat, feeding grounds, and other natural habitats. Hundreds of thousands of migratory birds, including the greater snow goose and other migratory waterfowl, migrating shorebirds, raptors, wading birds, and migratory songbirds, use Pea Island Refuge. And Pea Island Refuge manages approximately 1,000 acres of waterfowl impoundments for the benefit of migratory birds. Also, Pea Island Refuge has 13 miles of ocean beach that provide nesting habitat for loggerhead sea turtles, green sea turtles, piping plover, and several species of shorebird. These tremendous natural resources draw tourists, anglers, birders, and other outdoor enthusiasts. Many members of our organizations regularly recreate and enjoy the natural resources of Pea Island Refuge.

As the FEIS acknowledges, a long-term solution to the problems posed by locating transportation corridors within this volatile system is necessary to meet the purpose and need of the Bonner Bridge replacement project. The purpose and need as stated in the FEIS is: (1) Provide a new means of access from Bodie Island to Hatteras Island for its residents, businesses, services, and tourists prior to the end of the current Bonner Bridge's service life; (2) Provide a replacement crossing that takes into account natural channel migration expected through the year 2050 and provides flexibility to let the channel move; and (3) Provide a replacement crossing that will not be endangered by shoreline movement through the year 2050. FEIS at 1-6. While the purpose and need has been narrowed from the goals established by the Outer Banks Task Force, the FEIS purpose and need does reflect the dynamic nature of Oregon Inlet and the project area shoreline.¹

The Phased Approach, however, cannot meet the purpose and need or the Outer Banks Task Force objectives because it fails to protect NC 12 from shoreline movement during the project life, fails to take into account channel migration and to let the channel move, and fails to preserve the natural barrier island system. The Phased Approach will have significant effects on Hatteras Island and the transportation corridor cannot be maintained safely and efficiently within this dynamic environment. The Phased Approach attempts to continue to maintain a fixed transportation corridor on a shifting barrier island at the cost of public safety, reliability, and ecological protection. Furthermore, the Phased Approach is not compatible with the purpose of the Pea Island National Wildlife Refuge, pursuant to the National Wildlife Refuge System Improvement Act, nor is it a viable alternative pursuant to Section 4(f) of the Department of Transportation Act of 1966. As discussed in greater detail below, the Pamlico Sound Bridge is the only alternative that will work and can be authorized pursuant to applicable federal laws.

NC 12 and its associated maintenance are steadily degrading the Refuge, and the Phased Approach does not protect against this degradation. As discussed more fully below, the Phased Approach is not a viable, or lawful, alternative. The Phased Approach would keep NC 12 under construction for the life of the project as short bridges are

¹ Through the Outer Banks Task Force, state and federal agencies determined that the long-term goals for this area were (1) to preserve the natural barrier island system; (2) minimize impacts to Hatteras and Ocracoke islands; and (3) maintain access top and on the islands so that the transportation system is safe, efficient, and has minimal impact on the environment. SDEIS at 2-15.

perpetually built through the Refuge north of Rodanthe. Furthermore, the “phased” short bridge locations are estimated based on current shoreline erosion and inlet formation predictions. Shoreline changes, however, are often episodic in nature and are difficult to predict precisely. An inlet could form or the shoreline erode prior to or during a planned construction phase. Also, the effect of climate change has not been adequately evaluated. Any increase in storm intensity and/or sea level rise may cause substantial revisions to the current predictions, further exacerbating the uncertainty associated with predicting inlet/breach locations and timing. The FEIS attempts to respond to this natural uncertainty by proposing a monitoring program and by acknowledging that some of the phases may be different than those evaluated in the FEIS. This proposal, however, amounts to a blank check that cannot pass legal scrutiny.

Even if the Phased Approach could be completed in a manner compatible with the dynamic shoreline, the final project is a long bridge on the beach and in the Atlantic Ocean. As the FEIS acknowledges, the Phased Approach would substantially interfere with fishing, surfing, and other beach activities and will severely limit and reduce access to the Refuge. In contrast, the Pamlico Sound Bridge is safer, more reliable, and more protective of the environment. The Pamlico Sound Bridge would not be subject to ocean overwash, inlet formation, or erosion. It would allow the U.S. Fish and Wildlife Service to preserve and protect the Refuge and the associated wildlife. Furthermore, the Pamlico Sound Bridge is the only alternative that can be authorized pursuant to applicable federal laws.

As explained in more detail below, the Phased Approach rests on faulty legal assumptions, inadequate economic analysis and flawed predictions about engineering around future coastal conditions within the project area.

I. The Phased Approach fails to comply with the National Wildlife Refuge System Improvement Act.

A. NCDOT and FHWA must demonstrate that bridge replacement is compatible with the purposes of Pea Island National Wildlife Refuge.

Congress passed the National Wildlife Refuge System Improvement Act (“NWRSA”) in 1997. According to the legislative history, the purpose behind NWRSA is “to establish clearly the conservation mission of the System, provide clear Congressional guidance to the Secretary for management of the System, provide a mechanism for unit-specific refuge planning, and give refuge managers clear direction and procedures for making determinations regarding wildlife conservation and public uses of the System and individual refuges.” H. Rep. No. 105-106 (May 21, 1997). In enacting NWRSA, Congress stated:

[I]t is the policy of the United States that – (A) each refuge shall be managed to fulfill the mission of the System, as well as the specific purposes for which that refuge was established; . . . (C) compatible wildlife-dependent recreational uses

are the priority general public uses of the System and shall receive priority consideration in refuge planning and management.

16 U.S.C. § 668dd(a)(3). Further, “[T]he Secretary shall – (A) provide for the conservation of fish, wildlife, and plants, and their habitats within the System; (B) **ensure that the biological integrity, diversity, and environmental health of the System are maintained for the benefit of present and future generations of Americans.**” 16 U.S.C. § 668dd(a)(4) (emphasis added).

“[T]he Secretary shall not initiate or permit a new use of a refuge or expand, renew, or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety.” 16 U.S.C. § 668dd(d)(3)(A)(i). “‘Compatible use’ means a wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.” 16 U.S.C. § 668ee. “Sound professional judgment” requires “a finding, determination, or decision that is consistent with principles of sound fish and wildlife management and administration, available science and resources, and adherence to the requirements of this Act and other applicable laws.” 16 U.S.C. § 668ee.

In addition to “sound professional judgment,” the other major element of a compatibility decision is assessing whether the proposed use will “materially interfere with or detract from the fulfillment of the mission of the System or the purposes of the refuge.” 16 U.S.C. § 668ee. According to the Fish & Wildlife Service’s 2000 Final Compatibility Policy (65 Fed. Reg. 62484), which was announced concurrently with the implementing regulations:

Inherent in fulfilling the System mission is not degrading the ecological integrity of the refuge. Compatibility, therefore, is a threshold issue, and the proponent(s) of any use or combination of uses must demonstrate to the satisfaction of the Refuge Manager that the proposed use(s) pass this threshold test. The burden of proof is on the proponent to show that they pass; not on the Refuge Manager to show that they surpass. Some uses, like a proposed construction project on or across a refuge that affects the flow of water through a refuge, may exceed the threshold immediately, while other uses, such as boat fishing in a small lake with a colonial nesting bird rookery may be of little concern if it involves few boats, but of increasing concern with growing numbers of boats. Likewise, when considered separately, a use may not exceed the compatibility threshold, but when considered cumulatively in conjunction with other existing or planned uses, a use may exceed the compatibility threshold

The Refuge Manager **must consider** not only the direct impacts of a use but also **the indirect impacts** associated with the use and **the cumulative impacts** of the use when conducted in conjunction with other existing or

planned uses of the refuge, and uses of adjacent lands or waters that may exacerbate the effects of a refuge use.

65 Fed. Reg. 62484, 62490 (Oct. 18, 2000) (emphasis added). Of particular significance is the policy's statement that cumulative, indirect, and direct impacts of the use in conjunction with other existing or planned uses of the refuge and uses of adjacent lands and waters are all to be considered in determining whether the ecological integrity of the refuge is maintained. Thus, in the case of Bonner Bridge, the Refuge Manager's compatibility determination of replacement of the bridge under any alternative must consider all the impacts related to both NC 12 and the subsequent construction of the Phased Approach.

B. The Phased Approach cannot comply with the National Wildlife Refuge System Improvement Act.

1. Restricting the Phased Approach to the current NC 12 easement does not exempt the Phased Approach from a compatibility determination.

The FEIS rests on the erroneous assumption that any activity can take place within the existing right-of-way and not trigger a compatibility determination. FEIS at xi. The National Wildlife Refuge System Improvement Act, however, directly contradicts this interpretation. As discussed above, the Act requires the Refuge Manager to consider direct, indirect, and cumulative impacts associated with existing or planned uses of the refuge and the impact on adjacent lands and waters. This analysis should include the effect on the Refuge from keeping NC 12 in its current location; the impact on the Refuge from construction spanning the life of the project; the impact on the Refuge from measures taken within the easement to address shoreline erosion or storm events; and impacts on the Refuge from the final Phased Approach—a bridge that sits in the ocean and on the shore of the Refuge.

The following excerpt from agency compatibility regulations addresses maintenance activities within an existing easement:

(c) Existing right-of-ways. We will not make a compatibility determination and **will deny any request for maintenance of an existing right-of-way which will affect a unit of the National Wildlife Refuge System, unless:** the design adopts appropriate measures to avoid resource impacts and includes provisions to ensure no net loss of habitat quantity and quality; restored or replacement areas identified in the design are afforded permanent protection as part of the national wildlife refuge or wetland management district affected by the maintenance; and all restoration work is completed by the applicant prior to any title transfer or recording of the easement, if applicable. Maintenance of an existing right-of-way includes minor expansion or minor realignment to meet safety standards.

50 CFR 26.41 (emphasis added).

The maintenance of a transportation corridor within the Refuge physically jeopardizes the purposes of the Refuge. It adversely affects habitat and the ability of the Refuge to function as a natural system. The activities anticipated to occur with the Phased Approach are more significant and damaging than routine maintenance and this approach will not meet the National Wildlife Refuge Improvement Act's mandate that "the biological integrity, diversity, and environmental health" of the Refuge be maintained.

2. The Phased Approach cannot be found to be compatible.

In our comment letter on the SDEIS dated December 9, 2005, we reviewed in detail the legislative history and current cases interpreting the National Wildlife Refuge System Improvement Act (Refuge Act). The Refuge Act continues to be pertinent to the discussion of additional alternatives, but for the sake of brevity that discussion is hereby incorporated by reference.

The Phased Approach and any indirect or cumulative impacts associated with it are subject to a compatibility determination pursuant to the Refuge Act. The Refuge Act prevents any new use or expanded, renewed, or extended use of a refuge to be permitted, "unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety." 16 U.S.C. § 668dd(d)(3)(A)(i). To be compatible, uses must preserve a refuge and promote the refuge system's mission. Accordingly, any use of the Refuge must be one that does not degrade the Refuge's ecological integrity nor interfere with its mission to provide a refuge and breeding ground for migratory birds and other wildlife.

All indirect and cumulative impacts that arise from a refuge use must also be considered and determined to be "compatible." The Refuge Compatibility Policy clearly states: "The Refuge Manager must consider not only the direct impacts of a use but also the indirect impacts associated with the use and the cumulative impacts of the use when conducted in conjunction with other existing or planned uses of the refuge, and uses of adjacent lands or waters that may exacerbate the effects of a refuge use." 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). Because the Phased Approach, and the associated direct and indirect impacts, is a use of the Refuge that "materially interfere[s] with" and "detract[s] from the fulfillment of the mission of the System or the purposes of the refuge," it cannot be found to be compatible. 16 U.S.C. § 668ee.

The Phased Approach directly impacts the Refuge. The Phased Approach will maintain a transportation corridor that bisects the Refuge for fifty years (the life of the project). During the life of the project the perpetual construction and associated noise and direct environmental impacts will degrade the Refuge resources, degrade wildlife habitat, and materially interfere with the purpose of the Refuge. The Phased Approach also will have significant indirect impacts. Because of the unpredictable nature of barrier island dynamics—including inlet/breach formation, shoreline erosion rates and locations, and sound side erosion—the Phased Approach will likely require "temporary" or "emergency" actions that will permanently and adversely affect the Refuge. As has been the case for

maintaining NC 12 in the past, these temporary measures include sand bags, beach nourishment, dune rebuilding, dune sprigging, fencing, and road relocation. As the FEIS admits, NCDOT has never conducted these emergency or maintenance measures within the existing right-of-way. In a letter to Governor Easley, the Department of Interior states:

While the intent is to construct these new bridges within the existing road's right-of-way, we believe this alternative would require **continued maintenance outside of the existing road's right-of-way** through the Refuge until each subsequent phase of bridge construction along NC 12 is completed. Current information also indicates that all 4 phases would require at least 13 years of actual construction during a 28-year timeframe. Based on the information that the Service currently has, **it is unlikely that we could find this alternative to be compatible with the purposes for which the refuge was established**, as required under the Refuge Improvement Act.

Letter to Governor Easley, dated September 11, 2007 (emphasis added) (a copy is attached). Yet the FEIS fails to evaluate the impact on the Refuge from these measures.

Furthermore, all of these measures interfere with the natural barrier island dynamics that are necessary to sustain naturally the Refuge and the associated wildlife. These measures have severe affects on wildlife and habitat and are reasonably foreseeable indirect impacts associated with the Phased Approach. Finally, the final Phased Approach is a bridge in the Atlantic Ocean. This ocean-side bridge will be a new feature on the beach, which the FEIS fails to evaluate adequately. For example, an ocean-side bridge may affect erosion rates, inlet formation, ocean overwash, etc. Once these natural processes are interrupted, the bridge will impact migratory bird and other wildlife habitat. Although the FEIS refers to studies conducted on a pier, it is illogical to assume that a pier would have the same effects on the adjacent shoreline as a bridge that travels parallel to the shore for miles. The FEIS also acknowledges the disastrous impact from storms like Hurricane Katrina on bridges, but fails to analyze the increased impact on a bridge that would bear the brunt of an impact from a hurricane. For these reasons, the Phased Approach is not compatible with the Refuge.

The FEIS incorrectly states that a compatibility determination is only necessary for "alternatives that use Refuge lands outside the existing easement." FEIS at xi. First, as discussed above, the Refuge Act specifically mandates that a compatibility determination consider the direct, indirect, and cumulative impacts on refuge land and any adjacent land or waters that affect the Refuge use. The Phased Approach will have direct and indirect adverse impacts on the Refuge and it is therefore subject to a compatibility determination. Furthermore, the NC 12 easement is not a carte blanche proclamation that allows NCDOT to pursue any action without respect for the Refuge Act. The Refuge Act itself recognizes that easements and right-of-ways may coexist on national wildlife refuges. Work within easements, however, may be limited by the Refuge Manager and may be subject to a

compatibility determination. For example, maintenance of an existing right-of-way is subject to review and approval by the U.S. Fish and Wildlife Service and is restricted to minor actions such as minor expansions or minor realignments to meet safety standards. *See* Final Compatibility Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997, 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). The Phased Approach’s impacts on the Refuge are far from minor, include significant direct and indirect effects, and cannot be determined to be compatible. Furthermore, the FEIS fails to provide adequate information about how construction and maintenance could be restricted to the easement, which NCDOT has never done within the Refuge. The FEIS adds to this oversight with contradictory statements about activities outside the easement that could be part of future phases and maintaining that no work will occur outside the existing right-of-way. *See e.g.*, FEIS at 2-96, 2-147, and 4-8.

The FEIS is also inadequate because the information is not sufficient to prove that any of the Parallel Bridge alternatives, including the Phased Approach, could be compatible. North Carolina Department of Transportation and Federal Highway Administration have the burden to prove that a use is compatible. “Compatibility, therefore, is a threshold issue, and the proponent(s) of any use or combination of uses must demonstrate to the satisfaction of the Refuge Manager that the proposed use(s) pass this threshold test. The burden of proof is on the proponent to show that they pass; not on the Refuge Manager to show that they surpass.” 65 Fed. Reg. 62484, 62490 (Oct. 18, 2000). Nothing in the FEIS proves that any Parallel Bridge alternative, including the Phased Approach, could possibly be found to be compatible and the NCDOT and FHWA have not met their burden of proof. The FEIS acknowledges that future phases may not be built; may include different components from a “mix and match” menu; and may not meet federal legal requirements. These difficulties are not adequately addressed within the FEIS and in essence create a *carte blanche* approach that cannot be compatible with the Refuge. And NCDOT cannot rely on the existing easement as a legal shield to a compatibility analysis.

Finally, as discussed in section VI, *infra*, retaining the terminal groin is an essential part of the Parallel Bridge, and the impacts to the Refuge of retaining the groin must be considered in the compatibility analysis. According to the permit under which it was built, if the terminal groin is no longer required to protect the existing Bonner Bridge, it must be removed within two years. As discussed in section VI, though, if the groin is instead determined to be necessary to protect the new Parallel Bridge and it is retained, it will have numerous adverse environmental consequences that are not compatible with the purposes of the Refuge. These consequences must be considered in the compatibility analysis.

C. Only the Pamlico Sound Bridge alternative complies with the National Wildlife Refuge System Improvement Act.

The continued use of NC 12 thru the Refuge is a use that is subject to a compatibility determination. As discussed above, NCDOT and FHWA must demonstrate that a bridge replacement alternative is compatible with the Refuge’s purpose or it cannot

be permitted. The proposed construction of a bridge within the existing right-of-way is not a sufficient legal bar to a compatibility determination, despite the FEIS's unsupported statements to the contrary. None of the Parallel Bridge alternatives comply with the National Wildlife Refuge Improvement Act because the associated operation and maintenance of NC 12 and the subsequent construction of the Phased Approach interferes impermissibly with the Refuge's purpose. As explained in more detail below, the only compatible alternative is the Pamlico Sound Bridge.

The key to compatibility is the mission of the National Wildlife Refuge System and the purpose of the Refuge. The NWRIA establishes wildlife conservation as the primary National Wildlife Refuge mission. "Inherent in fulfilling the System mission is not degrading the ecological integrity of the refuge." Final Compatibility Policy Pursuant to the National Wildlife Refuge System Improvement Act of 1997, 65 Fed. Reg. 62484, 62489 (Oct. 18, 2000). Recognizing that the ecological integrity of any national park or refuge in the project area is closely tied to the geological dynamic system, the National Park Services policy now requires that the Cape Hatteras National Seashore be managed to "support the natural processes of barrier island dynamics." The Refuge was established by executive order in 1938 as the Pea Island Migratory Waterfowl Refuge and its purpose is to be "a refuge and breeding ground for migratory birds and other wildlife." 3 Fed. Reg. 734 (Apr. 12, 1938). As discussed above, the Refuge supports a vast array of migratory birds, mammals, and threatened and endangered species. The Refuge provides important feeding and nesting grounds for the federally-listed piping plover and is a nesting area for loggerhead and green sea turtles.²

Building any of the Parallel Bridge alternatives will directly, substantially, and adversely affect the continued utilization of the Refuge as a breeding ground for migratory birds and other wildlife and damage the ecological integrity of the refuge. In order to maintain NC 12 through the northern portion of Hatteras Island, which is a dynamic system with dramatic shoreline erosion and potential for new inlet formation, the needs of the wildlife refuge would be subsumed by the need to keep the road within the easement, fill in breaches, and develop an artificial dune system. Currently, the constant beach erosion and severe weather events result in continual maintenance to repair and protect the integrity of NC 12. Even if these activities could be confined to the existing right-of-way—and the FEIS provides no information about how that will be possible—continuing such invasive uses of Refuge land has significant adverse impacts on the Refuge. For example, the maintenance activities currently degrade the quality of habitat available for wildlife by preventing overwash, contributing to a degraded beach profile, and eliminating natural vegetation succession. In sum, the repair and maintenance of NC 12 degrades the ecological integrity of the refuge and harms the habitat of migratory birds and wildlife. These impacts will occur regardless of whether the maintenance occurs in or out of the existing right-of-way.

As the FEIS acknowledges, "Oregon Inlet, Bodie Island, and Hatteras Island are part of a migrating barrier system characteristic of the southeast Atlantic Coast," which

² Additional comments on the endangered species impacts are included in later sections of this comment letter.

are characterized by variable and high erosion rates. FEIS at 3-51. The FEIS predicts that the shoreline will erode well into refuge land over the next 50 years. Although it is important to note that the FEIS relies on average annual shoreline erosion rates to predict future shoreline conditions, the average rate does not take into consideration the high annual variability of erosion and accretion. In other words, within a year a stretch of shoreline could erode 10 feet and accrete 5 feet and would only have an annual shoreline erosion of 5 feet. All Parallel Bridge corridor alternatives will require continual NC 12 maintenance and the FEIS does not adequately evaluate the impacts on the Refuge from conducting these activities within the right-of-way. Furthermore, NCDOT cannot provide adequate assurances that any future activities will indeed take place within the right-of-way. The FEIS does not commit to any particular Parallel Bridge corridor and explicitly states that the Parallel Bridge corridor alternatives can be mixed and matched and that each phase will be re-evaluated prior to construction. This amounts to a blank check and the FEIS fails to evaluate the alternatives adequately. Ultimately, none of these repair, maintenance, or construction methods can occur within the Refuge in a manner that is compatible with the Refuge purpose.

Beyond shoreline erosion, the proposed project area is susceptible to large storm events, which dramatically shape the Refuge. “North Carolina coast is subject to two types of severe windstorms: extra-tropical northeasters and hurricanes. Northeasters, with accompanying high tides and waves, can rapidly erode the shoulders of Oregon Inlet. Northeasters are fairly common in this area, with between 30 and 35 hitting the coast each year. Hurricanes may be responsible for major events, such as inlet openings and closings and gorge shifts . . .” FEIS at 3-55. For the purposes of the compatibility determination, these severe weather events perform important ecological functions and are beneficial to the Refuge. Transportation corridors, however, require protection from severe weather events. In protecting NC 12, the natural processes are stunted and the Refuge cannot fulfill its purpose.

The Pamlico Sound bridge corridor allows the Refuge to manage its lands in such a way as to promote habitat creation and protection for the wildlife in the refuge. None of the Parallel Bridge alternatives allows sufficient flexibility for the Fish and Wildlife Service to manage the Refuge and therefore cannot be compatible.

II. The Department of Transportation Act of 1966 section 4(f) analysis is inadequate.

Section 4(f) of the Department of Transportation Act of 1966 prevents a federal project from using publicly owned land unless “(1) there is no prudent and feasible alternative to using that land; and (2) the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.” 49 U.S.C. § 303(c).

When there is no feasible and prudent avoidance alternative, the regulation implementing Section 4(f) states that “the Administration may approve *only* the alternative that . . . [c]auses the least overall harm,” using a balancing of seven factors. 23

C.F.R. § 774.3 (c)(1) (emphasis added). The Final Section 4(f) Evaluation contained within the FEIS (“Section 4(f) Evaluation”) determined that all project alternatives considered included some use of Section 4(f) property and that no feasible prudent avoidance alternative exists and proceeded to the least overall harm analysis. After purporting to engage in a balancing of the relevant factors, the Section 4(f) Evaluation determined that the Pamlico Sound alternatives would cause fewer impacts to most environmental resources, but that the Phased Approach would cause the “least overall harm.” FEIS at 5-44.

The 4(f) Evaluation prepared is insufficient for a number of reasons. First, it erroneously concludes that the Phased Approach will not “use” Refuge lands simply because it will operate within the existing NC 12 easement. Moreover, this erroneous conclusion skews the least overall harm analysis in favor of the Phased Approach, even though the Pamlico Bridge alternative is the sole alternative that bypasses the Refuge. In addition, the analysis of the Phased Approach’s impacts on the Refuge is inadequate and does not provide the decision-maker with sufficient information to meaningfully engage in the least overall harm analysis required by Section 4(f).

A. NCDOT erroneously concludes that the Phased Approach will not “use” Refuge lands because it will operate within the existing NC 12 easement.

NCDOT asserts that the Phased Approach “stays completely within the existing easement within the Refuge and, therefore, does not constitute a use of the Refuge under Section 4(f).” FEIS at 5-29. NCDOT also asserts that the construction and maintenance of the Phased Approach will occur completely within the existing right-of-way on the Refuge. “The Phased Approach / Rodanthe Bridge Alternative (Preferred) would not require the use of any property from the Refuge because it would be constructed and maintained entirely within NCDOT’s existing easement.” FEIS at 5-18. Indeed, NCDOT posits that it will be able to accomplish “all construction activities, such as material/equipment deliveries, excavations, temporary shoring, pile driving, and erection of bridge girders” within the existing right-of-way. FEIS at 2-123. NCDOT fails to explain how it is feasible to construct and maintain an elevated bridge within the existing right-of-way, construct a service road, while maintaining the current NC 12 and cause no further encroachments into the Refuge. While it lists a host of activities that will allegedly occur contemporaneously within the refuge, the Section 4(f) Evaluation falls short of explaining how all construction equipment and activities, including pile driving and shoring, and construction of a temporary road are going to co-exist.

NCDOT’s Section 4(f) Evaluation also neglects to address the projected dune building and maintenance activities through 2030 that are integral to the Phased Approach (FEIS at 4-71, 4-72), much less explain how future dune building and maintenance also will stay within the easement and cause no further encroachment onto the Refuge. For example, the FEIS makes reference to smaller dunes of indeterminate size and unquantified impact which will purportedly be built within the easement on the Refuge, but the Section 4(f) Evaluation omits dune maintenance and building from the discussions

of Refuge use and Refuge impacts. Absent credible information to the contrary, it is infeasible that NCDOT will be able to accomplish all of the activities it proposes – new dune construction and maintenance, a temporary road, and constructing a bridge over forty-feet wide – entirely within the its existing easement. Hence, it is foreseeable that the Phased Approach will result in actual use of additional Refuge land.

Assuming NCDOT feasibly could implement the Phased Approach within the bounds of the existing easement, the definition of “use” under 23 C.F.R. § 774.17 is broader than actual use. “Use” is not limited to physical takings and land acquisition, as is suggested by the Section 4(f) Evaluation’s repeated reference to the Phased Alternative staying within the easement and thereby avoiding “use” of the Refuge. Rather, “use” for purposes of Section 4(f) encompasses certain temporary and constructive uses of protected land. *See* 23 C.F.R. § 774.17. Temporary occupancies are categorically excluded from “use” only if they satisfy all of conditions set forth in the regulation. 23 C.F.R. § 774.13 (d). NCDOT fails to address whether and what kinds of temporary occupancies associated with construction and maintenance under the Phased Approach, particularly those occupancies which may result in permanent adverse impacts on the Refuge, could potentially constitute a temporary occupancy adverse to the statute’s preservation purpose and hence a “use” under Section 4(f) analysis.

Even if NCDOT could carry out the Phased Approach within the existing easement and avoid any actual temporary uses, the Phased Approach’s proximity impacts at a minimum will result in a “constructive use” of the Refuge:

A constructive use occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the resource are substantially diminished.

23 C.F.R. § 774.15 (a).

The Section 4(f) Evaluation includes a constructive use section. However, that analysis appears to be an afterthought with a foregone conclusion. Having already concluded that the Preferred Alternative would not “use” Refuge land under the “Use of Section 4(f) Properties” analysis, and having determined the Phased Approach would cause the Least Harm (FEIS at 5-45), the NCDOT then turned to whether the Phased Approach would result in a constructive use of Section 4(f) property. The implementing regulations are clear that any constructive uses should be evaluated in accordance with 23 C.F.R. § 774.03, which encompasses the avoidance alternative / least harm analysis. *See* 23 C.F.R. § 774.15 (b). Instead, NCDOT divorced the constructive use determination from the broader “use” determination, reaching the conclusion first that its preferred option would not “use” Refuge land and would cause the least overall harm. Not surprisingly, NCDOT determined that the Preferred Alternative would cause “no substantial impairment,” and hence no constructive use of Section 4(f) properties. In so

doing, NCDOT failed to give adequate consideration to the constructive uses of the Refuge caused by the Phased Approach.

More fundamentally, within the constructive use analysis provided, NCDOT consistently reads the constructive use threshold more narrowly than the regulation provides in determining that the various proximity impacts do not amount to 4(f) “uses.” The appropriate guidepost for constructive use throughout the regulation is “substantial impairment” of the property. As a literal reading of the phrase “substantial impairment” suggests, “Substantial impairment occurs when the activities, features or attributes of the 4(f) property are substantially diminished . . . which means that the value of the resource in terms of its Section 4(f) significance will be *meaningfully reduced* or lost.” Section 4(f) Policy Paper, Office of Planning, Environment and Realty Project Development and Environmental Review, US Department of Transportation – Federal Highway Administration (March 1, 2005) (emphasis added and internal citation omitted). For instance, in discussing potential proximity impacts of the Phased Approach, NCDOT determined that the vibration, visual, access and ecological impacts bridge within the Refuge under the Preferred Alternative will not prevent the Refuge from “continuing to function as a refuge.” FEIS at 5-53. Similarly, in evaluating the impacts on Rodanthe’s Historic District, NCDOT explained that the alteration of access would not detract from its eligibility for inclusion on the National Register of Historic Places. FEIS at 5-57. Proximity impacts need not completely eradicate the functioning of a Refuge or render a historical property ineligible for the listing in order to rise to the level of a constructive use. Total loss of the resource is not required; rather, meaningful reduction of the significance of the resource is sufficient for a proximity impact to amount to a constructive use.

In addition, the Section 4(f)’s Evaluation’s examination of specific proximity impacts as constructive uses fails to adequately assess ecological impacts and access restrictions of the Phased Approach in the Refuge. Ecological intrusion amounts to a constructive use the impact “substantially diminishes the value of wildlife habitat in a wildlife and waterfowl refuge adjacent to the project, substantially interferes with the access to a wildlife and waterfowl refuge when such access is necessary for established wildlife migration or critical life cycle processes, or substantially reduces the wildlife use of a wildlife and waterfowl refuge.” 23 C.F.R. § 774.15 (e)(5). The Section 4(f) Evaluation generally fails to address the long-term ecological proximity impacts from permanently altering the landscape within the Refuge with the introduction of an elevated bridge and hardened piles, which will affect sand and water migration, erosion, and eventually habitat in the ocean hazard zone and offshore currents. Although the Section 4(f) Evaluation acknowledges, for example, the USFWS’s request for additional studies on nighttime lighting effects on sea turtles, the effect on the piping plover as a result of an eventual offshore bridge, and an analysis for impact to habitat as a result of “scour, maintenance, placement of revetment or stabilizing structures and repair of bridge piles,” it fails to assess these potential ecological impacts or anticipate the constructive use of the Refuge likely to result from these types of proximity impacts.

In addition, the Section 4(f) Evaluation completely omits an analysis of ecological impacts on the Refuge stemming from planned “short-term” dune construction and maintenance within the easement during implementation of Phased Approach, which is estimated to be completed by 2030. FEIS at 4-68 to 4-73. In fact, the Section 4(f) Evaluation ignores the dune construction and maintenance planned with the Phased Approach, and submits that the Phased Approach “would allow more natural coastal processes to occur by eliminating artificial dune construction and beach nourishment.” FEIS at 5-52. This conclusion is not only inaccurate but underscores the inadequacy of the ecological impact analysis presented in the Section 4(f) Evaluation. The Section 4(f) Evaluation fails to consider whether and to what degree sand dune construction, maintenance, and the resulting interference with natural coastal processes will impact the Refuge and result in a constructive, if not an actual, use of Refuge lands that abut the easement.

The Section 4(f) Evaluation similarly fails to adequately assess as a potential constructive use of the Refuge the impacts from significantly restricting access. The Section 4(f) analysis concedes, for example, that the Phased Approach would “limit access to the Refuge to two locations” (FEIS at 5-51) and would cause loss of access “to the Refuge Visitor Center, headquarters, and North Pond Trail with the Preferred Alternative.” FEIS at 5-30. A restriction in access which substantially diminishes the utility of a significant publicly owned land is a constructive use. However, NCDOT dismissed this proximity impact because the restriction in access “would not eliminate the Refuge’s ability to function.” FEIS at 5-51. NCDOT misstates the applicable standard and fails to adequately assess the potential constructive use caused by the Phased Approach, which will cut off most access to the Refuge.

Thus, NCDOT’s determination that the Phased Approach will not “use” Refuge lands simply because it purportedly will operate within the existing NC 12 easement is based upon an incomplete analysis of actual or constructive uses of the Refuge and misapplication of the relevant standards. NCDOT neglects to explain how it is even feasible to accomplish implementation of a project of this magnitude within the confines of a 100-foot easement, and it essentially overlooks the significant proximity impacts to the adjacent Refuge and the resulting substantial impairment to the Refuge.

Finally, the Section 4(f) Evaluation fails to acknowledge or assess the use of the Refuge that will result from retaining the terminal groin, which does not lie within the existing NC 12 easement. The retention of the terminal groin is an essential part of the Phased Approach that will require NCDOT to secure a new permit to retain it in its existing location on the Refuge, as discussed in section VI, *infra*. Although the Section 4(f) Evaluation mentions the terminal groin as it relates to the Coast Guard Station, concluding that the Pamlico Sound alternatives will adversely affect the Coast Guard Station by reason of removal of the terminal groin (FEIS at 5-20), the Evaluation does not analyze the extent of use and environmental impacts on the Refuge posed by permitting and retaining the terminal groin.

B. NCDOT’s erroneous determination that the Phased Approach will not “use” the Refuge impermissibly skews the evaluation of the factors in the “least overall harm” analysis.

The Least Harm Analysis and balancing of factors³ presented in the Section 4(f) Evaluation analysis relies upon the assumption that the Phased Approach will not result in a use of the Refuge. In evaluating the first two factors, the ability to mitigate adverse impacts and the relative severity of remaining harm, the Section 4(f) Evaluation explicitly relies upon the assumption that the Phased Approach will not use Refuge lands. According to the Section 4(f) Evaluation, “[s]ince the Pamlico Sound Bridge Corridor alternatives and Phased Approach/ Rodanthe Bridge Alternative (Preferred) are the only alternatives that avoid permanently incorporating land from the Refuge, the FHWA and NCDOT consider them to be substantially equal as the best options in terms of use of Refuge lands under the requirements of Section 4(f).” FEIS at 5-30. In the conclusion of the discussion of the first two factors, the Section 4(f) Evaluation again reiterates its reliance on the assumption that the Phased Approach will not use Refuge lands, stating: “The Phased Approach/Rodanthe Bride Alternative (Preferred) would be confined to the existing easement, reducing its potential impact by not using Refuge lands, providing for fishing access, minimizing protected species impacts, minimizing direct impacts to habitat, and allowing for shoreline erosion.” FEIS at 5-35.

In considering the third factor, the relative significance of each Section 4(f) property, the Section 4(f) Evaluation similarly relies upon the assumption that the Phased Approach will not use the Refuge. The Evaluation acknowledges that the Refuge is “the most significant resource in the project area.” (FEIS at 5-44) and then notes that only the Phased Approach and Pamlico Sound alternatives “completely avoid a use of the Refuge.” FEIS at 5-38. While the overall least harm analysis eventually concludes that as between these alternatives, the Pamlico Sound alternatives “would cause fewer impacts to most environmental resources, including the Refuge which it avoids completely,” (FEIS at 5-44), the entire least harm analysis is colored by the incorrect assumption that the Phased Approach will not “use” the Refuge and is somehow on relative near or equal footing in with the only options that truly avoid the Refuge, the Pamlico Sound alternatives.

³ The least overall harm determination requires a balance of the following factors:

- (i) The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);
- (ii) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- (iii) The relative significance of each Section 4(f) property;
- (iv) The views of the official(s) with jurisdiction over each Section 4(f) property;
- (v) The degree to which each alternative meets the purpose and need for the project;
- (vi) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- (vii) Substantial differences in costs among the alternatives.

23 C.F.R. § 774.13 (c)(1).

C. Section 4(f) Evaluation of the Phased Approach's impacts does not provide the decisionmaker with sufficient information to engage in a meaningful "least overall harm" analysis required by Section 4(f).

The least overall harm analysis suffers from the same deficiencies in the evaluation of ecological impacts already noted in use analysis. In the absence of information to accurately gauge the severity of the harm caused by the Phased Approach and the ability to mitigate those impacts, NCDOT cannot meaningfully evaluate the Phased Approach alongside the other alternatives.

The Section 4(f) Evaluation fails to adequately assess the long-term ecological impacts which will result from permanently altering the landscape within the Refuge with the introduction of an elevated bridge and supporting structures. The Section 4(f) Evaluation does not provide a complete analysis of impacts on wildlife habitat caused by erosion, scour, sand migration, and maintenance and repair of the bridge. Furthermore, the Section 4(f) Evaluation and the least overall harm analysis omits any discussion of the potential environmental impacts from dune construction and maintenance planned over the course of the next two decades as part of the implementation of the Phased Approach. Having omitted this information, the least overall harm analysis reaches the untenable conclusion that the Phased Approach is among alternatives that allows for natural shoreline movement which also "would contribute to naturalizing this area of the Outer Banks, and benefiting wildlife in the Refuge." This conclusion highlights the hazard of undertaking an analysis with incomplete information. In addition there is no certainty in the Phased Approach with regard to the implementation of Phases II, III, and IV, including when and whether these phases will be implemented. The Section 4(f) Evaluation fails to address the impact of incomplete implementation of the Phased Approach on the Refuge and the potential impact of ongoing sand dune maintenance, potentially into perpetuity.

For all of these reasons, the Section 4(f) Evaluation submitted within the FEIS is inadequate and the conclusion reached therein is unfounded.

III. The FEIS does not adequately assess the environmental impacts from the Phased Approach.

A. To comply with NEPA, the FEIS must thoroughly and objectively analyze the environmental consequences of the alternatives.

Under federal law, environmental impact statements serve two key purposes. The first is to require federal agencies thoroughly and objectively to investigate, evaluate and disclose environmental consequences associated with any major federal action in sufficient detail to assist the agencies in determining whether and how to proceed with a proposed action. *See Nat'l Audubon Soc'y v. Dep't of the Navy*, 422 F.3d 174, 184 (4th Cir. 2005). The second is to provide the public with a full and accurate disclosure of the likely environmental impacts of a proposed action. In order to fulfill these purposes, the FEIS must describe the purpose and need for the proposed action, analyze the direct and

secondary environmental and economic impacts of a range of alternative means to fulfilling that purpose, and, if mitigation is proposed, analyze the effectiveness of the proposed mitigation. *See* 40 C.F.R. § 1502.1 (2005).

B. The Phased Approach environmental impacts analysis is inadequate.

Pursuant to NEPA, an Environmental Impact Statement (“EIS”) is required to satisfy a number of statutory and regulatory requirements. It must consider all reasonably foreseeable significant adverse impacts of the proposed action and all reasonable alternatives to the proposed action. *See* 40 C.F.R. § 15022.22; 42 U.S.C. § 4332(C)(iii), (E); 40 C.F.R. § 1502.1. It must consider the cumulative, indirect and secondary impacts of the proposed action, including reasonably foreseeable expansions in the scope of the proposed action. 40 C.F.R. § 1502.16. All cooperating agencies have a mandatory duty to consider the environmental impacts of other “past, present, and reasonably foreseeable future actions.” 40 C.F.R. § 1508.7. These regulations ensure that indirect, connected, cumulative and similar actions are properly considered in an EIS.

The Phased Approach will have significant adverse impacts on the Refuge that the FEIS fails to evaluate adequately. All Parallel Bridge alternatives, including the Phased Approach, will be affected by shoreline erosion, inlet formation, and ocean overwash. The shoreline erosion and inlet formation evaluation is particularly pertinent in evaluating the Phased Approach. Because these events are episodic by nature, it is impossible to predict precisely when and where an inlet might form or erosion imminently threaten NC 12. Although it is impossible to predict dates and times, past experience and current modeling predict that NC 12 is subject to perpetual threats. The schedule for the “phased” bridges may or may not coincide with the natural movement of Hatteras Island or with predicted inlet formations. A bridge might be under construction when an inlet forms underneath it or an inlet may form prior to construction even beginning.

The FEIS fails to analyze the reasonably foreseeable impacts to the Refuge from temporary or “emergency” measures taken to protect a phased bridge under construction or an area that is not slated for construction until decades after the threat. These temporary or emergency measures including, for example, sand bags, road relocation, beach nourishment, dune building (and rebuilding), all have permanent and adverse ecological impacts that severely affect biota, geology, and overall ecology of the Refuge. The FEIS without support states that these activities will take place within the existing right-of-way, but fails to recognize that these actions will still have an impact on the Refuge. The FEIS fails to provide adequate analysis of these environmental impacts of these activities.

Finally, the final outcome of the Phased Approach is a bridge in the Atlantic Ocean. The placement of a bridge of this length and size on a dynamic shoreline raises many concerns. How will the bridge withstand the natural forces, including increased impacts from wind, in a manner that provides a safe and reliable transportation corridor? How will the presence of a bridge parallel to the shore impact long shore sediment transport, erosion rates, and inlet formation? The FEIS acknowledges that the bridge and

pile placement could have detrimental effects “including changes to water flow[,] sediment grain size[,] and topography. : FEIS at 4-107. The bridge and piles may increase shoreline erosion and create hot spots in addition to the five currently identified. The bridge and piles will affect waves and longshore sediment transport. All of these effects will prevent Hatteras Island from functioning as a natural barrier island system and will adversely impact wildlife and wildlife habitat on the Refuge. The FEIS relies on a single study of a pier and analogizes to the ocean-side bridge that is parallel to the shore. This analysis lacks substance and is inadequate. Furthermore, the FEIS erroneously asserts without analysis that the final Phased Approach corridor “would allow long-term natural shoreline movement.” FEIS at xxv. Contradicting itself, the FEIS then states that a bridge in the ocean “would adversely impact the shoreline . . . the outcome of coastal processes along the beach and wildlife, including protected species that use beach habitat.” FEIS at xxviii. The FEIS fails to take a “hard look” at the adverse impacts from placing a transportation corridor within such a dynamic system. The Phased Approach instead avoids a hard look by proposing a monitoring program and by stating without evaluating that the future phases of the Phased Approach may incorporate any portion of any of the Parallel Bridge alternatives.

C. The FEIS fails to identify a preferred alternative and instead writes a blank check without adequate review of all the foreseeable environmental impacts.

The FEIS’s proposed “mix and match” approach cannot be supported by the NEPA analysis. The “mix and match” approach assumes that any and every combination of impacts has been adequately analyzed. Unfortunately, this approach fails to recognize that each alternative—bridges, nourishment, and dune building—will have different environmental impacts (direct, indirect, and cumulative) depending on the magnitude of the alternative (e.g. the total miles and location of nourishment), the sequence of chosen alternatives, the timing relative to shoreline changing events, and the scope and location of the initiating event (e.g. location and size of a breach or punctuated shoreline erosion). The FEIS inadequately evaluate the reasonably foreseeable environmental impacts and cannot support a “mix and match” approach. The FEIS cannot avoid the analysis by simply stating that these actions will be conducted within the existing right-of-way.

D. The FEIS fails to evaluate the ecological needs of the Refuge and the manner in which the Phased Approach interferes with the beneficial processes of this dynamic shoreline.

The FEIS inadequately analyzes the environmental impacts related to shoreline erosion and new inlet formation; endangered and threatened species; and impacts to wetlands. NCDOT mistakenly assumes in its analysis that natural shoreline movement is the equivalent of natural barrier island movement. Rather than allow the barrier island to move in a natural manner that promotes ecological sustainability of the system, wildlife habitat, and natural coastal processes, the Phased Approach will eliminate natural barrier island processes for both the short and long-term. The Phased Approach will not preserve the natural barrier island system or minimize impacts to Hatteras Island or maintain access

in a manner that has minimal impacts on the environment. FEIS at 4-167. Because it fails to analyze these beneficial processes of the environment within the project area, the Phased Approach analysis is inadequate.

1. Shoreline erosion, inlet formation, and ocean overwash

The proposed project is located in an extremely dynamic coastal area, which includes an active tidal inlet (Oregon Inlet) and a coast subject to significant shoreline erosion and ocean overwash. Within the project area, NC 12 is subject to perpetual threats from the shoreline erosion and ocean overwash and because of the dynamic nature of the system is subject to regular maintenance. The FEIS does not adequately analyze the effects of shoreline erosion, inlet creation, and ocean overwash on the proposed project area. Rather, the FEIS neglects the beneficial impacts to the environment, as well as the ways in which these processes make the Phased Approach an inappropriate solution.

We have attached a paper entitled, “North Carolina’s Coasts in Crisis: A Vision for the Future,” by S.R. Riggs, et al., which addresses the processes of barrier island formation, shoreline erosion, inlet creation, ocean overwash, climate change, and sea level rise, their beneficial effects on the environment, and their detrimental effects on infrastructure constructed on dynamic barrier islands. The paper is also available at: <http://www.coastal.geology.ecu.edu/NCCOHAZ/downloads/Coasts%20in%20Crisis%20Booklet.pdf>).

The authors have also penned a more detailed report entitled “NC Coasts in Crisis: A Case Study,” which is scheduled for publication by the U.S. Geological Survey. One of the authors, Dr. Stan Riggs, has written a third paper entitled, “Eye of a Human Hurricane: Pea Island, Oregon Inlet, and Bodie Island, Northern Outer Banks, NC,” which is scheduled to be published as part of a book by the Geological Society of America. Both papers offer greater technical and scientific detail on the inappropriateness of the Phased Approach in light of dynamic barrier island geography, climate change, and the predicted associated sea level rise. These two papers are scheduled for publication in 2009, and we ask that you refrain from issuing any Record of Decision until you have had a chance to receive and review them.

a. Shoreline erosion

The FEIS, by utilizing historic annual average erosion rates, may underestimate the amount of erosion that will occur and the projected shoreline movement through 2060 may be substantially conservative. In addition, sea level rise is also predicted to increase erosion rates. Finally, by utilizing an average erosion rate as a prediction tool for the shoreline, the FEIS fails to analyze adequately the importance of large or severe storm events in shaping the proposed project area. Although the effect of Hurricane Katrina and Hurricane Gustave on Gulf of Mexico barrier islands is still being evaluated, there is no doubt that major weather events shape the barrier islands. Historically, major storm events have a dramatic effect on the project area—creating inlets, increasing erosion. By failing to account for the impact from severe weather events, the FEIS arbitrarily

discounts the impacts of severe weather. Federal regulations require, however, that environmental impact statements analyze reasonably foreseeable catastrophic events, “even if their probability of occurrence is low.” 40 C.F.R. § 1502.22 (2005).

b. Inlet formation

Inlets are very high energy and difficult to predict. As the FEIS accurately summarizes, experts have identified five potential inlet locations along Pea Island. The FEIS ignores, however, the beneficial impacts to the environment of natural inlet creation, migration, and closure. For example, during severe weather events, inlets act as release valves, allowing storm surge that has entered the sound to exit. Inlets also help to protect shallow sand shoals.

c. Ocean overwash

Ocean overwash is a natural and essential part of barrier island dynamics. Overwash moves sand to the sound side of barrier islands. Over long time scales, these processes enable barrier islands to respond to sea level rise by moving the island landward. On shorter, multi-year time scales, overwash processes deposit sand and cause landform changes, both of which are needed to maintain a healthy ecosystem for coastal plant and animal species. Because ocean overwash is detrimental to the transportation corridor, engineering practices such as artificial dune building, sand bags, and road scraping are used to prevent or respond to ocean overwash. This deprives barrier islands of the necessary resilience to respond to sea level rise and prevents habitat creation. The FEIS does not analyze the environmental benefits from removing the transportation corridor and allowing ocean overwash.

2. Endangered and threatened species

The FEIS states that a parallel bridge corridor is likely to adversely affect the endangered leatherback sea turtle and piping plover and the threatened green sea turtle and loggerhead sea turtle. FEIS at 4-120, 4-122 to 123, 4-124, 4-125.

To address the impacts on these species, NCDOT has agreed to take reasonable and prudent measures as authorized in the *Biological and Conference Opinions* (USFWS 2008). While the FEIS states that a parallel bridge corridor is likely to adversely affect these species, the Pamlico Sound Bridge alternative is not likely to adversely affect any federally protected species. FEIS at 4-138.

The reasonable and prudent measures are not adequate to prevent impacts of a long-term construction schedule, as is proposed in the Phased Approach, required long-term nourishment, or any combination thereof. Furthermore, as discussed elsewhere, the Phased Approach impermissibly interferes with the Fish and Wildlife Service’s ability to manage the Refuge for the benefit of these species. These measures are designed to offset immediate impacts and are wholly inadequate to address the substantive impacts from the Phased Approach. It is of particular concern that the FEIS proposes any mix and match of

short bridge construction, beach renourishment, and dune building. Each of these will have specific impacts on protected species, such as the piping plover and sea turtles, as well as impacts to the natural biota. Moreover, overwash is part of ecologically important inlet creation, migration and closure and over time, helps to create new moist sand intertidal feeding areas on the sound side. Without overwash, erosion continues to threaten sound side wetlands. Limited overwash leads to loss of piping plover sound side feeding habitat and nesting habitat and prevents natural maintenance of existing habitat by increasing vegetative succession. Furthermore, the Phased Approach may result in a steeper beach profile, reducing the available intertidal area.

3. Wetlands

The various bridge alternatives assessed in the FEIS all impact wetlands and will require authorization under Section 404 of the Clean Water Act. The Pamlico Sound alternative impacts on wetlands and the aquatic environment are 4.18 to 4.84 acres of wetlands (depending on the terminus) including only .01 acres of CAMA wetlands. FEIS at 4-94. Of the alternatives assessed, the Parallel bridge/road north/bridge south alternative impacts by far the largest amount of wetlands: 78.2 acres of wetlands including 11.8 acres of CAMA wetlands. FEIS at 4-96. The parallel bridge/all bridge alternative impacts the second largest amount of wetlands: 12.3 acres of wetlands including 2.2 acres of CAMA wetlands. *Id.* The parallel bridge/nourishment alternative would impact an extensive but unquantified amount of wetlands and waters. While the FEIS states that this alternative would impact 4.3 acres of wetlands including .3 acres of CAMA wetlands, this estimate does not include extensive filling of near-shore waters associated with the required nourishment. *Id.* The FEIS states that 6.3 miles of beach will be nourished every four years. FEIS at 2-69.

The Phased Approach would impact 3.1 acres of wetlands, including 0.3 acres of CAMA coastal wetlands. FEIS at 4-96. This lower wetland impact appears to be based on the assumption that sand movement will naturally fill wetlands prior to implementing “phases” that include wetlands that currently exist. FEIS at 4-97. This assumption fails to consider the impacts from construction of the phases and the timing of the phases. Construction impacts from the Phased Approach include constructing a service road that will be in service for decades. Also, when and where wetlands are naturally filled may or may not be within the same time frame as construction of the Phased Approach. Therefore, the FEIS may underestimate the wetland impacts by assuming that the Phased Approach will occur in coordination with the natural erosion and overwash cycle. Furthermore, if overwash occurs before a planned construction phase, the NC DOT will push back any sand to recreate dunes and to stabilize NC 12. This action prevents the natural filling of wetlands in the right of way, making it more likely that the actual construction of the Phased Approach will require the fill of jurisdictional wetlands. Again, these assumptions may underestimate the actual impact to wetlands from the Phased Approach.

These impacts must be assessed and considered in the 404 permit review as a part of the Phased Approach per 33 C.F.R. § 325.1 (d)(2):

All activities which the applicant plans to undertake which are reasonably related to the same project and for which a DA permit would be required should be included in the same permit application. District engineers should reject, as incomplete, any permit application which fails to comply with this requirement. For example, a permit application for a marina will include dredging required for access as well as any fill associate with construction of the marina. 33 C.F.R. § 325.1 (d)(2).

The FEIS summarily dismisses these impacts and fails to evaluate the total wetland impacts from the Phased Approach.

Section 404(a) of the CWA, 33 U.S.C. § 1344(a), authorizes the Secretary of the Army, acting through the USACOE, to issue permits for the discharge of dredged or fill materials into wetlands or other waters. Section 404(b)(1) of the CWA, 33 U.S.C. § 1344(b)(1), directs the Environmental Protection Agency to issue guidelines (“404(b)(1) Guidelines”) defining the circumstances in which dredged or fill material may be discharged into wetlands or other waters. The USACOE must deny applications for section 404 permits if the discharge that would be authorized by the permit would not comply with EPA’s 404(b)(1) Guidelines. 33 C.F.R. § 320.4(a). The 404(b)(1) Guidelines prohibit issuance of a permit where:

- (i) There is a practicable alternative to the proposed discharge that would have less adverse effect on the aquatic ecosystem, so long as such alternative does not have other significant adverse environmental consequences; or
- (ii) The proposed discharge will result in significant degradation of the aquatic ecosystem . . . ; or
- (iii) The proposed discharge does not include all appropriate and practicable measures to minimize potential harm to the aquatic ecosystem; or
- (iv) There does not exist sufficient information to make a reasonable judgment as to whether the proposed discharge will comply with these Guidelines.

40 C.F.R. §230.12(a)(3). An alternative to discharge to a wetland “is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.” 40 C.F.R. § 230.10(a)(2). Where a discharge is proposed for a wetland or other special aquatic site, all practicable alternatives to the proposed discharge which do not involve a discharge to the wetland “are presumed to have less adverse impact on the aquatic ecosystem, unless clearly demonstrated otherwise.” 40 C.F.R. § 230.10(a)(3). “[T]he applicant and the [Corps] are obligated to determine the feasibility of the least environmentally damaging alternatives

that serve the basic project purpose. If such an alternative exists . . . the CWA compels that the alternative be considered and selected unless proven impracticable.” *Utahns for Better Transp. v. U.S. Dept. of Transp.*, 305 F.3d 1152, 1188-1189 (10th Cir. 2002). Furthermore, the total temporary and permanent biotic impacts (which include wetland impacts) from construction of either of the phased approaches are not insignificant (48.5 acres temporary biotic impact, FEIS at 4-91). The Pamlico Sound Bridge is a practicable alternative with the least impact on aquatic ecosystems and wetlands, and is the only alternative assessed in the FEIS that may be fully permitted under Section 404.

IV. The Phased Approach fails to address public access to the Refuge.

The FEIS identifies continued access to the Refuge as an area of concern. We support continued public access to the Refuge, as long as access is compatible with Refuge’s mission. Access is not contingent upon maintenance of NC 12 and many public lands provide for public access in ways that are compatible with the nature of the public lands and associated resources. We strongly recommend that access be accommodated within a reasonable refuge management plan.

The Phased Approach, however, will not provide compatible access and will severely limit or eliminate fishing, surfing, birding, and other resource dependent activities. Because the Phased Approach eliminates Refuge resources that create the need for adequate access, it is not a viable alternative.

V. The Phased Approach may not be able to be funded or comply with state or federal legal requirements.

The FEIS fails to identify a preferred alternative. Instead, NCDOT proposes to move forward with an initial phase—build a bridge substantially similar to the existing Bonner Bridge—and then monitor, evaluate, and implement additional phases on an indeterminate timeline. The initial phase standing alone cannot be legally permitted because it violates federal and state laws including NEPA and the National Wildlife Refuge Improvement Act. NCDOT and FHWA attempt to evade this legal hurdle by proposing additional phases, but fail to provide adequate specificity to analyze the alternatives or adequate legal assurances that any additional phases could be built. The FEIS explicitly states that the construction of future phases is dependent on funding, results of a shoreline monitoring program (currently undeveloped), and whether future phases can be permitted pursuant to federal and state law. Thus, future phases could be dramatically different or may not occur at all. Because this is a carte blanche approach, the NEPA analysis is inadequate and the Phased Approach does not meet legal requirements.

The FEIS and the merger process acknowledge the legal uncertainties surrounding future phases. NCDOT’s summary of the merger process which identified phase I of the Phased Approach as the least environmentally damaging practical alternative state, “[t]he agencies concur, based on information available today, they cannot conclusively say that permits or approvals will or will not be granted for these additional phases.” The FEIS

also admits the permitting difficulties for additional phases (“Phases II to IV present **substantial** challenges to obtaining permit approvals.”). By choosing the Phased Approach, NCDOT and FHWA have locked in place a transportation corridor that will need significant management for the life of the project and this management may not be permitted pursuant to federal or state law. To evade this legal box, NCDOT simply states that additional phases may or may not be built. This approach, however, ignores the natural environment of Hatteras Island—once phase I is built, NCDOT must continue the expensive and uncertain maintenance of NC 12. Whatever future measures are selected, NCDOT will be left with only options that either cannot meet applicable legal requirements or those that systematically destroy the Refuge.

VI. Because the terminal groin is an essential component of the Phased Approach, the effects from its removal or retention must be addressed in the FEIS and a compatibility determination is required.

The current permit for the terminal groin is explicit that it is only valid for the protection of the “*existing* Herbert C. Bonner bridge” and the permit terminates once the groin is no longer used for that purpose. In anticipation of replacing Bonner Bridge, NCDOT has two options: (1) comply with paragraph (17) of the permit, which requires the removal of the terminal groin and restore the land to its original condition (2) or apply for a new permit to maintain the terminal groin in its existing location. In order to comply with federal law, a full NEPA analysis and a compatibility determination are required for either option. The FEIS states the terminal groin is an essential part of the Phased Approach and the Parallel Bridge but fails completely to assess the environmental impacts of retaining the groin.

A. The FEIS is inadequate because the terminal groin is an essential part of the Phased Approach and the effects from either retaining it or removing it must be analyzed.

The FEIS states that the terminal groin will be required to be retained as part of the Phased Approach. FEIS at 2-147. Because the terminal groin is an essential component of the Phased Approach, the FEIS must analyze the impacts from either retention or removal of the terminal groin. The CEQ Guidelines are clear: “proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement.” 40 C.F.R. § 1502.4(a). Circumstances in which actions should be considered and evaluated together include:

- the situation in which one action “automatically trigger[s]” another action,
- the situation in which one action “cannot or will not proceed unless” another action is “taken previously or simultaneously,”
- the situation in which two actions “are interdependent parts of a large action,” and

- the situation in which two actions have “cumulatively significant impacts.”⁴

40 C.F.R. § 1508.25(a).

Breaking such actions “into small component parts” to avoid reviewing them together “is to engage in illegal ‘segmentation.’” *New River Valley Greens v. U.S.D.O.T.*, No. 97-1978, 1998 U.S. App. LEXIS 22127, **8-9 (4th Cir. Sep. 10, 1998) (quoting 40 C.F.R. 1508.27(b)(7)). A hallmark of segmentation is an initial proposed action involving “such a large and irretrievable commitment of resources that it may virtually force a larger or related project to go forward notwithstanding the environmental consequences.”

Id. Building the Parallel Bridge is one such “irretrievable commitment of resources” that will inevitably force later projects, even though their environmental effects are not analyzed in the FEIS. These later projects include the re-permitting of the terminal groin, as well as beach nourishment and relocation of NC 12 outside of the easement in response to storm events, if later phases are not funded and cannot be implemented, as appears to be likely.

Each of the four bullet-pointed criteria above aptly describes the relationship of the construction of the replacement bridge (Phase I) to subsequent phases (the re-permitting of the groin as well as either Phases II through IV or, if the state fails to be able to fund them, then beach nourishment and relocation of sections of NC 12 as necessary in response to storm events and erosion). Accordingly, the failure to consider the effects of all the phases or projects together in one impact statement amounts to improper segmentation.

The retention or removal of the groin will “significantly affect” the Refuge and the FEIS must address those effects. “Significantly” includes an evaluation of the context of the impact and the intensity of the impact. The intensity of the impact includes an analysis of such criteria as the unique geography of the site, the level of controversy surrounding the impacts, the uncertainty of the risks associated with the impact, whether the impact is related to other actions, and adverse affects on endangered or threatened species and associated habitat. See 40 C.F.R. §1508.27. The terminal groin significantly impacts the Refuge in many ways, including stopping the southward migration of the northern portion of Pea Island, producing sand accretion at the north end, and affecting down drift erosion along the Refuge. Not only are there important issues relating to groin induced erosion and whether the existing monitoring and mitigation requirements adequately address sand quantity issues, but there also are important questions regarding the quality and compatibility of sand that is placed on refuge beaches as part of a replenishment project. These direct affects impact the quantity and quality of habitat

⁴ An action will have a “cumulatively significant impact” if, although its individual effect is minor, its effect is “collectively significant” when considered together with “*other past, present, and reasonably foreseeable future actions* regardless of what agency or person undertakes such action.” *Western N.C. Alliance v. N.C. D.O.T.*, 312 F. Supp. 2d 765, 771 (E.D.N.C. 2003) (emphasis in original).

available within the Refuge. Any action, either removing the terminal groin or issuing a new permit, will require an analysis of the impacts to the quantity and quality of the habitat for the migratory birds, sea turtles, and other wildlife for which the Refuge was established.

Furthermore, the NCDOT must address the impacts from the connected project of replacing Bonner Bridge. NEPA requires considering the continued impacts from the terminal groin and any action that “cannot or will not proceed unless other actions are taken previously or simultaneously . . . [or] are interdependent parts of a larger action and depend on the larger action for their justification.” 40 C.F.R. § 1508.25 (a)(1). Likewise, an impact of the Phased Approach is the artificial dune that runs the length of Pea Island, with its adverse environmental impacts, will continue to exist until the roadway is replaced in phases by a bridge on pilings as discussed in the FEIS. The terminal groin is an essential component in the replacement of Bonner Bridge and impacts from the terminal groin are intertwined with impacts related to the Phased Approach or other Parallel approach alternatives.

Indeed, we understand that the FHWA agrees that the terminal groin is an essential part of the Phased Approach Parallel Bridge and will not let federal funding for any part of the project until a new permit is issued to retain the groin. If this is true, however, FHWA has apparently been persuaded by NCDOT to segment the NEPA analysis for the groin retention. If so, FHWA should reconsider this position as it constitutes an acknowledged and unlawful segmentation of the NEPA analysis.

B. The Section 4(f) Evaluation is incomplete because it fails to analyze the Refuge use and impacts resulting from retention of the terminal groin under the Phased Approach alternative.

As discussed in section II(A), *supra*, the Section 4(f) Evaluation does not address the inevitable use of the Refuge that will result from retaining the terminal groin, which does not lie within the existing NC 12 easement. The encroachment and adverse impacts to the Refuge from the perpetual existence and maintenance of the terminal groin cannot simply be ignored in the Section 4(f) analysis. Failure to address the use of the Refuge resulting from retention of the terminal groin, which is integral to the Phased Approach, further underscores the inadequacy of the Section 4(f) Evaluation and the indefensibility of the conclusion reached therein, namely, that the Phased Approach is the least overall harm alternative.

C. FWS must complete a compatibility determination for either retaining or removing the terminal groin and it is unlikely that retaining the terminal groin could be found to be compatible.

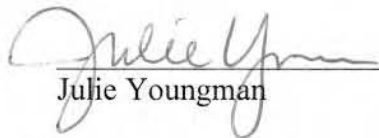
As discussed in more detail above, federal regulations related to wildlife refuges have changed since the terminal groin was initially permitted. Congress passed the National Wildlife Refuge Improvement Act (Act) in 1997. The Act prohibits permitting a “new use of a refuge or expand[ing], renew[ing], or extend[ing] an existing use of a refuge,” without a compatibility determination. 16 U.S.C. § 668ee. Because permitting

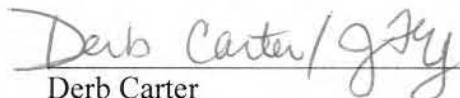
the terminal groin is a part of the proposed use of the Refuge for a bridge built in phases to eventually replace most of NC 12 through the Refuge, the compatibility determination must assess both the permitting of the terminal groin and the phased bridge construction through the Refuge. In order for the terminal groin to be retained, the compatibility determination must conclude that the long-term impacts associated with the terminal groin and the connected replacement of the Bonner Bridge “will not materially interfere with or detract from the fulfillment of the mission of the System or the purpose of the refuge.” 16 U.S.C. § 668ee. The compatibility determination must be issued before a new permit and must fully consider the impact on wildlife habitat, including the recently designated piping plover critical habitat.

Retention of the terminal groin will also result in adverse modification of designated piping plover critical habitat. The existing terminal groin occupies intertidal habitat that is important to wintering piping plovers. Removal of the groin as required by the permit if no longer necessary to protect the existing Bonner Bridge will make this habitat available. Retention of the groin to protect a new Parallel Bridge will result in adverse modification of critical habitat. In addition, retention of the terminal groin will interfere with natural inlet processes that create habitat conditions that are beneficial to piping plovers.

We recognize the need to replace Bonner Bridge and support construction of a new bridge that provides dependable transportation to Hatteras Island, is environmentally sound, and is economically reasonable. We support the Pamlico Sound Bridge corridor alternative and believe that it satisfies these objectives.

Thank you for your consideration of our comments.


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Appendix B: Road/Pea Island National Wildlife Refuge/Cape Hatteras National Seashore Timeline

The following timeline was assembled to help better understand the evolutionary relationship between the transportation corridor (on Bodie and Hatteras Islands), the Cape Hatteras National Seashore and the Pea Island National Wildlife Refuge. This timeline was developed by NCDOT and FHWA and shared with the US Fish & Wildlife Service in a meeting on March 19, 2009 for review and comment. The timeline was also provided to the Merger Team for the May 21, 2009 Merger team meeting.

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
1846	Oregon Inlet formed in a hurricane	http://www.coastalguide.com/parcel/oregoninletgetname.shtml
1918	For the first time a road in the Project Area appears on an official map. However, the map only covers the section of Hatteras Island from Rodanthe to the south.	U.S. Coast and Geodetic Survey map of Wimble Shoals to Ocracoke Inlet, 1918 http://dc.lib.unc.edu/cdm4/item_viewer.php?CISOROOT=/ncmaps&CISOPTR=948&CISOBX=1&REC=10
1920s	Tug and barge operation by Tillet over Oregon Inlet, sand roadway on islands "sand trail predated the refuge" "automobiles appeared in the 1920s" "Cars appeared at Chicamacomico in the 1920s; when a private car ferry opened at Oregon Inlet, villagers drove to the end of Pea Island and caught the ferry to Bodie Island and on to Manteo." N.C. enacts legislation consenting to acquisitions and condemnations by the U.S. to establish migratory bird sanctuaries and wild life refuges in the State as required by the federal Migratory Bird Conservation Act of 1929. This consent will allow the subsequent creation of PINWR in 1938.	PINWR CCP (2006) pp. 7, 25 & 39 Ethnohistorical Description of the Eight Villages adjoining Cape Hatteras National Seashore and Interpretive Themes of History and Heritage, NPS (2005) at pp.20 and 84
1929	N.C. enacts legislation consenting to acquisitions and condemnations by the U.S. to establish migratory bird sanctuaries and wild life refuges in the State as required by the federal Migratory Bird Conservation Act of 1929. This consent will allow the subsequent creation of PINWR in 1938.	Chap 163, s.I., codified at 8059(c) in the NC Code of 1939
1932 or 1933	A storm re-opens New Inlet on Pea Island (this inlet had closed in 1922) "The 1933 storm opened the inlet, and the State of North Carolina built a wooden bridge to Pea Island, the remnants of which can be seen today, in 2004."	Past Present and Future Inlets of the Outer Banks Barrier Islands, p.6 http://www.coastal.geology.ecu.edu/NCCOHAZ/downloads/Past%20Present%20and%20Future%20Inlets.pdf
May 1933	Sen. Josiah Bailey wrote to N.C. Governor Ehringhaus suggesting that state officials petition the federal government to use public works money to build a road south of Oregon Inlet	Ethnohistorical Description of the Eight Villages adjoining Cape Hatteras National Seashore and Interpretive Themes of History and Heritage, NPS (2005) at p.75 http://www.foresthistory.org/Fellowships/Senter.pdf p.346
1933	N.C. Dept of Conservation and Development announced a "North Carolina Coastal Development Project" of dune building/reforestation work, a Hatteras Island highway, and a national coastal park.	http://www.foresthistory.org/Fellowships/Senter.pdf p.348
1933	State Highway System Map shows no roads, but does show a	N.C.State Highway Commission Map, 1933

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
1934	toll ferry at Oregon Inlet and a free ferry at New Inlet	http://dc.lib.unc.edu/cdm4/document.php?CISOROOT=/ncmaps&CISOPTR=759&REC=9
1934-1941	An NPS survey recommends a hard surface road to Oregon Inlet, and an oiled road from Oregon Inlet to Hatteras Inlet. CCC implements dike construction, dune enhancement, water control structure installation, plantings, fencing, maintaining truck trails, etc. "The North Carolina Beach Erosion Control Project formally began on October 11, 1934, when CCC Camp Virginia Dare was established near Manteo." "On April 15, 1936, the CCC Camp at Manteo was turned over to the U.S Agricultural Department's Biological Survey, and enrollees worked on land then being acquired for a wildlife sanctuary on Peas Island." "WPA laborers also built a new road in Chicamacomico from topsoil collected from north Rodanthe; villagers with memories of World War I jokingly referred to it as "Burma Road." The second hurricane in a month strikes the Outer Banks, causing severe beach erosion, especially near Cape Point on Hatteras Island, some of which is owned by the Phipps family. Subsequently, the family decides to donate the land for use in the establishment of Cape Hatteras State Park, envisioned as the core of a larger future national park.	The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66, NPS, p. 14-15 PINWR CCP (2006) p. 9 The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66, NPS, p. 12-13; see also p.27 Ethnohistorical Description of the Eight Villages adjoining Cape Hatteras National Seashore and Interpretive Themes of History and Heritage, NPS (2005) at p.105; see also pp. 223 and 481. "The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
January 1934	The Daily Advance announces that the federal government was planning to put four or five thousand men to work on erosion control on the Outer Banks.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
1934	N.C. Highway Commission begins subsidizing Tillet's ferry across Oregon Inlet	PINWR CCP (2006) p. 39 and http://www.ncbeaches.com/Features/Attractions/Ferries/
October 1934	The "North Carolina Beach Erosion Control Project" formally begins with the establishment of CCC Camp Virginia Dare near Manteo.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
May 1937	PINWR authorized by Congress	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
August 17, 1937	Congress passed legislation that will establish CHNSRA once 10,000 acres of land is donated. PINWR continues as a refuge under the Secretary of Agriculture, but will also be part of CHNSRA and shall be administered for recreational uses not inconsistent with the refuge purposes, by the NPS.	27 50 Stat. 669 "The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix B
1937	CCC crews from Camp Virginia Dare excavated a series of artificial ponds after first building a line of barrier dunes for their protection.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.27
1938	Dare County Map shows a toll ferry across Oregon Inlet and unimproved road the length of PINWR, with three "highway bridges" crossing New Inlet	State Highway and Public Works Commission and Federal Works Agency map, 1938 http://dc.lib.unc.edu/cdm4/item_viewer.php?CISOROOT=/ncmaps&CISOPTR=471&CISOBX=1&REC=21
January 1938	Early NPS surveys recommended "restricted driving along the ocean beach when and where consistent with other uses," but also recommended roads because, as the caption on this photo noted, "auto travel on the sand roads is difficult and severe on mechanical parts." ("Report on Recommendations for Boundaries of the Cape Hatteras National Seashore," (NPS, January 1938))	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p. 12
March 1938	NPS issues a prospectus for the Seashore that expresses a desire for no road construction between Oregon and Hatteras Inlets	Prospectus of Cape Hatteras National Seashore, 1938
April 8, 1938	PINWR established by Executive Order 7864	3 Fed. Reg. 734 (April 8, 1938) PINWR CCP (2006) p. 7
April – October 1938	U. S. Secretary of Agriculture acquired the land for PINWR through condemnation actions. In some instances the land is taken subject to existing roads; and subject to N.C.'s rights to construct and maintain canals, to deposit dredged material, to construct jetties, and to plant grass to prevent the shifting of sands.	Deed Book 19, Page 451-453, Dare County, North Carolina; Deed Book 21, Page 81-86, Dare County, North Carolina.
March 1939	NC passes legislation establishing the N.C. Seashore Commission	"Chapter 257, Public Laws of North Carolina, 1939

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
	needed to assemble the land that must be donated to the U.S. in order to establish the CHNSRA. The law expressly conditions all conveyances of land upon N.C. retaining its rights to title and control of existing highways and roads and to construct future roads as needed	
1940	The Bureau of Biological Survey, which was under the Department of Agriculture, is combined with the Bureau of Fisheries to form the Fish and Wildlife Service. The FWS is placed under the Department of Interior	54 Stat. 1232
December 1941	Beach erosion controls stops (WWII)	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
1942	N.C. Highway Commission reimburses Tillet for ferry, tolls eliminated	PINWR CCP (2006) p. 39 and http://www.ncbeaches.com/Features/Attractions/Ferries/
March 1945	After oil companies become interested in the Outer Banks, the North Carolina General Assembly authorizes discontinuance of land acquisition efforts for the seashore for two years.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
Late 1940s	Paved roads link Hatteras Island villages	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p. 131
1949	Associate NPS Director Demeray states that "the Service no longer opposes road construction on the Outer Banks." NPS Chief of Land and Recreational Planning Division Wirth "emphatically assures locals that the Park Service fully realized that the communities along the banks would have to be served, and will cooperate fully with the State in providing roads." Six months later Wirth says "we are in favor of the road which the state is building."	The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66, NPS, pp.79, 82-85
May 1950	P.L. 81-516, The River and Harbor Act of 1950 authorized the Corps to dredge the ocean bar navigation channel to a depth of 14 feet at Oregon Inlet (dredging didn't occur until 1962)	GAO Oregon Inlet Jetty Project (2002) http://www.gao.gov/new.items/d02803.pdf
1950	Tillet sells ferry service to State	PINWR CCP (2006) p. 39
October, 29	Congress (PL-229) authorized the Secretary of Interior:	Pub.Law 229, 65 Stat. 661

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
1951	"...to convey to the State of North Carolina a permanent easement for the construction of a public road (together with rights for such other uses as may be customary or necessary in the State of North Carolina in connection with the construction or operation of such a road) through the Pea Island National Wildlife Refuge in Dare County, North Carolina, and to accept in return therefore the conveyance of any rights-of-way, easements, or other rights in or claims to land owned by the State of North Carolina not needed for use in the construction or operation of such road."	NCDOT ROW Notebook for Bonner, Tab 7
1951	State constructs clay-surface road	PINWR CCP (2006) p. 39
1952	Paved road through Pea Island	PINWR CCP (2006) p. 39
December 1952 - July 1953	Deeds, conveying NC property to the U.S. for the Seashore, subject to NC's rights to existing and future roads as necessary.	NCDOT ROW Notebook for Bonner, Tab 9
December 1952	The Cape Hatteras Seashore Commission recommends unanimously to Gov. Scott that he transfer several thousand acres of state-owned lands in Dare and Hyde Counties under three deeds to the United States to create the first national seashore. The Council of State approves and Governor Scott formally conveys the property to the federal government. Deed, conveying NC property to the U.S. for the Seashore.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A NCDOT ROW Notebook for Bonner, Tab 8
January 12, 1953	Seashore established by Order of the Secretary of Interior	18 Fed. Reg. 366 (Jan. 12, 1953) "The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.220
May 1953	State operation of ferry begins	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.131
April 1953	US Navy (through NPS) provides one LCU for state ferry	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
May 1954	State quitclaims to the United States all interest that it had on PINWR,	NCDOT ROW Notebook for Bonner, Tab 10

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
July 1954	<p>excepting a previously granted 100 foot permanent easement for right of way to operate and maintain the recently constructed road. We have no record of the U.S. accepting this grant.</p> <p>DOI conveyed a permanent easement in two parcels of land for the construction, operations, and maintenance of a public road across the PINWR. The easement to the State described a parcel of land as a strip of land measuring 100 feet wide, being 50 feet on both sides of a referenced center line. The easement also stated that nothing within the document was to limit or impair the right of the United States to continue to use the property for its intended purposes "not inconsistent with the construction, operation, and maintenance of a public highway thereon." The easement also provided for the construction, operation, and maintenance of a parking area and facilities for a ferry landing to be used in connection with the public road.</p>	NCDOT ROW Notebook for Bonner, Tab 11
1954	US Navy (through NPS) provides two more LCUs for ferry	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.132
May 26, 1955	Deed, conveying NC property to the U.S. for the Seashore, subject to NC's rights to existing and future roads as necessary.	NCDOT ROW Notebook for Bonner, Tab 12
February 1956	Special Use permit from DOI to NCDOT for road in Seashore near Ocracoke Village. It acknowledges that the permit does not relinquish N.C.'s rights as reserved in the 1939 statute creating the Seashore Commission	NCDOT ROW Notebook for Bonner, Tab 13
February 1956	NPS Director Wirth met with North Carolina Gov. Luther B. Hodges, the state highway commissioner, congressional representatives, and others to discuss beach erosion control, roads, and Mission 66, which as separate projects were becoming increasingly entwined. All wanted the NPS erosion control program to pick up where it had left off in 1941, but the Park Service wanted state assistance. Wirth noted that North Carolina was responsible for protecting its roads through the park and that meant going beyond the basic right-of-way..."	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.174

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
April 1956	Return of property to NC from DOI that was previously conveyed, but not in Seashore	NCDOT ROW Notebook for Bonner, Tab 14
August 1956	Congress amends the act of August 21, 1954, to extend its authority to Cape Hatteras National Seashore. The amendment essentially classifies the seashore as a national park for the purposes of the act, which allows the Park Service to use up to \$250,000 to complete the acquisition of in-holdings within the boundary of Cape Hatteras National Seashore. This authority allows Wirth to pay down the Worth judgment but the Service calculates the need for an additional \$400,000.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
November 1956	Final Mission 66 Prospectus for Cape Hatteras National Seashore approved by Director Wirth.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A http://narademo.umiacs.umd.edu/cgi-in/isadg/viewitem.pl?item=10474
September 1957	The North Carolina Council of State approves Director Wirth's request for an additional \$200,000 in aid to complete land acquisition efforts at Cape Hatteras. Wirth is notified on October 22, 1957.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
1957-1958	The NPS constructs a road, parking areas, and campgrounds on both sides of Oregon Inlet	NPS Memorandum of 12/13/57 "Additional Construction Needs at Cape Hatteras to Complete Current Project and Place in Condition for Visitor Use"
April 1958	DOI and NCDOA letters for submerged lands for inclusion in the Cape Hatteras National Seashore	NCDOT ROW Notebook for Bonner, Tab 16
August 1958	As part of the creation of the Cape Hatteras National Seashore, the United States then realized that it had failed to acquire all of the lands within the boundaries designated as Cape Hatteras National Seashore (including the PINWR area). Specifically, the lands located between the low and high tide water lines as well as submerged land in the Oregon Inlet and several islands all of which belonged to North Carolina. Therefore, by deed, North Carolina conveyed these lands to the United States and again expressly reserved the right to operate and maintain the roadway as the State deemed necessary: "...[T]he State of North Carolina and its subdivisions expressly retain	NCDOT ROW Notebook for Bonner, Tab 17

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
	<i>title to and control of all public roads and highways now laid out or established over and upon said lands, and the further right to lay out and establish over and upon said lands such other highways and roads as shall be deemed necessary by the State of North Carolina...</i>	
September 1958	Hurricane Helene hits Cape Hatteras with 100 mile per hour winds, tearing up the new road and destroying some 75 percent of the dune stabilization work completed on Ocracoke Island.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
March 11, 1959	The Solicitor of the U.S. Dept of Interior files a Declaration of Taking to quiet title, for all of CHNSRA on Hatteras Island. The action is for a fee simple subject to existing valid reservations, public roads, highways, and easements for public utilities. The Court grants the requested title on March 17, 1959.	NCDOT ROW Notebook for Bonner, Tab 18
Late 1950s-early 1960s	USFWS constructs three man-made impoundments on PINWR	PINWR CCP p.25
September 1960	Hurricane Donna hits the Outer Banks with winds up to 123 miles per hour causing extensive damage to the dune system on Ocracoke Island and scattered damage to dunes, buildings, roads, walks and vegetation throughout the park.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
January 1961	Special Use permit from DOI to NCDOT for road on Bodie Island at Oregon Inlet in Seashore. The permit notes that the N.C. State Highway Commission and NPS will consider exchanging the lands covered by the permit for land used for the present ferry and approach road.	NCDOT ROW Notebook for Bonner, Tab 19
July 1961	"All members of the [Master Plan Study Team] were concerned with the fact that it is difficult to see the ocean," said Superintendent Gibbs in July 1961. According to Gibbs, "the continued development of the dune stabilization program and establishment of vegetative cover give the visitor the feeling of traveling in a vacuum where it is impossible to view the seashore, which is the primary reason for coming to the park." To rectify this problem, the Master Plan Study Team proposed to construct a scenic bypass road somewhere along the middle of Hatteras Island that might for a mile or so provide a direct ocean view from the	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.169

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
	<p>roadway.698</p> <p>Some elevated platforms would be constructed, especially in the Pea Island Refuge where terrain features facilitated the enterprise, but the scenic drive was not to be. The expense and inefficiency of maintaining an unprotected road so close to the ocean was not feasible, and the lack of ocean views from the road remains an issue at the seashore to the present time. ("The Creation and Establishment of Cape Hatteras National Seashore (2007)")</p>	
August 1961	<p>NPS issued a press release discussing its support for congressional legislation that would allow the agency to help the state of North Carolina build a bridge across Oregon Inlet...The Park Service was interested in helping to pay for the bridge, which reversed its early position, if for no other reason than the congestion generated frequent criticism both by the public and in the press...The Park Service acknowledged that such a bridge was a long-sought goal of the state and those living in the Outer Banks but was a cost beyond their means. NPS staff also realized what a benefit it would be for the park and its visitors to have the bottleneck at Oregon Inlet eliminated. Three quarters of the bridge was to be paid by the U. S. Government through NPS and Bureau of Public Roads accounts..."</p>	<p>"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", p.190</p>
March 1962	<p>The "Ash Wednesday" Storm, a "nor'easter," opens an inlet north of Buxton on Hatteras Island which takes the Army Corps of Engineers one year to repair.</p>	<p>"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A http://www.publicaffairs.noaa.gov/releases2003/may03/noaa03r126b.html</p>
1962	<p>USACE begins dredging Oregon Inlet (later occurs every year)</p>	
October 11, 1962	<p>Congress authorizes the Interior Department to contribute \$500,000 toward the cost of constructing a bridge across Ocracoke Inlet, the purpose being "to facilitate visitor travel within the Cape Hatteras National Seashore." The remainder is to be funded with Federal-Aid Highway funds using the normal 50 percent pro-rata share. The State</p>	<p>Pub.Law 87-799, 76 Stat. 909 (Oct. 11, 1962) and Senate Report 2158, Sept 26, 1962. "The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A</p>

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
	will own and maintain the bridge. The Assistant Secretary of Interior wrote a letter supporting this bill based on the State's secondary system and ferries being the sole access for the entire Seashore. He called the bridge "a basic park feature."	
1962	Bridge over Oregon Inlet begins construction. NPS issues a special use permit to N.C. for a construction staging area and construction access.	NCDOT ROW Notebook Tab 20. "The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", page 193
1962	Part of NC 12 on PINWR washes away, North Carolina coordinated with the U.S. Department of Interior to relocate the road	Deed Book 116, Page 200, Dare County, North Carolina
1962-1965	USACE maintained the Oregon Inlet channel using hopper dredges, which remove dredged sand from the area.	http://www.publicaffairs.noaa.gov/releases2003/may03/noaa03r126b.html
July 1963	NPS Special Use Permit No. CAHA-3-63 for construction of bridge	NCDOT ROW Notebook for Bonner, Tab 22
October 1963	United States conveyed a Deed of Easement to the State for the relocated portion of NC 12	NCDOT ROW Notebook for Bonner, Tab 23
1963	Ferry service over Oregon Inlet ceases	PINWR CCP (2006) p. 39
September 1964	Hurricane Gladys causes extensive damage to the seashore with high waves and winds at 55 mph and gust up to 68 mph. Many dunes destroyed on Pea Island and around Oregon Inlet, including those protecting new Bonner bridge.	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
1965-1982	USACE maintained the Oregon Inlet channel primarily by using sidecast dredges, which redeposit sand adjacent to the dredged area.	http://www.publicaffairs.noaa.gov/releases2003/may03/noaa03r126b.html
1966	National Wildlife Refuge Administration Act of 1966 establishes refuge authority and addresses management of refuges. The law requires uses of refuges to be compatible with the purpose of the refuge	http://www.fws.gov/laws/lawsdigest/nwrsact.html
February 1967	FWS grants a right of entry to the State via a letter, to construct a relocated section of NC12 in PINWR	NCDOT ROW Notebook for Bonner, Tab 24
March 1967	Special Use permit from DOI to NCDOT for relocation of NC between mileposts 38 and 40.	NCDOT ROW Notebook for Bonner, Tab 25

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
September 1970	Special Use permit from DOI to NCDOT for areas along NC 12 to be provided for gulls to break open shellfish	NCDOT ROW Notebook for Bonner, Tab 26
December 1970	Congress authorizes dual jetty system for Oregon Inlet	http://www.publicaffairs.noaa.gov/releases2003/may03/noaa03r126b.html
April 1973	Special Use permit from DOI to NCDOT for relocation of NC 12 near Buxton	NCDOT ROW Notebook for Bonner, Tab 28
June 1973	Letter from DOI/NPS to NCDOT stating that Special Use Permits are adequate for the relocation of NC 12 and that exchange of fee titles is not required. Acknowledges that the State's original right of way is owned in fee, and that future relocations will be needed after future storms.	NCDOT ROW Notebook for Bonner, Tab 27
September 1973	NPS briefing statement is issued to explain the termination of erosion control program in the Outer Banks	"The Creation and Establishment of Cape Hatteras National Seashore: The Great Depression through Mission 66 (NPS 2007)", Appendix A
July 1975	MOA between NPS & USFWS to work together to manage PINWR & Seashore	PINWR CCP (2006) p. 9
February 1976	Special Use permit from DOI to NCDOT for NC 12 near Ocracoke	NCDOT ROW Notebook for Bonner, Tab 30
March 1977	Special Use permit from DOI to NCDOT for ferry boat landing in Ocracoke	NCDOT ROW Notebook for Bonner, Tab 31
June 1977	Special Use permit from DOI to NCDOT for Ocracoke Ferry information signs at Whalebone Junction	NCDOT ROW Notebook for Bonner, Tab 32
September 1977	Special Use permit from DOI to NCDOT for State Highway Maintenance area near Silver Lake Marina	NCDOT ROW Notebook for Bonner, Tab 33
May 1979	Special Use permit from DOI to NCDOT for turning lanes to/from NC 12 to Cape Point Lighthouse area	NCDOT ROW Notebook for Bonner, Tab 35
September 1979	Letter from NCDOT to Superintendent for Cape Hatteras referencing width of right-of-way through Cape Hatteras National Sea Shore.	NCDOT ROW Notebook for Bonner, Tab 36
September 1980	Draft Cooperative Agreement on NC 12 Right -of-way *3-14-88 – Special Use Permit No. SERO-CAHA-5700-051 for relocation of 1.9	NCDOT ROW Notebook for Bonner, Tab 37

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
July 1981	miles and dune reshaping on North end of Ocracoke Island. Interior Secretary denies permits for the USACE jetty project at Oregon Inlet and states that this decision is based on the project's incompatibility with use of NPS and FWS lands. The Secretary directs the FWS and NPS to work with the Corps to develop an alternative to the jetties.	http://georgewbush-whitehouse.archives.gov/ceq/ceq_chronol_2001.pdf GAO Oregon Inlet Jetty Project (2002) http://www.gao.gov/new.items/d02803.pdf
December 1986	Special use permit	NCDOT ROW Notebook for Bonner, Tab 38
1987	Amended MOA between NPS & USFWS to work together to manage PINWR & Seashore	PINWR CCP (2006) p. 9
April 1988	permit from DOI/FWS to NCDOT for 11.7 acres of Refuge for Highway permanent ROW and .088 acres for temporary drainage easement.	NCDOT ROW Notebook for Bonner, Tab 40
April 1988	Modification Request for Permit #56-87.	NCDOT ROW Notebook for Bonner, Tab 41
May 1988	Special Use Permit	NCDOT ROW Notebook for Bonner, Tab 42
March 1989	Special Use Permit & License for NON Federal Use of Real Property	NCDOT ROW Notebook for Bonner, Tabs 43 & 44
May 1989	License for NON Federal Use of Real Property	NCDOT ROW Notebook for Bonner, Tab 45
June 1989	FWS issues a right-of-way permit to the North Carolina Department of Transportation for constructing a terminal groin on the north end of Pea Island National Wildlife Refuge to protect the bridge over Oregon Inlet. FWS notes that "it is in our mutual interest" because if the erosion continued unabated, both NC12 and the refuge's waterfowl impoundments would be threatened. Two days later, the Corps issues permits for construction.	http://georgewbush-whitehouse.archives.gov/ceq/ceq_chronol_2001.pdf GAO Oregon Inlet Jetty Project (2002) http://www.gao.gov/new.items/d02803.pdf NCDOT ROW Notebook for Bonner, Tab 46
November 1989	North Carolina awards a contract for construction of the terminal groin to reduce erosion at north end of Pea Island and protect Bonner Bridge using the Corps' design for a 3,125-foot structure with the same dimensions and same location as the landward section of the proposed south jetty.	GAO Oregon Inlet Jetty Project (2002) http://www.gao.gov/new.items/d02803.pdf
October 1990	Barge collides with Bonner Bridge	http://www.outerbanks.com/oregoninlet/bonner-bridge-down.shtml

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
November 16, 1990	Congress directs USDOT to transfer title to the Coast Guard property on Pea Island to North Carolina	Pub.Law 101-591, 104 Stat. 2941 (November 11, 1990)
March 1991	Terminal Groin construction completed	GAO Oregon Inlet Jetty Project (2002) http://www.gao.gov/new.items/d02803.pdf
March 1993	Letter with permit for terminal groin for beach nourishment	NCDOT ROW Notebook for Bonner, Tab 47
Early 1990s	USACE maintained the ocean bar channel using ocean certified pipeline dredges that deposited the dredged material on Pea Island between 1 and 2 miles south of Oregon Inlet.	NOAA News Release 2003 http://www.publicaffairs.noaa.gov/releases2003/may03/noaa03r126b.html
April 1995	Right of Way Permit for realigning, operating and maintaining NC DOT State Hwy NC12 across a portion of PINWR	NCDOT ROW Notebook for Bonner, Tab 50
May 5, 1995	FWS issues a Finding of No Significant Impact to the environment for the 3.3 mile road relocation in PINWR; and also a compatibility determination under the Refuge Act	Exhibit D, tab 50
June 1995	Special Use Permit for NC 12 relocation (3.3 miles)	NCDOT ROW Notebook for Bonner, Tab 49
1995	Sand mining by NCDOT	PINWR CCP (2006) p. 50
1996	First piping plover nest on Pea Island	PINWR CCP (2006) p. 50
October 9, 1997	National Wildlife Refuge System Improvement Act of 1997 mandates CCP for refuges, and clarifies the compatibility requirement. Legislative history indicates "There are numerous existing rights-of-way on National Wildlife Refuge System lands for roads, oil and gas pipelines, electrical transmission, communication facilities, and other utilities. The Committee does not intend for this Act to in any way change, restrict, or eliminate these existing rights-of-way, whether established by easement or permit, or to grant the USFWS any authority that does not already exist to do so."	http://www.fws.gov/Northeast/planning/downloads/NWRSImprovementfact.pdf Pub.Law 105-57 (October 9, 1997) House Report 105-106 (May 21, 1997)
July 2001	USFWS designates critical habitat for piping plover	Federal Register: http://ecos.fws.gov/docs/federal_register/fr3775.pdf
April 1999	FHWA and FWS enter into an Interagency Agreement Relating to Public	http://www.fhwa.dot.gov/agreements/documents/hfle1agr.htm

Timeline of Events Related to Transportation, Cape Hatteras National Seashore & Pea Island National Wildlife Refuge (3.17.09)		
Date	Action	Source
July 2002	Roads on the National Wildlife Refuge System DOI issues two Special Use Permits—one by NPS and one by USFWS—to the USACE to construct a wider channel on the north side of the inlet, which would remove over 400 feet of the Bodie Island barrier spit within the Cape Hatteras National Seashore and deposit the 1 to 2 million cubic yards of dredge spoil on the oceanfront beaches of Pea Island. The construction would eliminate approximately 4 acres of wetlands, for which compensatory mitigation will be provided in the form of enhanced wetland habitat for migratory shorebirds elsewhere on the Bodie Island spit.	GAO Oregon Inlet Jetty Project (2002) http://www.gao.gov/new.items/d02803.pdf
2004	Court removes designation of critical habitat	Cape Hatteras Access Preservation Alliance v. U.S. Department of Interior (344 F. Supp. 2d 108 (D.D.C. 2004))
2004	Power line relocated on PINWR (most recent)	PINWR CCP (2006) p. 44
September 2006	PINWR CCP approved	PINWR CCP (2006)
November 2008	USFWS designates critical habitat for piping plover	Federal Register: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=2008_register&docid=fr21oc08-8
January 27, 2009	N.C. DOT completes is property surveys, establishing the current centerline of NC12, the southern boundary of PINWR, and the movement of the NC12 alignment over time	Memorandum from Charles Brown to Lori Kroll

Appendix C: Historic-related Conceptual Design Modifications

Road North/Bridge South and All Bridge Alternatives. The Rodanthe bridge portion of these alternatives was revised to locate the intersection with NC 12 approximately 530 feet (161.5 meters) north of the Rodanthe Historic District. The southern terminus is a curved intersection, similar to that designed for the Pamlico Sound Bridge Corridor with Curved Rodanthe Terminus considered in the FEIS. NC 12 traffic would be at-grade as it enters the Rodanthe Historic District. The section of NC 12 roadway between the southern terminus of the bridge portion north to the Refuge border would be maintained as a service road to provide property access to homes and businesses north of the bridge. The original alignment terminated within the district and had been developed for the 2005 SDEIS prior to a revision to the district boundaries with SHPO concurrence in 2006. Moving the alternative from the historic district places the southern terminus of the alternative between the 2050 and 2060 high erosion shoreline. This location does not achieve the project objective of an at-grade NC 12 being no closer than 230 feet west of the 2060 high erosion shoreline. However, NC 12 could be relocated again if the 2060 high erosion shoreline were to occur. The 2060 high erosion shoreline places almost all of the Chicamacomico Life Saving Station and approximately one-half of the Rodanthe Historic District in the Atlantic Ocean. Therefore, should a further relocation of NC 12 be needed under those conditions, the historic resource issue also is no longer expected to exist at that time. The northern terminus of the Rodanthe area bridge with the Road North/Bridge South and the All Bridge alternatives would remain the same, with bridging beginning approximately 2 miles (3.2 kilometers) north of the Refuge's southern boundary and extending into Pamlico Sound before rejoining NC 12 in Rodanthe.

Phased Approach/Rodanthe Bridge Alternative. The original design of the Phased Approach/Rodanthe Bridge Alternative included a bridge in Rodanthe that was contained within the existing 100-foot (30.5-meter) easement, with one-way service roads on either side of the bridge being used to provide local access. The alternative terminated approximately 1,560 feet (475.5 meters) south of the Rodanthe Historic District. The bridge was within the district boundaries and adjacent to the boundary of the Chicamacomico Life Saving Station. Because of the visual impacts of the bridge, as well as concerns over the impact of the associated change in access both to the Chicamacomico Lifesaving Station and across the Rodanthe Historic District, the Rodanthe area bridge was shortened to stop at a point approximately 420 feet (128.0 meters) north of the district. The southern end of this bridge would not be brought down to grade; instead, traffic would access the bridge via a two-lane ramp on the west side of the bridge. NC 12 traffic would be at-grade through the Rodanthe Historic District.

The main bridge would not be brought down to grade because of the risk of shoreline erosion. It is the goal of the project to move NC 12 or place it on a bridge such that the at-grade portions of NC 12 would be unaffected under high erosion conditions in 2060. In order to keep the bridge outside the Rodanthe Historic District, it must drop below the elevation of the storm surge in the general area of the 2020 high erosion shoreline and reach existing grade between the 2040 and 2050 high erosion shorelines. Thus, placing this ramp back to grade on one side and continuing the bridge at full height above the storm surge to a point between the 2040 and 2050 high erosion shorelines would reduce the risk to NC 12 of high erosion or an island breach. If high erosion rates manifest themselves or a breach occurs that puts the ramp-to-grade at risk, then a new ramp could be built off the full height bridge and/or the full height bridge could be extended as originally proposed. Again, the 2060 high erosion shoreline places almost all of the Chicamacomico Life Saving Station and approximately half of the Rodanthe Historic District in the Atlantic Ocean. Therefore, should further extensions of an NC 12 bridge be needed under those conditions, the historic resource issue also is no longer expected to exist at that time. The northern terminus of the Rodanthe bridge with the Phased Approach/Rodanthe Bridge Alternative would remain the same; bridging would begin at a point north of the Rodanthe 'S' Curves Hot Spot within the Refuge and extend south into Rodanthe while remaining within the existing 100-foot (30.5-meter) easement.

Appendix D: Merger Team Meeting Minutes Since FEIS

- November 13, 2008
- March 26, 2009
- May 21, 2009
- September 23, 2009



To: November 13, 2008 Bonner Bridge Merger Team Meeting Attendees
From: John Page, Parsons Brinckerhoff
Date: December 19, 2008
Subject: Revised Meeting Minutes – November 13, 2008 Merger Team 2A/4A Meeting for the Bonner Bridge Replacement Project (TIP No. B-2500)

Attendees:

Gary Jordan	USFWS – Raleigh Field Office
Bill Biddlecome	US Army Corps of Engineers
Christopher A. Militscher	USEPA
Kathy Matthews	USEPA
Ron Sechler	National Marine Fisheries Service
Darrell Echols	NPS – Cape Hatteras National Seashore
Clarence Coleman	FHWA – NC Division
Ron Lucas	FHWA – NC Division
Jim Gregson	NCDENR – DCM
Cathy Brittingham	NCDENR – DCM
Brian Wrenn	NCDENR – DWQ
David Wainwright	NCDENR – DWQ
Travis Wilson	NCWRC
Renee Gledhill-Earley	NCDOT – SHPO
Lori Kroll	NCDOT – Secretary’s Office
Beth Smyre	NCDOT – PDEA
Brian Yamamoto	NCDOT – PDEA
Rob Hanson	NCDOT – PDEA
Michael Turchy	NCDOT – Natural Environment Unit
Chris Rivenbark	NCDOT – Natural Environment Unit
Elizabeth Lusk	NCDOT – Natural Environment Unit
LeiLani Paugh	NCDOT – Natural Environment Unit
Morgan Weatherford	NCDOT – Natural Environment Unit
Doug Taylor	NCDOT – Roadway Design
D. R. Henderson	NCDOT – Hydraulics Unit
Bob Capehart	NCDOT – Division 1
Rodger Rochelle	NCDOT – Transportation Program Management Unit
Nilesh Surti	NCDOT – Transportation Program Management Unit
Virginia Mabry	NCDOT – Transportation Program Management Unit
Thomas Stoddard	NCDOT – TIP Development Unit
Calvin Leggett	NCDOT – Program Development Branch
A. L. Avant	NCDOT – Program Development Branch
Lonnie Brooks	NCDOT – Structure Design Unit
Mike Robinson	NCDOT – Construction Unit



Page 2

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

Don O'Toole
John Page
Bobby Norburn

NCDOT – Geotechnical Engineering Unit
Parsons Brinckerhoff
Parsons Brinckerhoff

The meeting started at 3:00 p.m. in the Board Room of the NCDOT Transportation Building. Bill Biddlecome began the meeting by informing the attendees that the purpose of today's meeting was to seek Merger Team concurrence on Concurrence Points 2A (Bridging Decisions and Alignment Review) and 4A (Avoidance and Minimization). He then asked the attendees to introduce themselves before turning the meeting over to Beth Smyre for NCDOT's presentation of the Merger Meeting Packet.

Beth Smyre said that the purpose of today's meeting was to seek concurrence only on Phase I (Oregon Inlet bridge) of the LEDPA for the Bonner Bridge Replacement Project. She also noted that it was a combined 2A/4A concurrence meeting because a 2A agreement was never signed by the Merger Team for the Parallel Bridge Corridor. She said that she had two versions of the concurrence form (i.e., a short form that referenced the Merger Team Packet and its findings and a longer form with space for listing the meeting agreements) that could be used depending on the team's preference and the outcome of today's meeting.

Concurrence Point 2A Discussion

Beth said that the first topic to discuss related to Concurrence Point 2A was the bridge landing on Bodie Island. The design and alignment analyzed in the FEIS and shown in the Packet is based on planning-level decisions, but the exact alignment will be developed by the Design-Build contractor. She asked if the agencies had any restrictions that they wanted to recommend for inclusion in the Design-Build contract beyond what is already specified in the FEIS, keeping in mind that NCDOT will require the contractor to design the bridge so that the impacts will not be worse than those presented in the FEIS, but the design could be altered and its location adjusted within the project's 1,000-foot corridor if there are opportunities identified to further reduce impacts. There were no suggestions for further restrictions beyond what is in the FEIS on the Bodie Island side of Oregon Inlet.

Beth said that the next topic to discuss related to Concurrence Point 2A was the bridge landing on Hatteras Island. She said that the alignment/design on Hatteras Island are limited by keeping the bridge in NCDOT's existing 100-foot NC 12 easement. David Wainwright asked about the reason for extending Phase I by an additional 2,000 feet beyond that defined in the FEIS. Beth responded that it was designed to protect the southern bridge terminus by extending it beyond an area that is currently showing increased soundside erosion.

Cathy Brittingham asked whether or not retaining walls were going to be used on the bridge landings for the Phase I bridge on Hatteras Island. She said that retaining walls for Phase I are shown on Figure 2-22 (page 2-104), and DCM is concerned about the use of retaining walls for the proposed project. DCM wants to further discuss retaining walls in terms of permitting for



Page 3

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

the project. Beth agreed that further discussions on retaining walls would occur during design coordination.

Beth asked if there were any further comments related to Concurrence Point 2A. There were none. She then asked if the agencies could agree on Concurrence Point 2A as presented in the Merger Team Packet and there were no objections.

Concurrence Point 4A Discussion

Oregon Inlet Dredging

Beth started the Concurrence Point 4A discussion with the first avoidance and minimization topic in the Packet – Oregon Inlet dredging. As stated in the Packet, she said that there would be no dredging in SAVs, as well as no dredging to a depth greater than 8 feet.

Darrell Echols requested that the NPS be added to the list of coordinating agencies shown in the Packet related to the Design-Build contractor’s development of dredging techniques and a disposal plan to minimize harm to natural resources. Beth responded that NPS would be added to this list.

David Wainwright asked about the use of dredge spoil for temporary impact wetland mitigation. Beth responded that the FEIS briefly discussed this use with respect to restoring the elevation of affected wetland areas.

Jim Gregson asked if there was a contingency plan to avoid any new areas of SAV that might be identified before the start of construction. Rodger Rochelle responded that the late 2007 SAV survey would be ground truthed and revised, if needed, prior to construction. He also said that it would be a contract requirement not to dredge in the SAV areas identified based on this ground truthing.

Dredge Spoil Disposal

Beth began the discussion of the second avoidance and minimization topic in the Packet – dredge spoil disposal. Gary Jordan asked about the statement in the Packet that indicates “the disposal of any excess material would be the responsibility of the contractor.” Beth responded that disposal of excess material would be the responsibility of the contractor, but that the contractor would contractually have to dispose of this material in accordance with NCDOT’s Standard Specifications, permit requirements, and other applicable laws. Ron Sechler asked if the contractor would also consult with the appropriate agencies on excess material disposal. Beth responded that this would be the case, and also that further coordination on disposal locations would occur at Concurrence Points 4B and 4C.



Page 4

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

Use of Work Bridges/Haul Roads

Beth said that there would be no haul roads used in areas with SAVs, but the option for the contractor to use haul roads through wetlands was being left open. Work bridges will be used in areas with SAVs.

Ron Sechler asked if the construction could be “top down” in jurisdictional areas. Rodger Rochelle responded that there was no way to know for sure at this point because replacement bridge span length could prevent the use of top down construction for most contractors. Rodger also said that an important part of the selection of the Design-Build contractor is the environmental quality component of the proposal. In other words, in selecting a contractor, NCDOT will be looking closely at each contractor’s proposed methods for minimizing impacts to natural resources.

Ron Sechler asked about the impacts of work bridges. Brian Wrenn also asked if the haul roads would be like causeways in terms of appearance and impacts. Bill Biddlecome also noted that Table 2 in the Packet indicates that there will be 2.4 acres of SAV impact because of the Bodie Island temporary haul road. Beth responded that there would be no fill from haul roads in SAV areas, so NCDOT needs to determine why there are 2.4 acres shown in the table. [It was later determined that this is the unmitigated impact, haul road instead of a bridge.]

David Wainwright asked about the use of turbidity curtains to limit turbidity with the placement of haul roads. Rodger Rochelle responded that turbidity curtains will work and that some method will be prescribed to limit turbidity, but the method that the contractor will use is not known at this time. David asked what other methods are available. Rodger responded that he was not aware of any at this time.

Chris Militscher asked if the SAV and wetland impacts from haul roads shown in Table 2 were the maximum impacts that would be expected occur. Beth responded that these amounts should be the maximums and that the contractor would attempt to decrease the amounts, but that this issue would be revisited during Concurrence Points 4B and 4C. Rodger Rochelle added that he expects these impacts will decrease, but there is a possibility that the contractor could request to increase these amounts if a possible “trade-off” is identified for reducing impacts in another area (e.g., if the construction duration could be shortened by a year). However, any such proposed trade-offs would be discussed in advance with the Merger Team. Bill Biddlecome again clarified that there should be no haul roads in SAVs, just possibly in wetlands.

David Wainwright asked if the impact amounts in Table 2 included demolition. Beth responded that impacts from demolition were not included. David asked if those impacts would be temporary impacts only. Beth responded that was the case.

Chris Militscher requested that prior to the Concurrence Point 4B meeting the Merger Team be provided information on the impacts that have changed since today’s meeting so that they can



Page 5

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

adequately prepare for the Concurrence Point 4B meeting. Beth responded that was acceptable to NCDOT.

Ron Sechler asked if work bridge pile impacts were included in the SAV impact amounts in Table 2. Beth responded that work bridge piles were included.

Bill Biddlecome said that he wanted to state for the record that the USACE wants all SAVs and wetlands bridged to the maximum extent practicable.

Chris Militscher asked about the timing for Phase II and whether or not the Merger Team was concurring today on anything related to Phase II. Beth responded that the Merger Team was not concurring today on anything related to Phase II. She also said that the proposed concurrence form indicates that combined Concurrence Point 2A/4A meetings will be held prior to the completion of the final design for each subsequent phase of the Preferred Alternative. Bill Biddlecome added that that was his recommendation. Chris said this was acceptable to him.

Cathy Brittingham asked about the distinction between temporary and permanent wetland impacts. For example, with haul roads, are the impacts considered to be temporary or permanent? Beth responded that the impacts were considered to be temporary if they were used only for construction (and subsequently removed), no matter how long the duration of the activity, and not a part of the permanent roadway facility. Cathy said that since the construction is estimated to last for 4 years, is it really appropriate to consider these as temporary impacts. Bill Biddlecome responded that the permits can contain conditions requiring that the temporarily impacted wetlands be restored and regain their previous functionality, or else the impact would have to be mitigated. He also did not agree that 1 to 1 mitigation was appropriate for this situation. Bill said that the issue of permanent versus temporary impacts needs to be discussed again at a later date once the amount of the temporary impacts is better known. Cathy added that the temporary wetland impacts would need to be closely monitored in case they need to be reclassified as permanent impacts. Ron Sechler said that the same consideration applies to SAVs because it is not possible to predict how the holes from temporary bridge piers will fill back in. Chris Militscher agreed that the issue of permanent versus temporary impacts can be dealt with later. Rodger Rochelle said he does not know how long work bridges and haul roads might have to remain in place, but he could ask some contractors for an estimated duration. Cathy said that they have seen standard language on haul roads in contracts in the past. Bill reiterated that this issue would be dealt with in the permitting process and that the permit would contain conditions for restoration of wetlands.

Ron Sechler asked if SAVs in the Oregon Inlet area had been mapped recently. Beth replied that the most recent SAV mapping is from late-2007; however, the Design-Build contractor will be provided with new aerial photography and required to ground truth the 2007 SAV mapping.



Page 6

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

Brian Wrenn asked about the intent to jet piles in open water. He said that based on the NCSU study that NCDOT references in the FEIS, jetting causes a high volume of sediment to be disturbed and introduced as turbidity into the open water, so why is the use of jetting in these areas a project intent. Mike Robinson responded that jetting is required for the placement of large diameter piles. Ron Sechler added that piles for temporary work bridges are small enough that jetting is not required. Brian asked if jetting would be needed for large diameter piles even in wetlands because he is concerned about turbidity and smothering of vegetation with jetting. The response was that jetting would be required for large diameter piles even in wetlands. Brian asked how the discharge would be handled so that areas can recover. He prepared a rough estimate that the jetting spoil in Oregon Inlet for the replacement bridge would fill approximately 22 dump trucks. In addition, the spoil could spread-out and cover adjacent SAVs. Rodger said that it could be included in the contract and the permits to prevent this from happening. Brian wants to see a plan for jetting operations that includes protecting jurisdictional areas. He added that there is good flow in Oregon Inlet, which will help, but there is a lot of variability in the way that turbidity curtains function in areas with high water velocities. Bill Biddlecome asked if NCDOT could make a commitment to not jetting temporary bridge piles. Rodger responded that NCDOT cannot commit to that at this time. Ron said that a post-construction assessment of impacts to SAV (that occur despite the Design-Build contractor's minimization efforts) would have to be done because it is not possible to precisely predict these impacts prior to construction. The type of material that will be disturbed (i.e., sands versus fines) is also a concern about jetting, but the material type is not currently known.

Protected Species Commitments and Retention of Portion of Existing Structure/Construction of Fishing Pier

Beth Smyre said that the last two avoidance and minimization topics in the Packet related to construction of the new bridge (protected species commitments and retention of portion of existing structure/construction of fishing pier) are intended as reminders to the Merger Team on how these topics are addressed in the FEIS and the Section 7 Biological Opinion. She said that the potential fishing pier would be discussed during the permitting process, but that there is no specific plan for the replacement of the fishing catwalks as of yet. Bill Biddlecome said that the USACE is concerned that if no submerged structure was included within Davis Slough, then Davis Slough could become the primary channel through Oregon Inlet and the planned navigation zone for the new bridge would be rendered useless to vessel traffic. This would hurt the USACE dredging efforts in Oregon Inlet. It was discussed that this issue would be further discussed during the permitting process. Bill also said that although the NCDOT estimated the needed width for the navigation span of the new bridge in the FEIS, the USACE has not yet decided how wide it needs to be. One reason for this is that the navigation span width cannot be accurately determined without knowing whether or not the terminal groin will be left in place. Chris Militscher asked if the USACE is proposing that the groin be left in place. Bill responded by referencing the language contained in the USACE's September 18, 2008 letter to NCDOT which stated that the Wilmington District strongly recommends that the



Page 7

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

terminal groin remain in place as an essential feature of the new Oregon Inlet bridge for the reasons stated in the letter. Bill also responded that it was his interpretation that without the terminal groin being left in place, the USACE would be unable to identify a Navigational Zone to NCDOT.

Chris Militscher said that Dave Henderson had told him about the recently approved AASHTO report on designing bridges in an ocean environment titled "Guide Specifications for Bridges Vulnerable to Coastal Storms." Chris requested that NCDOT provide the Merger Team with a copy of this report. Dave Henderson said that the report is 55 pages long, but the published version was not available yet because it had just gone to the publisher. Beth Smyre said that any Merger Team member that wants a copy should send her an e-mail request.

Demolition of Bonner Bridge

Beth Smyre said that the final Concurrence Point 4A topic in the Packet related to avoidance and minimization was the demolition of Bonner Bridge. She said that the commitments on access for construction also applied to demolition of the existing bridge.

Beth asked if there were any further questions on Concurrence Point 4A.

LeiLani Paugh asked about the comment in the USACE FEIS comment letter related to questioning NCDOT's proposed use of Ballance Farm as a wetland mitigation site. Chris Militscher said that EPA had the same comment as USACE on the proposed use of Ballance Farm. Bill Biddlecome responded that the Ballance Farm site could be used for mitigation of fresh water wetland impacts, but that it may not be appropriate for mitigation of salt water wetland impacts. LeiLani said that NCDOT needs to discuss this issue further with the USACE because a portion of Ballance Farm had been reserved for wetland mitigation for the subject project. Cathy Brittingham added that DCM also had not decided for sure if Ballance Farm was appropriate for wetland mitigation for this project, but that they preferred on-site mitigation. She said she was not sure whether or not NCDOT had exhausted possible on-site mitigation options, but she would like NCDOT to further investigate on-site options. Ron Sechler said that he shared the same concern about not using on-site wetland mitigation. It was discussed that the SDEIS included possible on-site mitigation sites, but these sites were removed from the FEIS in favor of the Ballance Farm site. Darrell Echols said that there could be appropriate on-site wetland mitigation options in the National Seashore on Bodie Island. Bill Biddlecome said that USACE has some ideas for on-site mitigation that they want NCDOT to further investigate. LeiLani said that this issue could be discussed further at a separate meeting between NCDOT, USACE, and DCM, but that NCDOT would like to resolve it as soon as possible. Beth said this discussion would be included in the meeting minutes and that NCDOT would follow-up with the USACE.

Beth Smyre asked if there were any further questions on Concurrence Point 4A. Hearing no further questions, she asked the Merger Team which concurrence form they wanted to use (i.e.,



Page 8

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

the short form or the longer form with space for adding specific topics from today's meeting). Bill Biddlecome responded that Table 2 in the Packet needed to be updated to correctly reflect the impacts to SAVs from the Bodie Island temporary haul road.

Chris Militscher said that he was concerned about the earlier DWQ comment related to the amount of jetted material that will be generated in Oregon Inlet. He realizes jetting is unavoidable, but he wants language included in the Design-Build contract related to use of Best Management Practices to minimize jetting impacts. In addition, a commitment to clean-up and restore the area could be included. Cathy Brittingham said that potential impacts from jetting were not quantified in the FEIS. Chris responded that these impacts cannot be accurately estimated in advance. Dave Henderson said that the sidecast dredging that is currently being used by USACE to maintain the Oregon Inlet channel has similar impacts to the proposed jetting for inserting bridge piles (i.e., sand is scooped up and thrown into the inlet). He asked if there was any evidence that sidecast dredging was causing negative impacts. Bill Biddlecome responded that there was currently no information on negative impacts from sidecast dredging. Cathy said that DCM's real concern is not jetting in open water, but rather near SAVs and wetlands. It was also discussed that the type of material jetted is of concern (i.e., if the deeper subsurface material consists of fines, that will be of more concern than jetting of sandy materials).

Based on the above-referenced discussions, Beth Smyre updated the concurrence form to include the following specific issues from today's meeting:

- Merger Team members will be provided, prior to Concurrence Point 4B, with any major changes in wetland/SAV impacts based on updated designs.
- The Design-Build contractor should minimize damage to wetlands/SAV/Oregon Inlet from jetting spoils.
- Table 2 currently shows temporary impacts from haul roads in SAV areas on Bodie Island. NCDOT will not allow haul roads within SAV.

Each agency's decision on concurrence for Concurrence Point 2A/4A is listed below and is also shown on the attached concurrence form:

- USACE – concurrence provided.
- USEPA – concurrence provided.
- NCDWQ – concurrence provided.
- SHPO – concurrence provided.
- NMFS – abstained from concurrence.
- NPS – concurrence provided.
- USFWS-PINWR – abstained from concurrence.
- NCDOT – concurrence provided.
- USFWS – abstained from concurrence.



Page 9

December 19, 2008

Minutes: November 13, 2008 Merger Team 2A/4A Meeting for Bonner Bridge

- NCWRC – abstained from concurrence.
- FHWA – concurrence provided.
- NCDMF – not represented at meeting (concurrence later provided).
- NCDCM – concurrence provided.

The agencies abstaining from concurrence will provide further written documentation on their reasons for abstaining.

With respect to the upcoming project schedule, Beth Smyre said that the Design-Build contract is planned to be awarded in June 2009. The Concurrence Point 4B meeting will likely be held in the Fall of 2009. Rodger Rochelle said that NCDOT would be the “go-between” for the agencies and the Design-Build contractor. He added that there would be no direct contact between the agencies and the potential contractors during the pre-bidding process unless a NCDOT representative is present.

Bill Biddlecome then adjourned the meeting.

file no.: 3301-2.7.2

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To: March 26, 2009 Bonner Bridge Merger Team Meeting Attendees
From: John Page, Parsons Brinckerhoff
Date: April 15, 2009
Subject: Meeting Minutes – March 26, 2009 NEPA/Section 404 Merger Team
Informational Meeting for the Bonner Bridge Replacement Project (TIP No.
B-2500)

Attendees:

Gary Jordan	USFWS – Raleigh Field Office
Pete Benjamin	USFWS – Raleigh Field Office
Mike Bryant	USFWS – NC Coastal Plain Refuge Complex
Dennis Stewart	USFWS – Pea Island National Wildlife Refuge
Bill Biddlecome	US Army Corps of Engineers
Scott McLendon	US Army Corps of Engineers
Stacie Craddock	US Army Corps of Engineers
Christopher A. Militscher	USEPA
Kathy Matthews	USEPA
Ron Sechler	National Marine Fisheries Service
Mike Murray	National Park Service – Cape Hatteras National Seashore
Thayer Broili	National Park Service – Outer Banks Group
Clarence Coleman	FHWA – NC Division
Ron Lucas	FHWA – NC Division
Michael Dawson	FHWA – NC Division
Rob Ayers	FHWA – NC Division
Amy Simes	NCDENR
Jim Hoadley	NCDENR – DCM
Cathy Brittingham	NCDENR – DCM
Sara Winslow	NCDENR – DMF
Brian Wrenn	NCDENR – DWQ
David Wainwright	NCDENR – DWQ
Travis Wilson	NCDENR – Wildlife Resources Commission
Renee Gledhill-Earley	NCDOT – SHPO
Greg Thorpe	NCDOT – PDEA
Beth Smyre	NCDOT – PDEA
Brian Yamamoto	NCDOT – PDEA
Rob Hanson	NCDOT – PDEA
Kristine O’Connor	NCDOT – PDEA
Missy Pair	NCDOT – PDEA
Michael Turchy	NCDOT – Natural Environment Unit
Chris Rivenbark	NCDOT – Natural Environment Unit
Elizabeth Lusk	NCDOT – Natural Environment Unit
Kathy Herring	NCDOT – Natural Environment Unit
Byron Kyle	NCDOT – Roadway Design



Page 2

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

Zak Hamidi	NCDOT – Roadway Design
Dave Henderson	NCDOT – Hydraulics Unit
Jerry Lindsey	NCDOT – Hydraulics Unit
Jerry Jennings	NCDOT – Division 1
Clay Willis	NCDOT – Division 1
Ray McIntyre	NCDOT – TIP Development Unit
Thomas Stoddard	NCDOT – TIP Development Unit
Debbie Barbour	NCDOT – Preconstruction
Victor Barbour	NCDOT – Technical Services
Mark Staley	NCDOT – Roadside Environmental Unit
Rodger Rochelle	NCDOT – Transportation Program Management Unit
Nilesh Surti	NCDOT – Transportation Program Management Unit
Virginia Mabry	NCDOT – Transportation Program Management Unit
Lonnie Brooks	NCDOT – Structure Design Unit
K. J. Kim	NCDOT – Geotechnical Engineering Unit
Sam Cooper	CZR
John Page	Parsons Brinckerhoff
Bobby Norburn	Parsons Brinckerhoff

The meeting started at 10:30 a.m. in the Board Room of the NCDOT Transportation Building. Bill Biddlecome opened the meeting and asked the attendees to introduce themselves. He then turned the meeting over to Beth Smyre.

Introduction and Purpose of this Meeting

Beth said that today’s meeting was an informational meeting and asked if everyone had a meeting packet. She said the purpose of the meeting was to discuss the possibility of revisiting the project’s LEDPA decision; however, before NCDOT formally asks for concurrence, it wants to inform the Merger Team members on the reasons behind this possibility and get agency feedback. In addition NCDOT wants each agency to have an opportunity to take information from today’s meeting back to discuss further with their management before any decision to change the LEDPA is made.

Project History and Current Status

Beth went through a brief summary of the LEDPA concurrence agreement (including the elevation process that occurred), the FEIS, and the Concurrence Point 2A/4A agreement for Phase I of the LEDPA, including the dates for each event. She also defined the LEDPA – the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative.



Page 3

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

Summary of Comments on the 2008 Final Environmental Impact Statement/Section 4(f) Evaluation

Beth turned the meeting over to Clarence Coleman to discuss the agency comments received on the FEIS, noting that a copy of all agency and NGO comments received were included in the merger packet. Clarence said that substantive agency and NGO comments were received on the FEIS, so NCDOT/FHWA started to review and respond to these comments. He said that the Record of Decision will include responses to all comments, but today's meeting will focus on several issues that FHWA believes need further discussion with the Merger Team based on the FEIS comments.

Clarence said that the first issue he wanted to discuss was the FEIS' Section 4(f) analysis. The Department of Cultural Resources (DCR) commented that there would be a substantial impairment to the Rodanthe Historic District as a result of the LEDPA. FHWA interpreted this comment to mean that DCR disagreed with the conclusion in the FEIS that there would not be a constructive use of the historic district with the LEDPA. DCR also commented that they disagreed with the FEIS determination that there would be no constructive use of the Refuge. DCR's comment indicates that, based on the LEDPA's impacts on the Refuge as documented in the FEIS, they believe that there would be a constructive use of the Refuge. In addition, the DOI commented that any of the Parallel Bridge Corridors would violate Section 4(f), and they also believed that there would be a constructive use of the Refuge. Finally, Southern Environmental Law Center (SELC) also commented that they disagreed with the constructive use analysis in the FEIS.

Clarence said the second issue that he wanted to discuss was Refuge access with the LEDPA. The DOI and several other agencies commented that they were concerned over the public's loss of access to the Refuge with the LEDPA.

The third issue that Clarence wanted to discuss was the future disposition of the terminal groin. SELC commented that the FEIS did not adequately assess the impacts of removing the groin with the LEDPA, and that this issue had a direct relationship to the project.

Certification of NC 12 Right-of-Way

Clarence discussed that FHWA requires NCDOT to certify that the right-of-way/easement is legal for federally-funded projects under FHWA jurisdiction to (i.e., to make sure the state has rights to the easement). He said that this process typically occurs once the NEPA process is completed, but based on the FEIS comments FHWA thought it should occur now. Therefore, NCDOT conducted a substantial amount of additional research into the history of the NC 12 easement through the Refuge and NCDOT's rights to this easement. Clarence also said that based on the property deeds and other legal documents discovered during the additional research, FHWA decided to reevaluate the applicability of Section 4(f) with respect to the Refuge for the proposed project. The reason for this decision is that FHWA believes that the



Page 4

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

research revealed an evolutionary relationship between NC 12 and the Refuge that could alter the Section 4(f) analysis for the Refuge in the FEIS. Clarence reiterated that despite rumors to the contrary, the genesis for this effort was the right-of-way certification process.

Renee Gledhill-Early asked if the re-evaluation of Section 4(f) was related only to the 4(f) use of the Refuge as refuge (i.e., the re-evaluation does not relate to other possible uses of the Refuge that qualify it for Section 4(f) protection). Clarence indicated that the Refuge is being re-evaluated as a refuge and as a historic resource under Section 4(f).

Clarence discussed that the Road North/Bridge South Alternative is being re-examined as the potential Preferred Alternative for several reasons. He discussed that the cost is less and that DCR preferred the Road North/Bridge South over the LEDPA because keeping NC 12 at-grade would be preferable for maintaining the integrity of the historic landscape of the Refuge.

Terminal Groin

Clarence discussed that FHWA and NCDOT want to keep the terminal groin with any Parallel Bridge Corridor alternative to protect the southern end of the replacement Oregon Inlet bridge on Hatteras Island. However, SELC is concerned with what they believed to be the FEIS' lack of analysis related to the impact of removing the terminal groin. Clarence said that the FEIS includes discussion of this issue, but if further analysis of removing the groin is needed, the analysis would need to consider all pertinent related issues for all of the detailed study alternatives, including the Pamlico Sound Bridge Corridor. Two such issues are Section 106 and Section 7 with respect to threatened and endangered species impacts (critical habitat for the endangered piping plover has been federally-designated behind the groin since the FEIS was published). Based on the current groin permit, it appears that the groin would have to be removed with the Pamlico Sound Bridge Corridor, but FHWA is currently coordinating with USFWS on whether or not this would be the case. It needs to be determined if it is possible to get a new permit to retain the groin, if needed, with any of the detailed study alternatives. Clarence said that further coordination with USFWS is needed in the next few weeks on NEPA and other related issues related to retaining the groin with the LEDPA.

Section 106 Coordination

Clarence said that there was a Section 106 coordination meeting between FHWA, NCDOT, and the Section 106 consulting parties last Tuesday (3/24/09). The reason for the meeting was to discuss DCR's comments on the FEIS related to impacts to the Rodanthe Historic District. DCR's comments led FHWA and NCDOT to take a closer look at the inconsistencies in the locations of the NC 12 termini in Rodanthe between the Parallel Bridge Corridor alternatives and the Pamlico Sound Bridge Corridor alternatives (i.e., the Pamlico Sound Corridor alternatives were designed to avoid the historic district as defined in the Supplement to the SDEIS, whereas the Parallel Bridge Corridor alternatives were defined based on an earlier district boundary and while avoiding the district's old boundary, they did encroach on the



Page 5

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

revised boundary). Clarence said that in order to address this inconsistency, the NC 12 termini in Rodanthe for the Phased Approach/Rodanthe Bridge, Road North/Bridge South, and All Bridge alternatives have been redesigned to stay out of the historic district. He said that as a result of these design changes, it was agreed at the Section 106 meeting that now there would be “No Adverse Effect” on the historic district with the Phased Approach/Rodanthe Bridge, Road North/Bridge South, and All Bridge alternatives. Beth discussed the design changes in more detail, and copies of the new designs were also included in the meeting packet. Clarence noted that these new designs are an outcome of the Section 106 coordination process and will apply no matter which alternative is chosen as the LEDPA.

Clarence said that the proposed project’s effects on the Refuge were also revisited at the Section 106 meeting, but no revised concurrence was made related to impacts on the Refuge. He said that it is a fact that NC 12 has been moved four times within the Refuge with no documented significant environmental impacts. He also said that a FONSI was completed on the last road relocation in the Refuge in the 1990s. However, additional Section 106 coordination will continue since no revised concurrence was reached. FHWA agreed to gather some additional information, including drawings, and then get back with DCR to further discuss impacts on the Refuge. At the Section 106 meeting, it was agreed that the adverse effects determination in the FEIS for the Coast Guard Station still applies for all alternatives. In addition, an agreement was reached on the use of a temporary staging area at the Coast Guard Station for Phase I.

Next Steps

- **Preparation of draft revised Section 4(f) analysis by FHWA** – FHWA is revising the FEIS’ Section 4(f) analysis based on the new right-of-way data generated by NCDOT’s additional research on the NC 12 easement. Mike Murray asked if the Merger Team would have a chance to review and comment on the revised Section 4(f) analysis once it is completed since it includes new information. Clarence responded that they would.
- **Review of new right-of-way data and draft timeline by FHWA, NCDOT, and DOI, followed by distribution of data to Merger Team** – FHWA has sent information on the right-of-way agreements to USFWS and DOI, who will verify the validity of the data before it is distributed to the other Merger Team members. FHWA and NCDOT also have prepared a draft timeline of the history of the NC 12 easement through the Refuge and past agreements (i.e., the evolutionary relationship between NC 12 and the Refuge discussed previously), which also has been sent to USFWS and DOI for their concurrence and/or feedback before it is distributed to the rest of the Merger Team. Ultimately, the NC Attorney General and agency lawyers may have to meet to discuss the official timeline before the issue can be finalized. Clarence said that the additional data and the timeline are factors in determining the applicability of Section 4(f) with respect to the Refuge. Bill Biddlecome asked if this issue only related to the applicability of Section 4(f) and not



Page 6

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

compatibility. Clarence responded that the issue only relates to Section 4(f) (i.e., compatibility is a separate issue).

- **Continuation of Section 106 coordination.**
- **NCDOT and FHWA will continue to examine the Road North/Bridge South Alternative as a potential Preferred Alternative.**
- **Next Bonner Bridge Merger Team Meeting will be held on May 21, 2009** – Clarence said that the next proposed Merger Team Meeting has been pushed back from April 16 to May 21 (i.e., to the next regularly scheduled meeting on May 21, 2009) in part because of the outcome of the Section 106 meeting, but also to allow the timeline to be finalized and then subsequently to allow all of the Merger Team agencies to have time to review the timeline before the meeting.

Question and Answer

Pete Benjamin said that he doesn't understand the timeline argument with respect to Refuge Section 4(f) applicability – it doesn't seem relevant. He would like something in writing from FHWA related to where they are going with this issue. Mike Bryant asked who within his agency has the information that Clarence referenced because he has not seen it. Mike said he has only seen the map that was being used as a display at today's meeting which shows the year in which various parcels were transferred from the state to the Refuge. Clarence said that he had been told that the DOI solicitor has the new right-of-way information and is reviewing it. In addition, he thought that tabular information listing resources for the new data was e-mailed last Monday to Mike, and possibly to Pete, but Clarence will confirm that DOI has received the intended information. He also said that he wanted to make it clear that FHWA's research and conclusions are not the final word, rather FHWA is looking for DOI to agree with FHWA's findings and/or provide missing elements. He re-iterated that ultimately lawyers from the state, FHWA, and the DOI would likely be involved in determining a final conclusion.

In response to a comment, Clarence said that no one with FHWA has claimed that NCDOT has the right to move NC 12 wherever they want within the Refuge. At this point, FHWA and NCDOT are simply speculating that the extensive collaboration between the state and the DOI that has occurred over the years, as exhibited in the documents gathered in NCDOT's research back to the early 1900s, may indicate that Section 4(f) does not apply for moving NC 12 within the Refuge due to joint planning. However, it was discussed that it has yet to be determined whether or not the passing of the National Wildlife Refuge System Improvement Act in 1997, which brought about the requirement for Refuge compatibility determinations, would impact the historic process that has been followed for relocating NC 12 within the Refuge (i.e., the process prior to 1997 that became evident based on the new right-of-way data gathered).



Page 7

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

Travis Wilson asked for clarification as to whether or not the tiered EIS that had been planned for implementing the multiple phases of the current LEDPA (the Phased Approach/Rodanthe Bridge Alternative), for which it had been assumed that all alternatives for maintaining NC 12 through the Refuge (i.e., nourishment, relocation on road, and relocation on bridge) would be kept available for Phases II to IV, would still keep these additional options for future phases if the Road North/Bridge South is selected as the LEDPA. Clarence responded that the other options would remain available. He said that Phase I (the new Oregon Inlet bridge) would be basically the same for any alternative at this point, including extending the bridge to the south across the northern-most hot spot on Hatteras Island, but beyond that the best option (based on future impact analyses) at the time the project is ready for implementation could still be chosen for future phases. FHWA regulations allow the ROD to be revised as long as all alternatives being considered for the revised ROD were carried forward for detailed study in the FEIS. Beth added that based on the estimated costs for the project, any alternative will now have to be phased. For example, the Road North/Bridge South Alternative is anticipated to be two to three phases, with the new Oregon Inlet bridge as the first phase. She added that later phases could change to other alternatives based on future conditions in the Refuge. Mike asked if there would be a Supplemental EIS for changes to future phases of the LEDPA. Clarence said that a Reevaluation would be done of the ROD to determine if there were any new significant impacts and that would be the catalyst for possibly doing a Supplemental EIS.

Chris Militscher asked if the Section 404 permit would be phased. Scott McLendon responded that the permit would be phased, but the impacts for all phases would be considered in issuing the initial permit so that hopefully the maximum impacts for all phases are known in advance.

Scott asked why the Road North/Bridge South Alternative would be chosen because it has much greater wetlands impacts. Clarence responded that part of the reason was related to the access issues comments from the DOI, as well as concerns over elevated structures (because of aesthetics) through the Refuge from other commenters. In addition, as he discussed previously, NC 12 has been relocated at-grade several times through the Refuge with no identified significant impacts. Dennis Stewart commented that we need to keep in perspective that this relocation would be much longer than previous relocations. Clarence said that it was still a fact that all previous relocations had been handled with FONSI (or possibly lesser environmental documents).

Scott asked for clarification on whether or not Section 4(f) and the new easement data were the primary reasons behind the Merger Team being asked to possibly consider changing the LEDPA to the Road North/Bridge South Alternative. Clarence responded that based on the new data FHWA is re-analyzing the applicability of Section 4(f) to the Refuge because it may not apply to the Refuge as a refuge, but it may still apply to the Refuge as a historic site. He also noted that the Road North/Bridge South Alternative would cost substantially less to build than the Phased Approach/Rodanthe Bridge Alternative (approximately \$500 million less based on the most recent cost estimates).



Page 8

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

Clarence said that the DOI commented that the Pamlico Sound Bridge Corridor may be feasible and prudent to build, so the LEDPA would violate Section 4(f). Based on this comment, FHWA is looking at the issue of prudence again and this will be part of the new Section 4(f) analysis. He added that FHWA believes that it has already been proven that the long bridge is not practicable and USACE had agreed with this conclusion by signing the Review Board agreement. Scott commented that if FHWA determines again that the long bridge is not prudent, that means that it cannot be built under Section 4(f), but that determination would not apply to Section 404. (Note: Prudence is an FHWA decision under Section 4(f)). The Corps has already agreed that the Pamlico Sound Alternative is not practicable, consistent with Section 404 b(1) Guidelines. Clarence agreed but added that he hoped USACE would consider FHWA's Section 4(f) determination that the alternative could not be built in their Section 404 decision.

Brian Wrenn asked if there would be any other design changes with the redesigned Road North/Bridge South Alternative that would affect the impact numbers in the FEIS. Beth said that two additional design changes that are being considered with the Road North/Bridge South Alternative are extending the new Oregon Inlet bridge approximately 2,000 feet to the south (as with the Phased Approach) and possibly shifting the Road North part of the project to try and reduce wetland impacts. Any possible shifts to the alignment to reduce wetland impacts would be discussed further with USACE and NCDENR, including bridging opportunities. She said that these other potential design changes had not been finalized yet, but any additional changes would be included in the information packet sent out prior to the next meeting so that the Merger Team would have an opportunity to discuss the changes at the meeting. Brian asked if design changes would also be considered for the other Parallel Bridge Corridor alternatives. Beth said that further design changes would probably only be looked at for the Road North/Bridge South Alternative because the Phased Approach had already been improved as much as possible at this point and the focus is now on possibly pursuing the Road North/Bridge South as the new LEDPA.

Brian commented that he hasn't heard sufficient justification for pursuing the Road North/Bridge South Alternative when the wetlands impacts are so significantly higher. He added that he thought the other alternatives should also be looked at further for reducing impacts rather than focusing on customizing one alternative. He said that it would be difficult for DENR to permit one alternative when there are other alternatives on the table that have fewer impacts. Scott agreed that it would be difficult for the USACE to justify changing the LEDPA based on just looking at changes to one alternative without also looking at improving the other alternatives.

Pete asked if the May 21 meeting would be a concurrence meeting. Clarence responded that it possibly would be a concurrence meeting. Pete said that he wants to be provided information that fully "connects the dots" as to how the decision was made to consider moving away from the Phased Approach as the LEDPA. Clarence said that a package would be put together to more fully explain to the Merger Team members why the Road North/Bridge South



Page 9

April 15, 2009

Minutes: March 26, 2009 Merger Team Informational Meeting for Bonner Bridge

Alternative is under consideration as the new LEDPA, and that this information would be provided before the next meeting. Pete requested a one month advance notice with the informational packet for the next meeting.

Bill said that he is still confused as to how compatibility fits into the current decision-making process to pursue the Road North/Bridge South Alternative. Clarence said compatibility is not FHWA's decision. Mike responded that compatibility is still a major issue that would apply unless something takes away DOI's rights to part of the property within the Refuge. Bill asked if compatibility was being considered in parallel with the other issues that were discussed today. Clarence responded that the attorneys are considering this issue. Scott asked if a decision on compatibility would be made prior to the next Merger Team meeting. Mike responded that he was not sure. He just knows that the DOI solicitors had asked for all of the relevant project information, including the new data, so that they can have an informed discussion. Bill said that he thought the attorneys should make a decision on compatibility before the next meeting. Mike said that he cannot make a compatibility determination now, but he could render a new opinion once he has more information or new direction from DOI.

Clarence again summarized the action items that need to occur prior to the next Merger Team meeting:

- All documentation related to the new data and timelines need to be reviewed by the FHWA, NCDOT, and DOI attorneys and finalized, and then provided to the Merger Team members prior to the meeting.
- Refuge management needs to provide an indication on their jurisdiction related to compatibility once the agency attorneys have reviewed and provided comments on the new data and timeline.

Scott asked if the compatibility action item was appropriate. Mike responded that compatibility determinations usually take place after the NEPA process has been completed, but in the past draft determinations have been made to help explain USFWS' position. As far as he knows, USFWS still considers the NC 12 easement through the Refuge to be the easement shown in the FEIS, but we will have to wait and see if the new data changes anything.

Cathy Brittingham asked if the team members would be provided a summary of today's meeting. Beth responded that meeting minutes would be prepared.

Bill Biddlecome then adjourned the meeting.

file no.: 3301-2.7.2

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To: May 21, 2009 Bonner Bridge Merger Team Meeting Attendees
From: John Page, Parsons Brinckerhoff
Date: June 29, 2009
Subject: Meeting Minutes – May 21, 2009 NEPA/Section 404 Merger Team Meeting for the Bonner Bridge Replacement Project (TIP No. B-2500)

Attendees:

Gary Jordan	USFWS – Raleigh Field Office
Pete Benjamin	USFWS – Raleigh Field Office
Mike Bryant	USFWS – NC Coastal Plain Refuge Complex
Dennis Stewart	USFWS – Pea Island National Wildlife Refuge
Bill Biddlecome	US Army Corps of Engineers
Christopher A. Militscher	USEPA
Kathy Matthews	USEPA
Ron Sechler	National Marine Fisheries Service
Thayer Broili	National Park Service – Outer Banks Group
Clarence Coleman	FHWA – NC Division
Ron Lucas	FHWA – NC Division
Diane Mobley	FHWA (by phone)
Michelle Sayyar	FHWA (by phone)
Rob Ayers	FHWA – NC Division
Amy Simes	NCDENR
Jim Gregson	NCDENR – DCM
Cathy Brittingham	NCDENR – DCM
Michele Walker	NCDENR – DCM
Sara Winslow	NCDENR – DMF (by phone)
Brian Wrenn	NCDENR – DWQ
David Wainwright	NCDENR – DWQ
Travis Wilson	NCDENR – Wildlife Resources Commission
David Cox	NCDENR – Wildlife Resources Commission
Renee Gledhill-Earley	NCDENR – SHPO
Morgan Jethro	Albemarle RPO (by phone)
Greg Thorpe	NCDOT – PDEA
Beth Smyre	NCDOT – PDEA
Brian Yamamoto	NCDOT – PDEA
Rob Hanson	NCDOT – PDEA
Drew Joyner	NCDOT – Human Environment Unit
Mary Pope Furr	NCDOT – Human Environment Unit
Michael Turchy	NCDOT – Natural Environment Unit
Chris Rivenbark	NCDOT – Natural Environment Unit
Elizabeth Lusk	NCDOT – Natural Environment Unit
Morgan Weatherford	NCDOT – Natural Environment Unit
Leilani Paugh	NCDOT – Natural Environment Unit



Page 2

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

Doug Taylor	NCDOT – Roadway Design
Jerry Jennings	NCDOT – Division 1
Ray McIntyre	NCDOT – TIP Development Unit
Victor Barbour	NCDOT – Technical Services
Mark Staley	NCDOT – Roadside Environmental Unit
Nilesh Surti	NCDOT – Transportation Program Management Unit
Virginia Mabry	NCDOT – Transportation Program Management Unit
Lonnie Brooks	NCDOT – Structure Design Unit
Scott Slusser	North Carolina Department of Justice
Sean Doyle	North Carolina Department of Justice
Don O’Toole	North Carolina Department of Justice
John Page	Parsons Brinckerhoff
Bobby Norburn	Parsons Brinckerhoff

The meeting started at 1:00 p.m. in the Board Room of the NCDOT Transportation Building. Bill Biddlecome opened the meeting and asked the attendees to introduce themselves. He then turned the meeting over to Beth Smyre.

Bill said that there was some confusion as to the purpose of today’s meeting – the purpose could either be to revisit Concurrence Point No. 3, or it could be an informational meeting. Beth said that the reason for the uncertainty on the purpose of the meeting was because NCDOT had initially planned to seek concurrence on a new LEDPA, but whether or not that occurs will depend partially on how the meeting progresses.

Beth started to present the meeting packet which was distributed to the Merger Team prior to the meeting. She discussed the Road North/Bridge South (Avoid Ponds) Alternative and the reason it was developed (i.e., because of the Section 106 adverse effects determination for the Pea Island National Wildlife Refuge with the original Road North/Bridge South Alternative). She said that this alternative tries to address this determination by avoiding the ponds. Beth described the alternative using a map that was included in the packet. There was discussion on a possible alignment behind the ponds, but NCDOT did not pursue this alignment because of the potential for high wetland impacts. Beth noted that the impacts with the “Avoid Ponds” Alternative were included in the meeting handout with the impacts for the other project alternatives.

Renee Gledhill-Earley said that she had seen this alternative previously at a Section 106 coordination meeting, and that it does not really avoid the ponds. Dennis Stewart said that it would really be considered as being in the ponds, as it appears to impact marsh areas that are considered a part of the ponds. Beth said that aerial photographs showed it as being out of the ponds and in the adjoining wetlands, but that this would need to be field verified if that option was selected. However, the adverse effects determination for the Refuge did not change with the “Avoid Ponds” Alternative because of the “Bridge South” segment of the alternative.



Page 3

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

Beth asked for further feedback on the “Avoid Ponds” Alternative. Renee reiterated that there was still an Adverse Effect on the Refuge because of the bridging in the southern part of the Refuge. In response to a question from Bill Biddlecome, Renee said that any bridging through the historic landscape of the Refuge would be an Adverse Effect.

Clarence Coleman asked which Parallel Bridge Corridor alternative would be preferred from the perspective of Section 106 impacts. Renee responded that whichever alternative minimizes impacts would be preferred; however, in keeping with the intent of the Merger Team Process, she said that wants to know what the other agencies think about which alternative minimizes impacts before deciding which one she thinks minimizes impacts. She said she was not ready to express a preference yet.

Cathy Brittingham noted that biotic community impacts were listed in the handout tables, but CAMA wetland impacts were not shown. She asked what percentage of the wetland impacts were CAMA wetland impacts. Dennis discussed the location of CAMA wetlands in the Refuge. The high wetland impacts for the Road North/Bridge South Alternative in relationship to the other alternatives were discussed further. Cathy said that she wants the CAMA coastal wetlands impacts listed separately as NCDENR-DCM has requested throughout the project.

Jim Gregson said that CAMA wetland impacts are a major consideration for NCDENR-DCM. He also asked why the “Avoid Ponds” Alternative is being considered if the purpose and need is not being met because it would be impacted by the future shoreline before the design year. Beth responded that this alternative was an attempt at minimization for Section 106 impacts after the meeting with SHPO. Clarence agreed that this was the main reason for looking at this alternative.

Dennis asked if the 230-foot buffer was maintained between the future shoreline and the “Avoid Ponds” Alternative. Beth responded that the 230-foot buffer was considered, but it was violated out of necessity in attempting to minimize Section 106 impacts. She added that the buffer was used to determine when dunes would be needed with the “Avoid Ponds” Alternative.

John Page said that CAMA wetlands are shown on the biotic communities color figures in the FEIS appendices and impacts to CAMA wetlands are listed in Table 4-25 on page 4-96 of the FEIS. He said that there are some CAMA wetlands in the ponds area. Cathy added that depending on the outcome of today’s meeting, they may send someone to the project area to take a closer look at the locations of CAMA wetlands.

Brian Wrenn said that the Road North/Bridge South Alternative may not be permissible based on high wetland impacts when there are other alternatives with lower wetland impacts.

Bill Biddlecome referred to the COE’s May 15, 2009 letter that states their position on wetland impacts issues. The COE prefers the Phased Approach from the perspective of wetland



Page 4

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

impacts, but realizes that the Road North/Bridge South Alternative is better from the perspective of Section 4(f) impacts.

Clarence said that comments from the DOI and other agencies were not favorable towards the Phased Approach, so that is the main reason that the Road North/Bridge South Alternative was being revisited.

Thayer Broili said that he has similar concerns with the “Avoid Ponds” Alternative as with the original Road North/Bridge South Alternative.

Ron Sechler said that he shares USFWS’ concerns related to the Road North/Bridge South Alternatives because EFH is affected by both of them. He also shares the COE’s concerns about wetland impacts.

David Cox said that the NCDENR – Wildlife Resources Commission abstained at the last LEDPA selection meeting and they may abstain again. Also, they will defer to the USFWS on which alternative meets their Refuge management goals.

Chris Militscher said that EPA concurs with the COE’s May 15, 2009 letter. In addition, they have concerns about the Section 404 aspect of the increase in the magnitude of impacts with the Road North/Bridge South Alternative. He said that we already have a signed form from the Review Board that satisfies the process needs and we should move forward with the Review Board agreement.

Pete Benjamin said that he has many concerns with the revised Road North/Bridge South Alternative. He said that it does not fully avoid the ponds, but he does not like the impacts on the ponds with either Road North/Bridge South alternative. He is also concerned with beach nourishment with any alternative. The Road North/Bridge South alternatives would have adverse impacts on wildlife habitat in the Refuge. Also, no mitigation opportunities for the adverse impacts to the Refuge are available within the Refuge even if mitigation was an option. He said these alternatives were not likely to be compatible, so they would not be permissible.

Mike Bryant agreed that the Road North/Bridge South alternatives likely were not compatible. He discussed his April 30 to FHWA letter related to the project (see attached). The letter discussed the priorities of the Refuge management (i.e., “wildlife first”). Clarence said he had not seen this letter. Mike said it was addressed to John Sullivan.

Clarence asked about the DOI comment related to Refuge access with the Pamlico Sound Bridge Corridor. Mike and Pete agreed that that issue was not as important as wildlife impacts with the Parallel Bridge Corridor alternatives. Mike said that he thought the DOI comment was basically just pointing out that there would be Refuge access issues with the Pamlico Sound Bridge Corridor. Clarence said that the comment also referred to specific Refuge access issues such as access being lost to the Visitors Center. Also, he said that part of the reason for



Page 5

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

revisiting the Road North/Bridge South Alternative was to provide a future road at-grade to allow better Refuge access.

Sara Winslow said that the high wetland impacts are her main concern with the Road North/Bridge South alternatives.

Beth discussed why FHWA and NCDOT are now proposing that the Road North/Bridge South Alternative is the LEDPA. She went through the six reasons contained in Section IV of the meeting handout. She said that FHWA and NCDOT were aware that some of the resource and regulatory agencies likely would not agree with this position; therefore, with that in mind, she also wanted to discuss the e-mail that Chris Militscher had sent to the Merger Team members on May 15. She said that FHWA and NCDOT liked the proposal that Chris presented in the e-mail.

Chris discussed his e-mail (see attached). He said that the Review Board made a decision in August 2007 and that none of the agencies officially challenged that decision, although they may have disagreed with the decision. He said that the ambiguity in the Section 404 regulations led EPA to defer to the COE and NCDENR on their decision on the LEDPA. He said that EPA was not willing to look at the Pamlico Sound Bridge Corridor again (having been determined by the Review Board to be not practicable), so he thinks we are limited to the Parallel Bridge Corridor. He said that the Review Board left the LEDPA open beyond Phase I because they felt that future conditions were too uncertain in the Refuge to go beyond Phase I at this point, and he did not understand why the Merger Team felt that it had to go beyond what the Review Board decided by determining future phases now. He said that he does not doubt the quality of the future shoreline modeling that has been done for the project, but there is a great deal of uncertainty in even the best models of future conditions for coastal barrier island areas like the Bonner Bridge project area. Therefore, it was EPA's opinion that it could be arbitrary and capricious to make decisions based on modeling that included so much uncertainty.

Chris said that he thought Phase I should be built, and then the rest of the project should be examined in more detail when future conditions are more known. This also would keep FHWA from committing a huge amount of money to a project with a substantial amount of future uncertainty. He discussed what EPA believes to be the false assumption that this approach would be considered segmentation. He said segmentation was acceptable when alternatives analyses were "too speculative to allow for productive decision making." He said an adaptive management plan was needed to assist with cooperative decision-making for future decisions related to the project, but he wants the Merger Team to go ahead and move forward in a cooperative manner based on the Review Board agreement.

Beth discussed the August 2007 Review Board agreement. She said that the Merger Team agreed that the Bonner Bridge needs to be replaced. The Review Board agreement said that the Pamlico Sound Bridge Corridor is not practicable and that the Parallel Bridge Corridor



Page 6

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

includes several different alternatives which could be considered in the future when future conditions are better known. Based on this, NCDOT agrees that specifics related to future phases could be decided on closer to when they will be built using an adaptive management strategy. Beth recommended that the team start with the previous Review Board agreement and add to it if needed. Chris added that all of the agencies involved should be included in the adaptive management process.

Thayer discussed adaptive management from the perspective of the NPS. He said that it is virtually the opposite of the compatibility determination process because adaptive management will look at needs related to the future road, whereas compatibility only looks at Refuge concerns.

Chris said we have to determine how the Refuge and the road can co-exist because neither can move. He said that possibly a memorandum of agreement was needed between those agencies whose primary concern was transportation issues and the environmental resource and regulatory agencies to allow the two to co-exist. He added that we probably cannot adequately plan for future worst-case scenarios (e.g., a category 4 storm hitting the project area).

Clarence said that the revised Road North/Bridge South Alternative was in part to respond to Refuge comments on the Phased Approach. He said that FHWA's initial reaction is to agree with Chris' suggestion for how to move forward, but he asked Chris for further explanation of the segmentation issue. Chris said that he thought segmentation issue would not be a problem on this project because the administrative record includes thorough documentation of the extensive research that has taken place related to the unpredictable future conditions in the project area. Also, multiple alternatives for the full project were evaluated. Chris reiterated that he wants to move forward and thinks it would not be constructive to move backwards again. Clarence asked for other agency thoughts on this idea.

Pete said that he thought the idea had merit. He said that DOI had said that Phase I of the Phased Approach was compatible and could be built. He said that USFWS has experience with adaptive management, but he was trying to decide if adaptive management was appropriate for this project. He wonders whether or not we could identify in the future a solution through the Refuge that is legal from the perspective of all of the agencies involved. He thinks we need more than just the "hope" that we can find an appropriate future solution.

Clarence asked whether or not the Phased Approach was legal from the USFWS' perspective. Pete and Mike responded that they had concerns with its compatibility and that building a bridge across Oregon Inlet to the north end of the Refuge would lock us in to a narrow choice of options that would have to continue through the Refuge. Pete also expressed concern that the Phased Approach would likely require future work outside of the easement, so it may not actually be compatible. Clarence responded that the No-Action Alternative also would require work outside of the easement in the Refuge. Pete said that if the Merger Team decides to



Page 7

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

support Chris' option, the USFWS can go along with the team, but he does not think the team should think the problem is solved.

Chris said he wants more information from the USFWS on what compatibility is. Mike quoted DOI regulations and admitted that they were "loose" in order to give him the utmost discretion to say "no" to compatibility requests that were not in the best interest of the Refuge's mission. He said that he had less discretion to say "yes" to compatibility requests and that this is designed to keep the Refuge from "dying a death by 1,000 cuts." The 1997 Act raised the bar on what is allowed within the Refuge. It defined activities that were allowed more clearly and gave less flexibility than previously in allowing activities that may not be compatible with the Refuge's mission. Chris noted that the DOI did not elevate the Phased Approach selection to the CEQ after the FEIS.

Clarence asked if the meeting attendees were ready to move forward with Phase I. Renee said that she was willing to go along with Chris' proposal, but we still need to address the adverse effects of Phase I. She said an adaptive management process for future phases would have to include determining the likely impacts to the Refuge's historic landscape as a result of future phases.

Thayer said that he would like to reserve judgment on Chris' suggestion until after the meeting between the FHWA and DOI attorneys next week. Mike agreed with this. Chris said that it was possible that the attorneys would have more questions than answers after their meeting. He added that he did not think that was what the Merger Process should be based on, and that legal challenges would still apply even if the Merger Team decides to move forward.

Bill said that the Review Board agreement basically says what Chris is suggesting. He said it seems like the team is basically back to where we were two years ago at the time of that agreement. He is still agreeable to the Review Board agreement, but he would also listen to any suggested edits that any of the other agencies may have. He also understands the concern of the construction of Phase I limiting future options. Chris said that no agency challenged the FEIS to CEQ, so we should move forward. Beth said that we could put a commitment to adaptive management for future phases in the ROD.

Clarence said that based on today's discussions, he understands that other agencies want flexibility with future phases, which is something that the FHWA thought the Road North/Bridge South Alternative increased. He said that one of the main reasons for today's meeting was to discuss possible revisions to the Road North/Bridge South Alternative in response to previously expressed agency concerns. Beth noted that according to the Review Board agreement, the other Parallel Bridge Corridor alternatives are still being considered to allow flexibility with future phases. She also said that the team's final agreement at today's meeting would be included in the ROD.



Page 8

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

Clarence asked if the Merger Team needed to prepare a formal agreement for the outcome of today's meeting, including the possibility of forming an adaptive management plan. Chris said that he thought we should prepare a memorandum of understanding or agreement in order to document that all of the Merger Team member agencies agreed with the outcome of the meeting.

Pete asked what the ROD would state with respect to the other project alternatives. Clarence responded that FHWA would think about this and then discuss a proposed strategy with other team members before finalizing what would be in the ROD with respect to the other project alternatives.

Dennis commented that with respect to an adaptive management plan, the Refuge manager would still have the final say on decisions within the Refuge. He asked if this would be addressed in the ROD. Beth responded that the Refuge manager's rights with respect to legal issues in the Refuge would be recognized under an adaptive management agreement.

Dennis asked where would the funding come from for implementing ideas generated from the adaptive management plan within the Refuge. He also asked if such funding would be committed to in the ROD. Clarence responded that it would be hard to answer that question today. Dennis said that he realizes this needs more thought, but he thought some level of detail of commitments would be needed in the ROD. Clarence said that he did not see this as a major stumbling block, but he does not want to speak for NCDOT.

Thayer said that he is not sure if NCDOT fully understands what the concept of adaptive management means to the DOI, and that we need to be careful that the different agencies are not speaking in different "languages" about the same terms. Pete said he would send the team members a link to the DOI webpage that explains the agency's concept of adaptive management.

Clarence and Beth briefly summarized the discussions at today's meeting and asked if there was an agreement to move forward based on the 2007 Review Board agreement without any changes. **All agencies in attendance agreed to move forward based on the 2007 Review Board agreement.**

Chris added that the Merger Team needs to try to gain a better understanding of how DOI handles adaptive management, and then work together to develop a framework for moving forward with the concept of adaptive management for future project-related decisions.

Beth said that currently the ROD is scheduled to be released in October and the design/build contract is scheduled to be let in February 2010, with construction likely starting about one year later. In response to a question from Cathy, Beth said that the permit process would likely begin by the spring of 2010.



Page 9

June 29, 2009

Minutes: May 21, 2009 Merger Team Meeting for Bonner Bridge

Bill asked about a memorandum of understanding or agreement for today's agreement. Beth responded that FHWA and NCDOT would initiate this effort. Clarence added that they would think about whether or not a memorandum of agreement was needed now, or just the commitment to do one.

Bill asked if the Merger Team would be informed about the results of the meeting next week between the FHWA and DOI lawyers. Clarence said that he would provide information about the results of the meeting to the Merger Team.

Gary Jordan noted for the record that the USFWS never concurred with the Phased Approach Alternative as the LEDPA, but the decision was elevated above them.

Bill asked Beth for clarification on whether NCDOT was going to revise the language in the Review Board agreement related to the Phased Approach for the ROD. Beth responded that the wording in the Review Board agreement says that it is "expected" that the Phased Approach would be identified in the ROD as the LEDPA, not that it "will be" the LEDPA. Therefore, NCDOT needs to take a closer look at this issue before determining the exact wording for the ROD.

Leilani Paugh asked if there would be a separate meeting to discuss Phase I mitigation with the agencies. Beth responded that NCDOT was planning to have a meeting, but the exact time would be worked out later.

Bill Biddlecome then adjourned the meeting.

file no.: 3301-2.7.2

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

September 23, 2009

To: September 17, 2009 Bonner Bridge Merger Team Meeting Attendees

From: Beth Smyre, PE *Beth Smyre*
Project Planning Engineer

Subject: NC 12 Replacement of Herbert C. Bonner Bridge, (Bridge No. 11) over Oregon Inlet, Dare County, WBS No. 32635, Federal-Aid No. BRS-2358(15), TIP No. **B-2500**

Merger Team Meeting Summary

A merger team meeting was held on September 17, 2009 for the subject project. The following people were in attendance:

Scott McLendon	US Army Corps of Engineers (USACE)
Ron Sechler	National Marine Fisheries Service (NMFS)
Clarence Coleman	Federal Highway Administration (FHWA)
Ron Lucas	FHWA
Chris Militscher	US Environmental Protection Agency (USEPA)
Kathy Matthews	USEPA
Rosemary Hall	USEPA
Mike Murray	National Park Service (NPS)
Thayer Broili	NPS
Sara Winslow	NC Division of Marine Fisheries (NCDMF)
Travis Wilson	NC Wildlife Resources Commission (NCWRC)
Jim Gregson	NC Division of Coastal Management (NCDCM)
Jim Hoadley	NCDCM
Cathy Brittingham	NCDCM
Renee Gledhill-Earley	State Historic Preservation Office (SHPO)
David Wainwright	NC Division of Water Quality (NCDWQ)
Amy Simes	NC Dept. of Environment and Natural Resources
Jerry Jennings	NCDOT- Division 1
Greg Thorpe	NCDOT- Project Development & Environmental Analysis
Rob Hanson	NCDOT- PDEA
Brian Yamamoto	NCDOT- PDEA
Beth Smyre	NCDOT- PDEA

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RALEIGH NC

Phil Harris	NCDOT- Natural Environment Unit
Bruce Ellis	NCDOT- NEU
Elizabeth Lusk	NCDOT- NEU
Michael Turchy	NCDOT- NEU
Karen Lynch	NCDOT- NEU
Steve Mitchell	NCDOT- NEU
Kathy Herring	NCDOT- NEU
LeiLani Paugh	NCDOT- NEU
Morgan Weatherford	NCDOT- NEU
Kerry Vallant	NCDOT- Transportation Planning Branch
Dave Henderson	NCDOT- Hydraulics
Lonnie Brooks	NCDOT- Structure Design
Don O'Toole	NC Department of Justice
Mark Laugisch	NCDOT- Roadside Environmental Unit
Virginia Mabry	NCDOT- Transportation Program Management
Victor Barbour	NCDOT- Technical Services
KJ Kim	NCDOT- Geotechnical Engineering
Harrison Marshall	NCDOT- Human Environment Unit
Ray McIntyre	NCDOT- TIP Development Unit
Thomas Stoddard	NCDOT- TIP Development Unit
John Page	PB

Representatives from the USFWS (Raleigh and Manteo offices) were not present.

Part I: Discussion of Wetland Mitigation for Phase I

The meeting consisted of discussion of anticipated impacts due to the construction of Phase I to wetlands, submerged aquatic vegetation (SAV), and National Park Service (NPS) property; this was followed by a discussion of appropriate mitigation or conservation measures for each impact type. This project will follow a phased mitigation approach with the proposed phased construction of the preferred alternative. Impacts to US Fish and Wildlife Service (USFWS) property will be discussed at a later date since USFWS representatives were not in attendance.

The Team reviewed Figures E-2g and E-2h from the FEIS and Table 1 from the merger packet that illustrated the biotic communities, including wetlands, which were delineated within the Parallel Bridge Corridor. Table 1 provides a range of impacts to identified wetland types including man-dominated, salt shrub, maritime grassland, overwash, maritime shrub thicket, reed stand, and CAMA wetlands of salt flat, brackish marsh, smooth cord grass, and black needlerush.

The final impact numbers could change based on the final design and landing points of the bridge but will be within the same scale as reported on Table 1. The dominant species and quality of wetland was questioned for the man-dominated type on the table. The merger team would like to see the NCWAM types indicated. **NEU will review the area called man-dominated and assess the type and quality of all wetlands according to NCWAM.**

All agencies agreed that offsite wetland mitigation is not preferred for this project. FHWA questioned the use of existing wetland mitigation sites for offsetting impacts. USACE pointed to the exceptional quality and type of habitats associated with the Outer Banks as justification for alternative mitigation and allowed within the new federal mitigation rule. USACE noted that credits from existing wetland mitigation sites could eventually be utilized to compensate for impacts for Phase I. NPS requires that all impacts to Park Service property is mitigated within the park. Other agencies agreed that alternative mitigation or conservation measures would be acceptable. NPS suggested that a phragmites control program could be an appropriate mitigative measure using a 4:1 ratio. NCWRC recommended that any measures take into account site conditions and adjacent phragmites populations, which may require a larger treatment area other than what is dictated by ratios. Additional areas could be used to offset impacts from future phases of the roadway project. NCDWQ will have to discuss fulfillment of no-net-loss policy with their management. NCWAM has been suggested previously by NCDWQ as a method to demonstrate no-net-loss of functions through wetland enhancement. NCDWQ stated the Dare County Land Use plan requires 25% of the mitigation within the county. **NEU will coordinate with the NPS to develop an appropriate, practicable phragmites control proposal for review by NCDOT and agencies as mitigation for wetland impacts.**

The Team reviewed the figure included in the meeting package that illustrated the SAV survey transects completed by NEU in June 2009. The survey results show that SAV coverage within the corridor averaged 27.7%, which equates to an estimated 1.68 acres of SAV impacts. Impacts from Table 1 were estimated using 25% average SAV coverage within the corridor.

NMFS considers the SAV impact area to be the total amount of potential habitat within the corridor, not just the areas with presence of SAV. This area would be a maximum of 6.04 acres within the right-of-way of Phase I. NEU can refine this acreage by eliminating non-habitat areas such as mud, silt, and deep water areas. Other State agencies would not require any additional mitigation than required by the NMFS. NCDWQ requested SAV mapping of corridor prior to construction. Removal of the existing bridge may result in impacts also. Bridge demolition techniques will be discussed at 4B and 4C meetings. **NEU will provide an estimate of the total SAV habitat area, impacts due to shading, and impacts due to fill.**

NCDWQ discussed construction techniques that could increase impacts, such as jetting piles. The dispersion of material could smother SAV beds. A recent study funded by NCDOT discusses the range of effects. If preventive or clean-up measures are not undertaken, the impacts would be considered permanent.

Removal of the existing bridge could be used as on site mitigation of SAV impacts, with consideration given to impacts from bridge demolition. NPS questioned the lack of certainty of SAV habitat restoration by bridge removal. However, the same lack of certainty exists with impacts of the new bridge. **NEU will provide an estimate of the potential SAV habitat area under the existing bridge.**

NEU discussed offsite, out-of-kind mitigation of SAV impacts by oyster reef construction. The SAV mitigation panel recommends funding research as a priority. Restoring SAV beds can be problematic in such dynamic environments. SAV tends to be opportunistic and will populate habitat areas as they develop. NMFS will be open-minded and suggested current USACE dredging projects and other civil works projects as potential cooperative opportunities to restore SAV habitat.

Dave Lekson (USACE) should be contacted for additional mitigation opportunities. NCDOT should show due diligence in reviewing onsite mitigation and conservation measures. Other measures were suggested for wetland mitigation including restoration of piping plover habitat, control of vegetation encroachment, and enhancement of fisheries. NCDOT also referred to the Coastal Habitat Protection Plan for targeted areas and measures. All mitigation pursued should take into account any Section 7 measures.

Part II: Discussion of Draft Preferred Alternative Partnership Agreement

The purpose of this portion of the meeting was to discuss the draft (dated September 8, 2009) Preferred Alternative Partnership Agreement that was developed to address how decisions on future phases of the project would be made. The intent of the agreement was to identify the responsibilities of all agencies that must be involved before NCDOT can move forward on future phases and to state protocol for how alternatives for future phases will be evaluated. The agreement was developed based on the suggestion from the USEPA during the May 21, 2009 merger team meeting that an adaptive management strategy that deferred decisions on later phases would best fit this project, due to the unpredictability of the environment within the project area. Although the team decided to revise the LEDPA/Preferred Alternative decision during the May 21 meeting, no concurrence form was signed.

The group discussed whether the Partnership Agreement was necessary in the current context of the Merger Process; several agencies felt that a Merger Process concurrence form would be more appropriate. Some members of the team expressed concerns about not having the authority to sign a Partnership Agreement on behalf of their agency; however, they were authorized under the current Merger agreement to sign a concurrence form.

The concept of adaptive management, first mentioned during the May 21 merger team meeting, was discussed. The Department of Interior's Adaptive Management is a policy for how to manage a resource over time to achieve a desired outcome. Several agencies questioned whether an adaptive management plan should be stipulated in any agreement.

The team determined that a Partnership Agreement was potentially more appropriate for the USFWS and the NPS (as managers of the federal lands along the NC 12 corridor) than to the other members of the merger team. USEPA suggested that the US Institute for Environmental Conflict Resolution, an independent and impartial federal program in Arizona, could assist in the development of a Partnership Agreement between the transportation and federal land agencies. The Department of Interior has an Office of Collaborative Action and Dispute Resolution that could also be utilized.

The team discussed revising the draft Partnership Agreement into a Merger Process concurrence form, which would amend (not conflict with) the Review Board agreement that was signed on August 27, 2007. The concurrence form should include the following:

- Recognition that the Review Board agreed that Phase I should proceed as soon as possible;
- Review the amount of studies of the project area that have been completed to date;
- Recognize the available solutions for later phases that were studied;
- Explain why the team agreed during the May 21 meeting that decisions on the later phases of the project could be postponed; and
- An additional formalized agreement should be pursued with the US Fish and Wildlife Service and the National Park Service that provides additional information on how decisions about later phases will be made.

It was also noted that some discussion may be needed about what would trigger NCDOT and FHWA to reconvene the merger team for future phases. USEPA mentioned that the tenets of the existing draft Partnership Agreement should be included within the Record of Decision for the project.

NCDOT asked that the team provide any comments on the existing draft Partnership Agreement as well as any comments on what would trigger the merger team's involvement on future phases by **Friday, September 25**. NCDOT and FHWA will draft a concurrence form with the above stipulations and send it to the merger team for review.

Appendix E: New Preferred Alternative

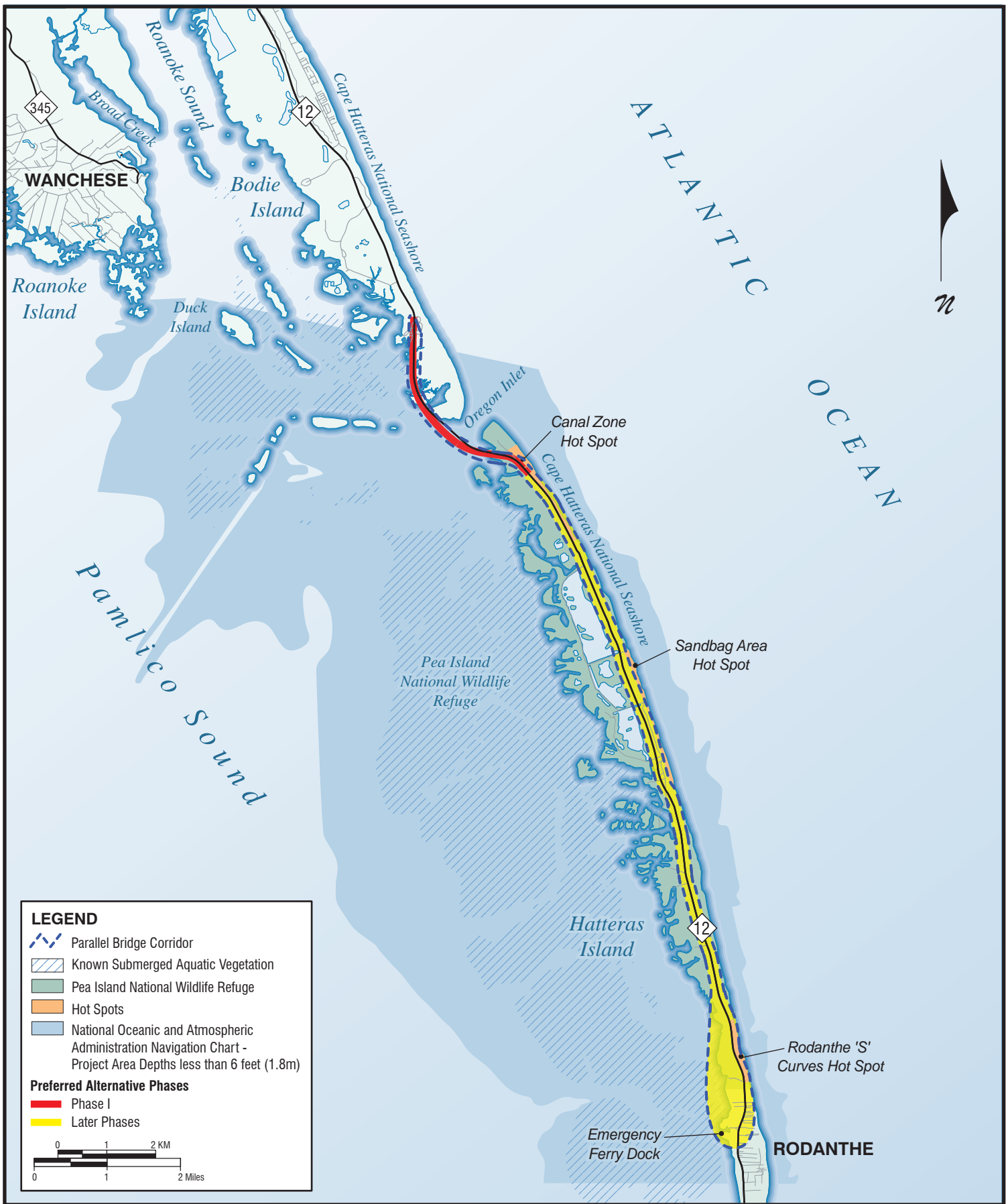
The following describes the Preferred Alternative (Parallel Bridge Corridor with NC 12 Transportation Management Plan) that was approved by the project's Merger Team.

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative proposes to proceed with construction of Phase I of the Parallel Bridge Corridor as soon as possible. Phase I of the Parallel Bridge Corridor would consist of a parallel replacement structure on the west side of the existing Bonner Bridge.

A single conceptual alignment for Phase I is under consideration at the Phase I Bodie Island terminus. The final design in this location would be developed in coordination with the National Park Service (NPS) so as to minimize adverse impacts to Cape Hatteras National Seashore resources. The main bridge structure would be designed in coordination with the US Army Corps of Engineers (USACE) and the US Coast Guard (USCG) so as to maximize the available navigation span and thereby minimize future dredging required within Oregon Inlet. All aspects of Phase I would be designed to conform to North Carolina highway specifications as approved by the Federal Highway Administration (FHWA) and NCDOT to ensure the safe construction and operation of the highway. In addition, other state and federal environmental regulatory and resource agencies would have an opportunity to review and comment on the final design prior to authorization of construction.

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative (Preferred) does not specify a particular action at this time on Hatteras Island beyond the limits of Phase I. The selection and finalizing of future phases of the Preferred Alternative would be determined through the Merger Process and a separate Partnership Agreement, which FHWA and NCDOT will pursue with the NPS and USFWS (as the federal land management agencies) (See Appendix H). The Merger Process and the Partnership Agreement would address transportation management through 2060 with a plan to monitor conditions on NC 12 and the affected environment, and modify management actions so as to minimize adverse impacts to the Refuge resources while maintaining NC 12 as a viable transportation facility. Future construction actions within the Parallel Bridge Corridor would be evaluated in cooperation with the appropriate environmental regulatory and resource agencies through the Merger Process and the Partnership Agreement.

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative is consistent with the Section 404/NEPA Merger Process agreement for this project that was approved in August 2007. The various Parallel Bridge Corridor alternatives reflect a reasonably foreseeable range of options that could be implemented in later phases.



PREFERRED ALTERNATIVE

B-125

Figure
S-1

Phase I of the Parallel Bridge Corridor with NC 12 Transportation Management Plan

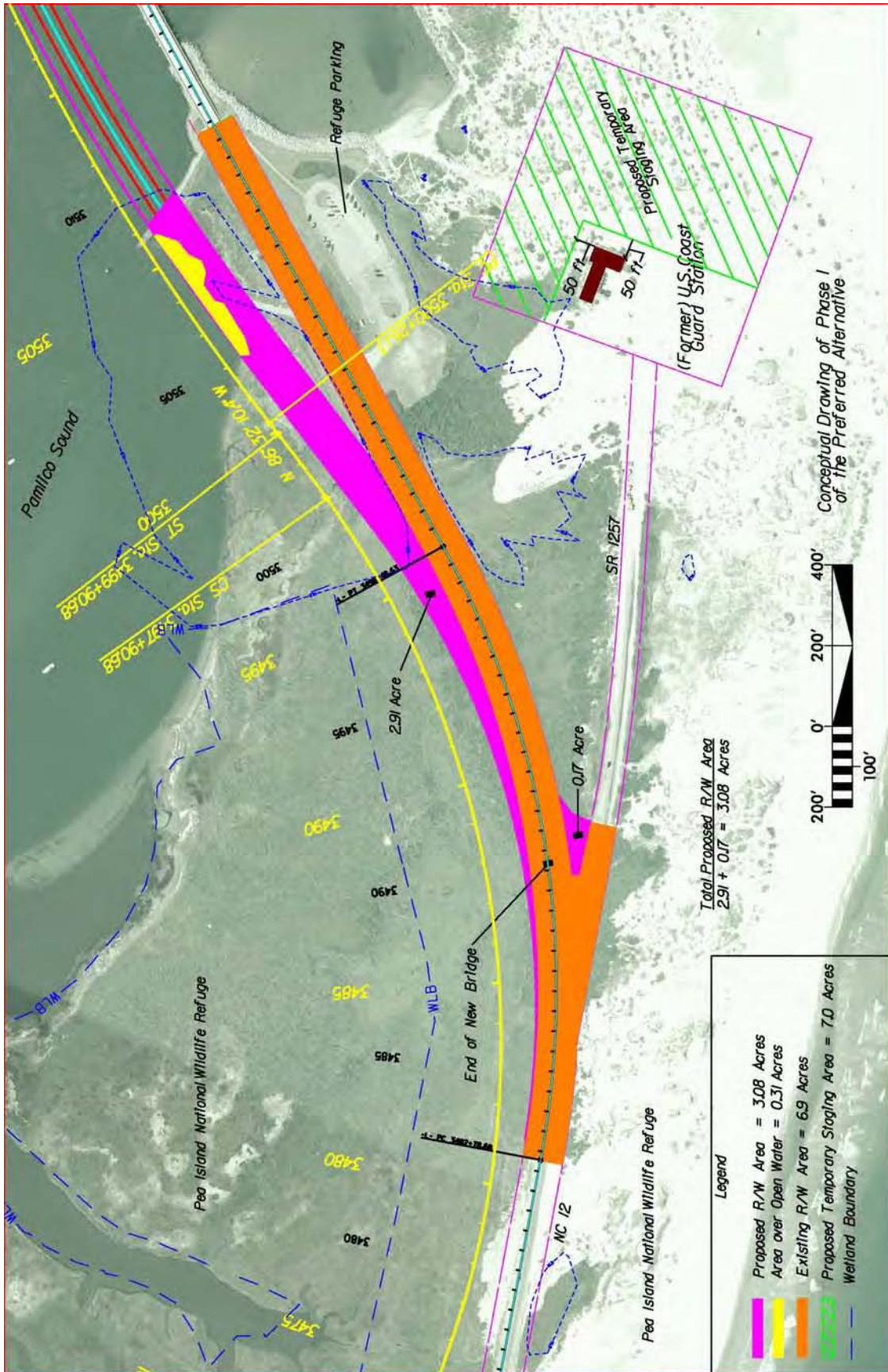
NCDOT initially developed several design concepts for the Oregon Inlet replacement bridge and its southern terminus on Hatteras Island; these concepts are represented in the Oregon Inlet bridge component of the Parallel Bridge Corridor alternatives. At a site visit on July 15, 2009, USFWS representatives identified an additional design concept that is considered a minor variation of Phase I of the Phased Approach alternatives, because it would be immediately adjacent to the western edge of the existing NC 12 easement within which the Phased Approach alternatives would be built. This USFWS-suggested variation would encompass a total area for the transportation facility of approximately 7.2 acres (6.9 acres of current easement plus 0.3 additional acres for a total of 7.2 acres). The USFWS also stated at this meeting that their suggested design option would not require a compatibility determination by the Refuge, since it would be considered a minor modification of the NC 12 easement.

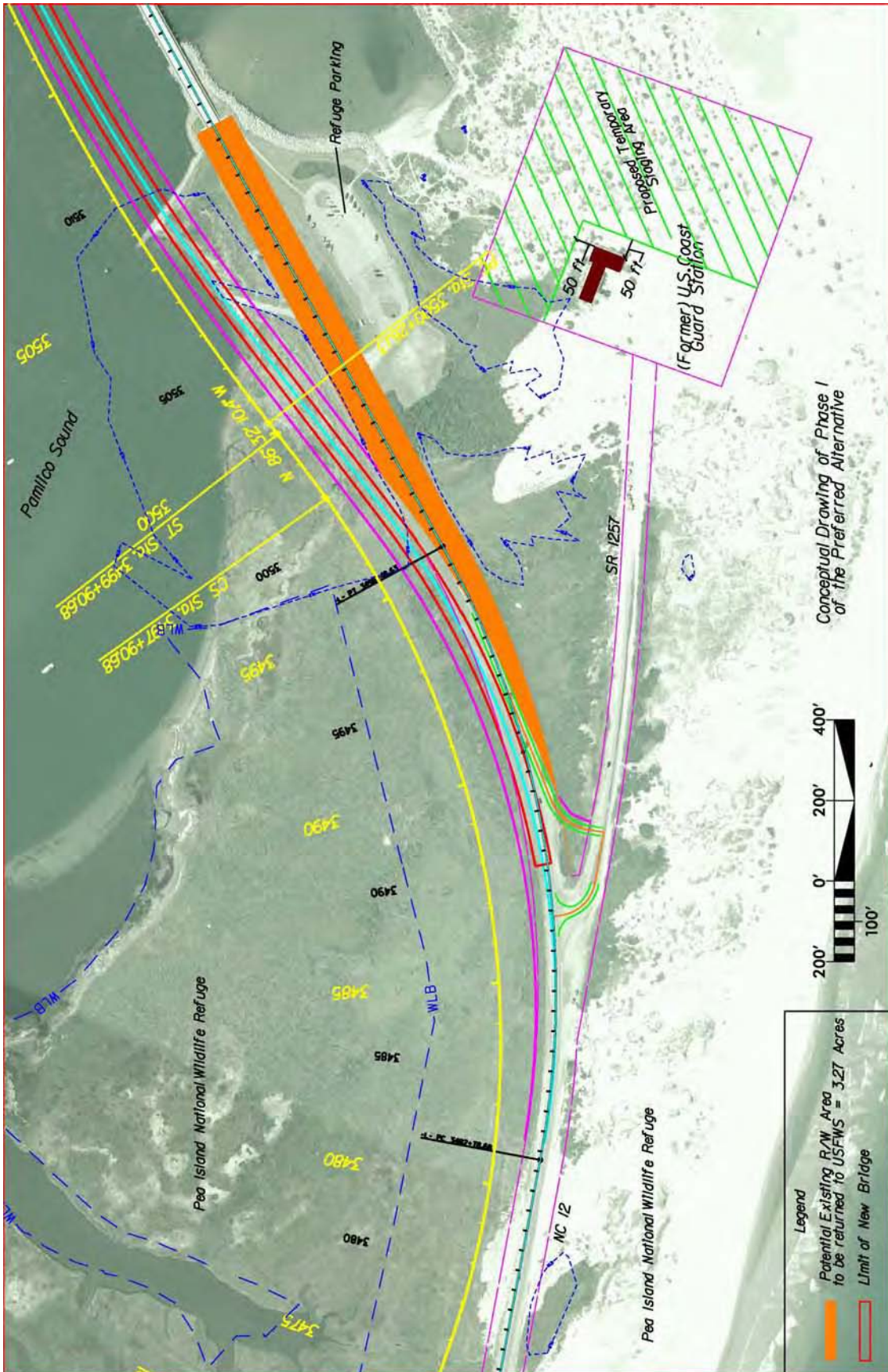
On September 2, 2009, NCDOT and FHWA met with USFWS and NPS representatives as a follow-up to the July 15, 2009 meeting. During this meeting, NCDOT and FHWA requested that the USFWS consider a larger minor modification beyond the limits that were provided by the USFWS. The design that contains the alignment outside of the USFWS limits provides more room for heavy trucks and recreational vehicles. According to NCDOT Division 1 personnel who will administer the construction oversight of this project, this design provides more separation between the existing Bonner Bridge and the construction of the new bridge. This increases the safety to the motorists that will be traveling on existing NC 12 during construction. This slightly different version (see graphic below) would encompass a total area for the transportation facility of approximately 3.08 acres (2.91 acres of current easement plus 0.17 additional acres for a total of 3.08 acres). This NCDOT variation will be evaluated for Section 4(f) applicability. NCDOT and FHWA will continue to coordinate with the USFWS to resolve the alignment for Phase I of the Parallel Bridge with the Transportation Management Plan. Though there may be changes to this proposed alignment as coordination with the USFWS continues, the impacts are expected to remain within the range of Phase I impacts proposed for the Parallel Bridge Corridor alternatives.

Following are graphical representations of the proposed NCDOT variation (based on the USFWS concept).

**Parallel Bridge Corridor with
NC 12 Transportation Management Plan
Phase I Conceptual Design Impacts**

<i>Main Bridge Design</i>	
Approximate amount of new (100') easement needed for new bridge	127,900 square feet 2.91 Acres
Potential amount of existing easement available to be returned	142,600 square feet 3.27 Acres
<i>Refuge Parking Lot Access</i>	
How traffic would access Refuge parking lot	Via intersection with SR 1257, and remnant of existing NC 12
Approximate amount of new easement needed for Refuge parking lot access	7,300 square feet 0.17 Acre
<i>(Former)USCG Station Access</i>	
How traffic would access USCG Station	Via SR 1257
Amount of new easement needed for USCG Station access	None
Length of Existing NC 12 needed to maintain access to USCG Station access road	None





Appendix F: Draft Section 106 Programmatic Agreement

The draft version of the programmatic agreement to resolve adverse effects from the project on historic resources has been, and continues to be, coordinated and developed in consultation with the NC State Historic Preservation Officer, the Advisory Council on Historic Preservation, and consulting parties. The Programmatic Agreement will be finalized prior to the Record of Decision.

**PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICER
AND
THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
FOR
THE REPLACEMENT OF HERBERT C. BONNER BRIDGE (BRIDGE NO. 11)
ON NC 12 OVER THE OREGON INLET
DARE COUNTY, NORTH CAROLINA
TIP PROJECT B-2500
FEDERAL AID PROJECT BRS-2358(15)**

WHEREAS, the Herbert C. Bonner Bridge (Bridge No.11, Dare County), built over Oregon Inlet in 1962, is approaching the end of its reasonable service life and as part of NC 12 provides the only highway connection between Hatteras Island and Bodie Island; and

WHEREAS, NC 12 has been and continues to be subjected to washouts and disruptions due to storms and other natural events that are a part of the dynamic and ever-changing environment along North Carolina's Outer Banks; and

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the North Carolina Department of Transportation (NCDOT), has determined that replacement of Bonner Bridge is necessary and intends to proceed with construction of a parallel bridge across Oregon Inlet as soon as possible; and

WHEREAS, the replacement consists of a parallel structure on the west side of the existing Bonner Bridge in the immediate vicinity of Oregon Inlet, hereinafter defined as the Undertaking/Phase I and described in Attachment A, which has been accepted by the Interagency NEPA/Section 404 Merger Team of which the consulting parties to this Programmatic Agreement (PA) are members, or are represented by the members; and

WHEREAS, to address the unpredictability of natural events which could impact NC 12 in the future, the NCDOT and FHWA will develop in consultation with the Interagency NEPA/Section 404 Merger Team, the NC 12 Transportation Management Plan (TMP). The NC 12 TMP will be a phased-decision making process that responds to and plans for the dynamic and changing environment in which the Undertaking/Phase I and future steps to maintain NC 12 as a viable transportation corridor are thoroughly considered; and

WHEREAS, this PA shall be incorporated into the NC 12 TMP; and

WHEREAS, the Undertaking/Phase I anticipates retention of the terminal groin and revetment on Hatteras Island, which requires the issuance of a new permit from the U.S.

Fish and Wildlife Service (USFWS) under the authority of the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee); and pursuant to 50 CFR 29.21; and

WHEREAS, this PA does not pertain to any future road and/or bridge construction south of the Parallel Bridge Corridor undertaken by FHWA and/or NCDOT, nor does it abrogate the USFWS's rights, responsibilities, and obligations to manage Pea Island National Wildlife Refuge pursuant to the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee) and other relevant authorities; and

WHEREAS, NCDOT and FHWA have endorsed the application for NC 12 to become a National Scenic Byway as established under the Intermodal Surface Transportation Efficiency Act of 1991, and reauthorized in 1998 under the Transportation Equity Act for the 21st Century; and

WHEREAS, identification of historic properties within the Undertaking/Phase I's Area of Potential Effects has been carried out in accordance with the Advisory Council on Historic Preservation's (ACHP) regulations (36 CFR Part 800) for implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, the Undertaking/Phase I will affect the National Register of Historic Places (NRHP)-listed (former) Oregon Inlet US Coast Guard Station and the Pea Island National Wildlife Refuge, a property determined or eligible for inclusion in the NRHP; and

WHEREAS, NCDOT has agreed to design modifications that keep subsequent phases of the project out of the limits of the Rodanthe Historic District (NRHP-eligible), which also includes the Chicamacomico Life Saving Station (NRHP-listed), but it is also understood that dramatic changes may require reassessment, under the NC 12 TMP, for that phase; and

WHEREAS, FHWA has prepared the FEIS and additional documentation that have identified phases of the Undertaking/Phase I and effects on historic properties and submitted a notice of adverse effect to ACHP, which elected to participate in this consultation; and

WHEREAS, the FHWA has consulted with the North Carolina State Historic Preservation Officer (SHPO) and the ACHP to develop this PA pursuant to Section 14(b)(3) of 36 CFR Part 800; and

WHEREAS, NCDOT has participated in the consultation and been invited as a signatory to this PA; and

WHEREAS, the National Park Service (NPS), the USFWS, County of Dare, the Chicamacomico Historical Association (CHA), and the North Carolina Aquariums (Aquariums) have participated in the consultation and been invited to concur in this PA;

NOW, THEREFORE, FHWA, the ACHP, the SHPO, and the NCDOT agree that the Undertaking/Phase I and subsequent phases covered by the NC 12 TMP shall be administered in accordance with the following principles and stipulations to satisfy FHWA's Section 106 responsibilities for these actions.

PRINCIPLES

FHWA and NCDOT shall adhere to the following principles for replacement of the Bonner Bridge and development and implementation of the NC 12 TMP:

1. FHWA and NCDOT commit to plan, design, and implement the Undertaking/Phase I in accordance with the best practices and measures available at the time to avoid and minimize impacts to historic properties.
2. FHWA and NCDOT will seek, discuss, and consider the views of the consulting parties to this PA concerning design and construction options throughout the planning for any subsequent phases.
3. Given the potential for changes in the environment and historic properties, FHWA and NCDOT will, for any subsequent phases, identify and evaluate any properties that are or may be eligible for listing in the NRHP.
4. FHWA and NCDOT will take into account direct, indirect, and cumulative effects on historic properties pursuant to 36 CFR 800.5(a)(1) and will consider measures to improve existing conditions affecting historic properties.
5. As a matter of public policy and in accordance with FHWA guidance at the time, reasonableness of cost shall be considered when selecting measures to avoid, minimize, or mitigate adverse effects to historic properties. Cost should not be the only determining factor in mitigation decisions.
6. FHWA and NCDOT will minimize impacts associated with the Management of NC 12 on the natural habitat and the NRHP-eligible historic landscape of the Pea Island National Wildlife Refuge.
7. FHWA has an Emergency Relief Program that establishes protocols for coordination with NCDOT and other Federal and state agencies to deal with emergencies. FHWA and NCDOT will comply with 23 CFR 668 and 36 CFR 800.12, and other applicable environmental laws, when a disaster and/or emergency is declared by the appropriate authority.

STIPULATIONS

FHWA will ensure that the following measures are carried out:

I. Parallel Bridge Corridor Minimization/Mitigation Measures

In order to facilitate planning and streamline development of plans for the Undertaking/Phase I, NCDOT shall, in consultation with the consulting parties,

develop the following historic contexts to aid in historic planning for the parallel bridge corridor and possible heritage tourism initiatives.

A. Ethnographical Context

- 1) NCDOT will work with the USFWS, SHPO, and NPS to compile an ethnographical context of the men and women that lived and worked in the general project area during the late nineteenth and early twentieth centuries. The context will focus on the area's watermen, fishermen, Civilian Conservation Corps, members of gun or hunting clubs, and life saving station employees. NCDOT will be responsible for the following tasks.
 - a. Gathering oral histories from surviving members of these groups or families.
 - b. Conducting primary and secondary research regarding the activities of these groups.
 - c. Compiling documentary materials and digitizing images.
- 2) NCDOT will produce a digital document which contains the recorded oral histories and documentary materials. NCDOT shall afford the USFWS, SHPO, and NPS an opportunity to review and comment on the draft digital document. If no comments are received from the USFWS, SHPO, and NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the document. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments. NCDOT shall deposit copies of the documentation with USFWS, NPS, SHPO, and the Historic Architecture Group of NCDOT within three (3) years of the letting of the Phase I contract.

B. Context for Tourism

- 1) NCDOT will work with the USFWS, SHPO, Aquariums, CHA, and NPS to compile a context for the Coast Guard and Life Saving stations, wildlife refuges, and other state and federal "outposts" on North Carolina's Outer Banks.
- 2) NCDOT will produce a digital document which synthesizes the histories and documentary materials associated with the various sites.
- 3) In addition, NCDOT will prepare the artwork and text for a brochure that could be used by travelers and residents as a guidebook to locate and understand the significance of the various sites and their place in history of the Outer Banks and the state.
- 4) NCDOT shall afford the USFWS, SHPO, Aquariums, CHA, and NPS an opportunity to review and comment on the draft brochure. If no comments are received from the USFWS, SHPO, Aquariums, CHA, and NPS within thirty (30) days of confirmed receipt, NCDOT can

assume that the reviewing parties do not object to the brochure. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.

- 5) NCDOT shall deposit copies of the documentation and brochure artwork and text with USFWS, SHPO, Aquariums, CHA, and NPS within three (3) years of the letting of the Phase I contract and will provide 50,000 brochures to tourism organizations such as Historic Albemarle, Coastal Guide, NC Northeast Commission, Outer Banks Visitors Bureau, and state visitor centers.

II. Pea Island National Wildlife Refuge

A. Bridge Design

Currently, the bridge rail is proposed as a 32-inch concrete parapet with 2-bar, metal rail atop the parapet. Prior to completion of the final design for the Undertaking/Phase I bridge structure within the Pea Island National Wildlife Refuge, NCDOT shall afford the SHPO, USFWS, and NPS an opportunity to review and comment on the plans and specifications for the parapet and bridge rail for NC 12. If no comments are received from the SHPO, USFWS, or NPS within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the proposed design. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.

B. Management of NC 12

NCDOT, in consultation with FWHA, USFWS, NPS, SHPO, and the North Carolina Coastal Geological Cooperative, will develop and implement sustainable techniques to protect NC 12 and subsequently ameliorate the adverse impacts to the Refuge and Pea Island.

C. Copies of Technical Reports

NCDOT will provide the USFWS and NPS with copies of the cultural resource technical reports previously produced by NCDOT to describe the historic architecture, historic landscape, terrestrial archaeology, and underwater archaeology investigations in the Undertaking/Phase I's Area of Potential Effects. NCDOT will deliver this information to USFWS and NPS within six (6) months of signing the PA.

D. Signs

NCDOT will provide and install signs within the Refuge, at locations coordinated with the USFWS and NPS, to direct people to the visitor's center and points of historical interest, including prominent Civilian Conservation Corps installations, within three (3) years of the letting of the Phase I contract.

E. Exhibits and Kiosks

- 1) NCDOT will provide the USFWS and NPS with information about the historic significance and structural importance of Civilian Conservation Corps' work efforts in the Refuge for use in exhibits and kiosks that will be made available to visitors.
- 2) NCDOT will design and produce a custom kiosk at a location specified by the USFWS within three (3) years of the letting of the Phase I contract. The kiosk, like the signs mentioned in Stipulation C above, will be installed or built in a manner consistent with USFWS or the Refuge's Visitor Service Facility Standards. More specifically, NCDOT will research and design the interpretive panels; design the structure, provide funding for fabrication of the kiosk, and install the kiosk at the site. Prior to fabrication of the interpretive panels and kiosk structure NCDOT shall afford the SHPO, ACHP, and USFWS an opportunity to review and comment on the panels and structure. If no comments are received from the SHPO, ACHP, or USFWS within 30 days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the proposed design. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.
- 3) Once installed by NCDOT, it is the intention of USFWS to maintain the kiosks subject to the availability of appropriated funds.

III. (former) Oregon Inlet US Coast Guard Station

A. Parking Lot and Access Road

- 1) NCDOT will make improvements (clearing sand and paving) to the access road (SR 1257) and parking area, if NCDOT needs these areas for staging. If and when the (former) Oregon Inlet Coast Guard Station becomes a viable facility and is open to the public, NCDOT will maintain SR 1257 to the standards of the North Carolina Secondary Road System.
- 2) For the purposes of this PA, staging areas are defined as (1) the storage of equipment or materials that are needed for the construction/demolition of the bridge over the Oregon Inlet and (2) the placement of temporary offices or trailers.
- 3) NCDOT shall insure access to the (former) Oregon Inlet Coast Guard Station during construction of the Undertaking (Phase I).

B. Signs

NCDOT will provide and install roadside signs to direct visitors to the station from Northbound NC 12 and Southbound NC 12 within one (1) month of the replacement bridge over Oregon Inlet being open to traffic.

C. Exhibits and Kiosks

NCDOT will provide Aquariums with information about the historic significance and structural importance of the Station for use in exhibits and kiosks, which will be made available to visitors. NCDOT will design and produce a custom kiosk at a location specified by Aquariums within three (3) years of the letting of Phase 1 of the project.

- 1) More specifically, NCDOT will research and design the interpretive panels; design the structure, provide funding for fabrication of the kiosk, and install the kiosk at the site.
- 2) Prior to fabrication of the interpretive panels and kiosk structure NCDOT shall afford the SHPO, ACHP, and Aquariums an opportunity to review and comment on the panels and structure. If no comments are received from the SHPO, ACHP, or Aquariums within thirty (30) days of confirmed receipt, NCDOT can assume that the reviewing parties do not object to the proposed design. Should any of these parties have questions about or comments on such plans and specifications, NCDOT shall consult with that party, and if necessary with several or all consulting parties to address such questions and comments.
- 3) Once installed by NCDOT, Aquariums will maintain the kiosks.

IV. Context Sensitive Solutions

FHWA and NCDOT commit to utilizing the best practices and measures available at the time during the construction the Parallel Bridge and when implementing activities associated with Pea Island/NC 12 Transportation Management Plan to avoid and minimize all impacts to historic properties.

V. Unanticipated Discovery

If additional historic properties are discovered or unanticipated effects on historic properties are found after FHWA approves the Undertaking/Phase I and construction has commenced, FHWA will consult with the SHPO, the property owner, and any Indian tribe that may ascribe traditional cultural and religious significance to the properties in accordance with 36 CFR 800.13(b). If Native American human remains are discovered, NCDOT and FHWA will contact the federal land managing agency so that it may comply with Native American Graves Protection and Repatriation Act (NAGPRA). Inadvertent or accidental discovery of human remains will be handled in accordance with North Carolina General Statutes 65 and 70.

VI. Dispute Resolution

Should any of the Signatory or Concurring Party(ies) object within (30) days to any plans or documentation provided for review pursuant to this PA, the FHWA shall consult with the objecting party(ies) to resolve the objection. If the FHWA

or objecting party(ies) determines that the objection cannot be resolved, the FHWA will forward all documentation relevant to the dispute to the ACHP. Within thirty (30) days after receipt of all pertinent documentation, the ACHP will either:

- Provide the FHWA with recommendations which the FHWA will take into account in reaching a final decision regarding the dispute, or
- Notify the FHWA that it will comment pursuant to 36 CFR Section 800.7(c) and proceed to comment.
- Any ACHP comment provided in response to such a request will be taken into account by the FHWA, in accordance with 36 CFR Section 800.7 (c) (4) with reference to the subject of the dispute.

Any recommendation or comment provided by the ACHP will be understood to pertain only to the subject of the dispute. FHWA's responsibility to carry out all of the actions under this PA that are not the subject of the dispute will remain unchanged.

VII. Amendments

Should any of the Signatory parties believe that any of the terms of this PA cannot be carried out or that an amendment to the terms must be made, that party(ies) shall immediately consult with the other party(ies) to develop an amendment. The amendment will be effective on the date a copy is signed by all of the original signatories. If the signatories cannot agree to appropriate terms to amend the PA, any signatory may terminate the agreement in accordance with Stipulation VIII, below. Environmental conditions will be monitored for any changes prior to permitting of subsequent phases and the NC 12 TMP may provide for any amendments that may result from environmental changes and need for permits at those times.

VIII. Termination

Any Signatory may terminate this PA by providing notice to the other party(ies), provided that the party(ies) will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Termination of this PA will require compliance with 36 CFR 800. This PA may be terminated by the execution of a subsequent PA that explicitly terminates or supersedes its terms.

If the USFWS does not renew the existing permit for the terminal groin, FHWA shall notify the parties to this PA that the Undertaking will not proceed as planned and that this PA is null and void. In the event that FHWA and NCDOT are unable to proceed with the Undertaking/Phase I as currently proposed, FHWA

shall reinitiate Section 106 consultation in accordance with 36 CFR Part 800 regarding other alternatives for the replacement of the Herbert C. Bonner Bridge.

IX. Duration

Unless terminated pursuant to Stipulation VIII above, this PA will be in effect until FHWA, in consultation with the other Signatory and Concurring Party(ies), determines that all of its terms have satisfactorily been fulfilled, which ever time comes first, or if NCDOT is unable or decides not to construct the Undertaking/Phase I.

Execution of this PA by FHWA, ACHP, and SHPO, and implementation of its terms, evidence that FHWA has afforded the Council an opportunity to comment on the Undertaking/Phase I, and that FHWA has taken into account the effects of the Undertaking/Phase I on the historic properties.

SIGNATORIES:

By: _____ Date: _____
Sullivan
Federal Highway Administration, North Carolina

By: _____ Date: _____
Crow
North Carolina State Historic Preservation Officer

By: _____ Date: _____
Fowler
Advisory Council on Historic Preservation

By: _____ Date: _____
Gibson
North Carolina Department of Transportation

CONCURRING PARTIES:

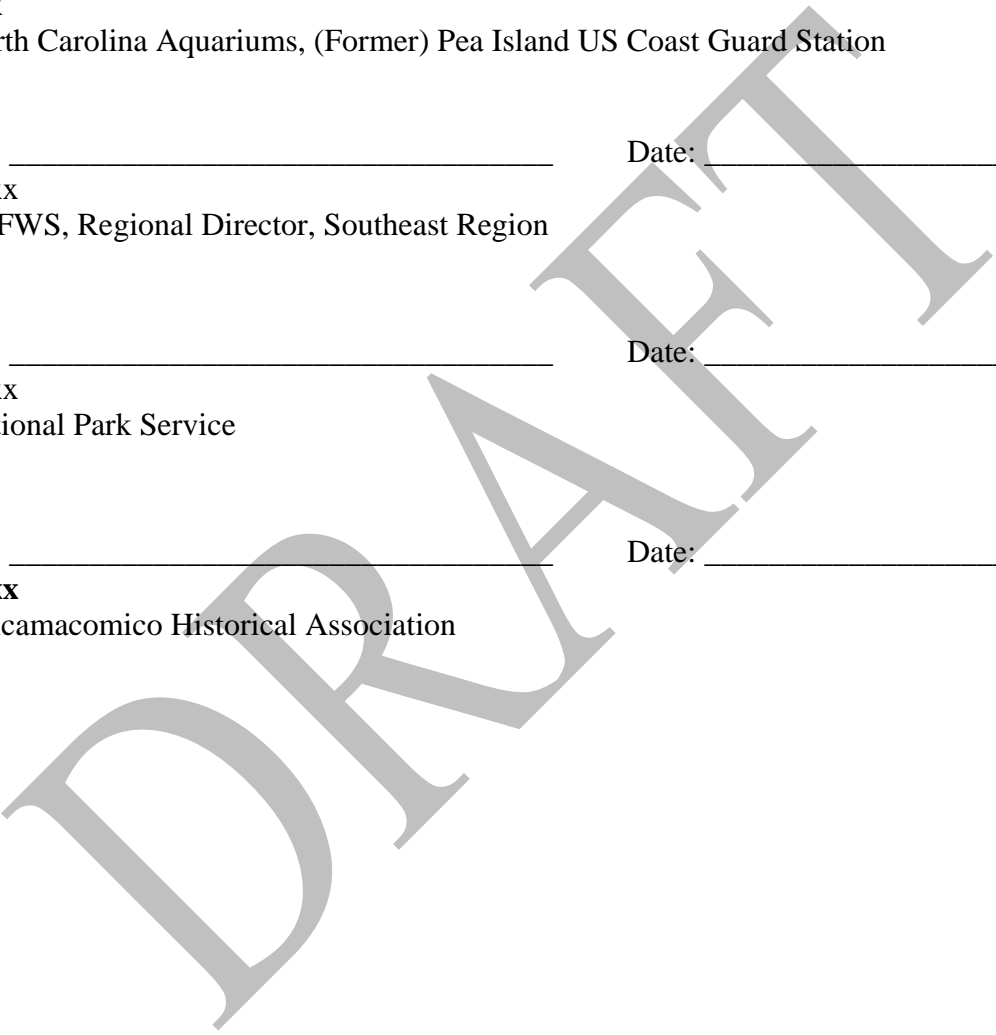
By: _____ Date: _____
xxx
Dare County, North Carolina Manager

By: _____ Date: _____
xxx
North Carolina Aquariums, (Former) Pea Island US Coast Guard Station

By: _____ Date: _____
xxxx
USFWS, Regional Director, Southeast Region

By: _____ Date: _____
xxxx
National Park Service

By: _____ Date: _____
xxxx
Chicamacomico Historical Association



Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative

The revised Preferred Alternative, the Parallel Bridge Corridor with NC 12 Transportation Management Plan, proposes to proceed with the construction of Phase I of the Parallel Bridge Corridor as soon as possible. Phase I of the Parallel Bridge Corridor consists of a parallel replacement structure on the west side of the existing Bonner Bridge in the immediate vicinity of Oregon Inlet. Several alternative conceptual designs for Phase I will be evaluated in an Environmental Assessment/Section 4(f) Evaluation. Following a Record of Decision, the exact alignment and pier placement for Phase I would be determined during the final design engineering process.

Specifically, the southern bridge approach and its connection to the existing road for Phase I within the Pea Island National Wildlife Refuge would be determined in coordination with the U.S. Fish and Wildlife Service so as to minimize adverse impacts to refuge resources. The northern bridge approach and its connection to the existing road for Phase I on Bodie Island would be determined in coordination with the National Park Service so as to minimize adverse impacts to Seashore resources. The bridge structure itself would be designed in coordination with the U. S. Army Corps of Engineers and the U. S. Coast Guard so as to maximize the available navigation span and thereby minimize future dredging required within Oregon Inlet. All aspects of Phase I would be designed to conform to North Carolina highway specifications as approved by FHWA so as to ensure the safe construction and operation of the highway facility. In addition, all environmental regulatory and resource agencies would have an opportunity to review and comment on the final design prior to the authorization of construction.

The Parallel Bridge Corridor with NC 12 Transportation Management Plan Alternative does not include any action at this time on Hatteras Island beyond the limits of Phase I. The study and selection of future actions on Hatteras Island beyond the limits of Phase I would be undertaken as outlined in a Partnership Agreement between the cooperating agencies, including the State Historic Preservation Office. The Partnership Agreement will address transportation management through 2060 with a plan to monitor conditions on NC 12 and the affected environment, and modify management actions so as to minimize the adverse impacts to the Refuge resources while maintaining NC 12 as a viable transportation facility. Future construction actions within the project corridor would be evaluated in cooperation with the appropriate environmental regulatory and resource agencies in a process stipulated in the Partnership Agreement. The Partnership Agreement will incorporate by reference all relevant planning legislation, including the National Environmental Policy Act, Section 7 of the Endangered Species Act, Section 106 of the National Historic Preservation Act, etc. In addition, the Partnership Agreement shall reference the Section 106 Programmatic Agreement among the Federal Highway Administration, Advisory Council on Historic Preservation, the North Carolina State Historic Preservation Officer and North Carolina Department of Transportation for

the Replacement of the Herbert C. Bonner Bridge dated dd/mm/yy within the “Mutual Agreements” section.

The new Preferred Alternative, the Parallel Bridge Corridor with NC 12 Transportation Management Plan, is consistent with the Section 404/NEPA Merger Process agreement for this project that was approved in August 2007. The Signatory and Concurring parties to the Partnership Agreement shall include those members of the Section 404/NEPA Merger Process team who wish to participate.

DRAFT

Appendix G: Evaluation of the Pamlico Sound Bridge Corridor Alternative as a Feasible and Prudent Avoidance Alternative Under Section 4(f) of the Department of Transportation Act

Introduction

Section 4(f) of the US Department of Transportation Act of 1966 prohibits FHWA from approving a project using more than a *de minimis* amount of Section 4(f) property unless FHWA determines (1) that there is no feasible and prudent alternative that avoids using Section 4(f) property, and (2) that all possible planning to minimize harm to the Section 4(f) property has occurred (49 USC § 303 and 23 USC § 138). Section 4(f) properties include publicly owned public parks, recreation areas, wildlife or waterfowl refuges, and publicly or privately owned historic sites listed or eligible for listing on the National Register of Historic Places.

The United States Department of Interior (USDOJ), in its comments on the Final Environmental Impact Statement (FEIS) and Final Section 4(f) Evaluation (FEIS/Final Section 4(f) Evaluation), commented (see Appendix A) *“Even though the information presented in the FEIS and Section 4(f) Evaluation is proposing a Parallel Bridge Corridor alternative, it still demonstrates that the implementation of any of the Parallel Bridge Corridor Alternatives may violate Section 4(f) because the Pamlico Sound alternative would appear to be a feasible and prudent and would minimize harm to the Refuge (a section 4(f) property.”* However, the FEIS/Final Section 4(f) Evaluation had not addressed whether the Pamlico Sound Bridge Corridor Alternative was a feasible and prudent avoidance alternative under Section 4(f) because the Pamlico Sound Bridge Corridor Alternative was not considered to be an avoidance alternative at that time. Under the Section 4(f) regulations, only avoidance alternatives are analyzed for feasibility and prudence. The Pamlico Sound Bridge Corridor Alternative was not considered to be an avoidance alternative because at that time, FHWA determined that the alternative would use a portion of the Cape Hatteras National Seashore, which is a Section 4(f) property. However, as explained in the Revised Final Section 4(f) Evaluation, recent historical research caused FHWA to reconsider its analysis. FHWA has determined that, because the highway, the Cape Hatteras National Seashore and the Pea Island National Wildlife Refuge (as a refuge) were planned and developed jointly, impacts from the transportation facility would not be considered use of those properties. Therefore, Section 4(f) approvals for use of the Cape Hatteras National Seashore and the Pea Island National Wildlife Refuge (as a refuge) are not applicable in this instance. However, FHWA determined that the Pea Island National Wildlife Refuge is a site on or eligible for the National Register of Historic Places. Therefore, a Section 4(f) approval would be applicable for the Refuge as a historic site. FHWA now must consider whether the Pamlico Sound Bridge Corridor Alternative is a feasible and prudent avoidance alternative to the use of Pea Island National Wildlife Refuge (as a historic property) as part of its Revised Final Section 4(f) Evaluation.

The Pamlico Sound Bridge Corridor Alternative would avoid use of this Section 4(f) historic property by constructing an approximately 17.5-mile bridge in the Pamlico Sound that would completely bypass the Refuge. The Pamlico Sound Bridge Corridor Alternative is depicted in Chapter 2 of the FEIS.

Background

The Bonner Bridge Replacement Project has followed an interagency coordination process commonly referred to as the “Merger” Process. This process merges the environmental analysis required to satisfy federal actions under the Clean Water Act and National Environmental Policy Act. Merger Team members include representatives from state and federal transportation and environmental regulatory and resource agencies.

As a result of earlier coordination with the Merger Team, the Pamlico Sound Bridge Corridor Alternative was presented to the Merger Team in 2003, and the North Carolina Department of Transportation (NCDOT) agreed to study a number of different alternative alignments in the corridor. The Pamlico Sound Bridge Corridor Alternative proposes to relocate 11 miles of NC 12 roadway within the Pea Island National Wildlife Refuge to an approximately 17.5-mile bridge constructed in the Pamlico Sound. This alternative would completely bypass the Refuge, and it is highly likely that NC 12 within the Refuge would be abandoned.

Purpose

The purpose of this document is to analyze whether or not the Pamlico Sound Bridge Corridor would be a feasible and prudent avoidance alternative to the use of the Pea Island National Wildlife Refuge. This analysis also addresses and responds to USDOJ’s comment on the FEIS/Final Section 4(f) Evaluation as to whether or not the Pamlico Sound Bridge Corridor Alternative would be a feasible and prudent avoidance alternative to avoid the Pea Island National Wildlife Refuge.

Section 4(f) Feasible and Prudent Standards

FHWA regulations implementing Section 4(f) provide the following standards for determining whether or not an avoidance alternative is feasible and prudent, located in the definition of “feasible and prudent avoidance alternative” at 23 CFR 774.17:

- (1) *A feasible and prudent avoidance alternative avoids using Section 4(f) property and does not cause other severe problems of a magnitude that substantially outweighs the importance of protecting the Section 4(f) property. In assessing the importance of protecting Section 4(f) property, it is appropriate to consider the relative value of the resource to the preservation purpose of the statute.*
- (2) *An alternative is not feasible if it cannot be built as a matter of sound engineering judgment.*
- (3) *An alternative is not prudent if:*
 - (i) *It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;*
 - (ii) *It results in unacceptable safety or operational problems;*
 - (iii) *After reasonable mitigation, it still causes:*
 - (A) *Severe social, economic, or environmental impacts;*
 - (B) *Severe disruption to established communities;*
 - (C) *Severe disproportionate impacts to minority or low income populations; or*
 - (D) *Severe impacts to environmental resources protected under other Federal statutes;*
 - (iv) *It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;*
 - (v) *It causes other unique problems or unusual factors; or*
 - (vi) *It involves multiple factors in paragraphs (3)(i) through (3)(v) of this definition, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.*

Analysis of the Feasibility and Prudence of the Pamlico Sound Bridge Corridor Alternative

Feasibility

A “feasible” alternative for Section 4(f) purposes is one that is capable of being built as a matter of sound engineering judgment. A Pamlico Sound Corridor Bridge would be a significant engineering feat. The longest bridge built in North Carolina to date is approximately 5.2 miles long. At approximately 17.5 miles, a bridge through the Pamlico Sound Bridge Corridor would be one of the longest bridges in the world. Nonetheless, FHWA and NCDOT do believe that, from an engineering standpoint, a Pamlico Sound Corridor Bridge could be designed and constructed. Therefore, the Pamlico Sound Bridge Corridor Alternative is considered feasible under Section 4(f).

Prudence

An avoidance alternative may only be eliminated for not being prudent under Section 4(f) if the alternative has specific, severe problems. The issue here is whether construction of the Pamlico Sound Bridge Corridor Alternative “results in additional construction, maintenance, or operational costs of an extraordinary magnitude” or “causes other unique problems or unusual factors.”

Pamlico Sound Bridge Corridor Alternative Determined “Not Practicable” in the Merger Process

During the Merger process, NCDOT identified one of the challenges to the Pamlico Sound Bridge Corridor Alternative to be finding the funding to construct a bridge of this magnitude.¹ Table G-1 summarizes the Pamlico Sound Bridge Corridor Alternative’s lowest and highest initial construction cost estimates as presented in the FEIS in Tables 2-9 and 2-10.² The cost estimate for the Pamlico Sound Bridge Corridor Alternative ranged from approximately \$943 million to \$1.441 billion in 2006 dollars.

Table G-1. Pamlico Sound Bridge Corridor Alternative Initial Construction Cost (2006 dollars)

	Low Estimate	High Estimate
Bridge Construction	\$929,100,000	\$1,425,500,000
Right-of-way	\$5,245,000	\$6,890,000
Bridge Demolition	\$4,000,000	\$4,000,000
Pavement Removal	\$4,255,000	\$4,255,000
Wetland Mitigation	\$329,000	\$512,000
Total	\$942,929,000	\$1,441,157,000

The NCDOT did not identify the Pamlico Sound Bridge Corridor Alternative as its Preferred Alternative/Least Environmentally Damaging Practicable Alternative (LEDPA) because the high construction cost exceeded its ability to finance the project. Instead, NCDOT presented the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge as the preferred alternative to the Merger Team during a May 23, 2007 Merger Team meeting. In this meeting and through a series of meetings summarized in Chapter 8 of the FEIS, NCDOT explained the methodology, data, and results associated

¹ July 23, 2003 Merger Team Meeting Minutes, September 10, 2003.

² The cost was estimated as a range rather than a single number in accordance with FHWA guidance for “major projects” over \$500 million, which are by nature more complex and have more elements of risk and uncertainty than projects of lesser cost.

with development of the alternative cost estimates presented in the FEIS. Also during the May 23, 2007 meeting, NCDOT presented why NCDOT funding and innovative financing could not be used to implement the Pamlico Sound Bridge. This included a discussion of how the State distributes funds by geographic area based on the 1989 Equity Formula for the Statewide Transportation Improvement Program (STIP).

In a follow-up June 20, 2007 Merger Team meeting, the NCDOT provided additional information to the Merger Team. This information included NCDOT's documentation of its cost estimates for alternatives, the Finely Engineering firm's independent estimate of alternative costs, and FHWA's verification of project cost estimates. The NCDOT also provided a handout that outlined applicability of the State Infrastructure Bank, GARVEE Bonds, and tolling for the Pamlico Sound Bridge. This information supported the NCDOT position that based on restrictions in state law; it did not have the financial resources to construct a Pamlico Sound Bridge Corridor Alternative.

NCDOT also answered questions regarding its analysis during additional individual meetings with resource agencies during June and July of 2007 and in follow-up correspondence. After the series of meetings, responses to comments, and providing additional detailed information as requested, state and federal resource agency representatives had little comment on the cost estimate methodology and analysis.

The NCDOT sought concurrence on the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge alternative as the LEDPA during an August 15, 2007 Merger meeting. Merger Team representatives did not concur that the Phased Approach/Rodanthe Bridge alternative was the LEDPA. The decision for concurrence was elevated to the Merger Dispute Review Board (comprised of US Army Corps of Engineers, NCDOT, North Carolina Department of Environment and Natural Resources, and FHWA representatives). The Merger Dispute Resolution Board met on August 27, 2007 to review agency briefings and hear discussion on the concurrence point. During the Review Board proceeding, none of the Merger Team agencies provided information to contradict the estimated high cost and financing problems that NCDOT had identified for the Pamlico Sound Bridge Corridor Alternative. The Merger Dispute Resolution Board reached concurrence on an approach to advance the Bonner Bridge project. Based on the information presented at that time, the Board concurred that the Pamlico Sound Bridge Corridor Alternative was not practicable,³ based on cost estimates, and thus was not LEDPA. The Board also concurred with building Phase I of the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge alternative (short bridge over Oregon Inlet) with every possible effort to be made to touch the bridge down within the existing easement. The Board also concurred that Phase I alone does not meet purpose and need of the project and additional phases⁴ will be needed to meet purpose and need.

Financing a Pamlico Sound Bridge Corridor Alternative with Federal-Aid Highway Funds

FHWA administers a number of categories of grants-in-aid for highway construction. The Bonner Bridge replacement project is being developed in compliance with federal laws and regulations so that the project will be eligible for Federal-aid highway funds for construction. The standard federal share of a project funded with Federal-aid highway funds is 80 percent. The state would be responsible for paying the other 20 percent of the cost. The 80 percent federal share of the Pamlico Sound Bridge Corridor Alternative

³ The LEDPA decision requires a finding that there is no "practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences" (40 C.F.R. § 230.10[a]). To be "practicable," an alternative must be "available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes" (40 C.F.R. §230.3[q])

⁴ FHWA, Final Environmental Impact Statement and Section 4(f) Evaluation, NC 12 Replacement of the Herbert C. Bonner Bridge, Volume 2, September 17, 2008, Appendix D

would range from \$754,343,200 to \$1,152,925,600. There are three traditional methods for Federal-aid financing for the Pamlico Sound Bridge Corridor Alternative: apportioned Federal-aid highway funds; advanced construction cash flow management; and GARVEE bonds. These options are discussed below.

Financing with Apportioned Federal-Aid Highway Funds

Whenever a consumer purchases gasoline, a federal tax is collected and deposited in the Federal Highway Trust Fund. A complex formula provided by periodic multi-year legislation apportions the Federal-aid funds among the states each year. The traditional method of authorizing a Federal-aid highway contract is for the state to commit the total contract amount needed for the project from that year’s apportionment. If NCDOT were to use this method of financing a Pamlico Sound Bridge Corridor Alternative there would be a drastic impact on other highway needs across the state. The total Federal-aid highway funding apportioned to North Carolina over the last five years is shown in Table G-2. Over the last three years, North Carolina has received about \$1 billion per year in apportioned Federal-aid highway funds.⁵ These funds are not block grants to the states. Rather, as shown in the table, Congress apportioned 14 different categories of highway grant programs. The Bonner Bridge replacement is not eligible for all the grant categories listed in the table. Funding that could be eligible to be used for the Bonner Bridge would be the National Highway System, Bridge Replacement and Rehabilitation Program, Equity Bonus, and part of the Surface Transportation Program categories of funds. The project does not meet the eligibility criteria of the other programs.

Table G-2. Federal Highway Apportionments to North Carolina

Federal-Aid Program	2009	2008	2007	2006	2005
Interstate Maintenance	\$176,973,972	\$172,268,070	\$174,794,941	\$149,924,855	\$155,205,333
National Highway System	\$207,688,264	\$203,242,297	\$206,781,440	\$181,838,229	\$186,864,719
Surface Transportation Program	\$237,173,790	\$231,580,249	\$236,608,466	\$203,141,566	\$236,301,154
Bridge Replacement and Rehabilitation	\$146,290,683	\$140,563,218	\$133,254,026	\$108,916,741	\$116,492,030
Recreational Trail	\$1,719,240	\$1,780,661	\$1,692,798	\$1,578,400	\$1,369,950
CMAQ	\$50,535,860	\$48,243,443	\$48,797,913	\$41,964,818	\$42,965,693
State Planning/Research	\$19,245,953	\$17,725,073	\$19,086,939	\$16,710,356	\$15,718,697
Metropolitan Planning	\$5,677,834	\$5,588,967	\$5,501,508	\$5,358,969	\$5,489,337
Equity Bonus	\$87,017,985	\$87,041,256	\$97,920,150	\$98,324,366	\$92,386,941
Appalachian Development	\$32,921,949	\$38,102,372	\$38,098,851	\$36,964,241	\$36,668,688
Rail Highway Crossing	\$6,199,544	\$6,171,837	\$6,051,930	\$6,215,292	\$0 ⁶
Highway Safety	\$37,371,167	\$36,020,062	\$37,103,109	\$31,639,097	\$0 ⁴
Safe Routes to Schools	\$5,034,374	\$4,050,525	\$3,175,243	\$2,333,556	\$1,000,000
Redistribute Certain Funds	\$0	\$4,498,928	\$8,642	\$6,697,961	\$8,105,300
Total Apportionment	\$1,013,850,615	\$996,876,958	\$1,008,875,956	\$891,608,447	\$898,567,842

Congress has special rules that limit the use of the Surface Transportation Program category of funds. These grants are subject to a suballocation process for use in specified areas as illustrated in Table G-3.

⁵ North Carolina also received additional funding allocated for specific projects identified by Congress, but the funds are not shown in the table because that funding can only be used for the specific project identified by Congress

⁶ Prior to SAFETEA-LU, 10% of Surface Transportation Funds were suballocated for safety construction activities (i.e., hazard elimination and rail-highway crossings).

Congress established that 10 percent of Surface Transportation Program funds be set-aside for Transportation Enhancement Projects, for which bridge work is not eligible. Funding is also suballocated to urban areas in the state. Since the Bonner Bridge is not located in an urbanized area, suballocated urban funds could not be utilized for the replacement of the bridge. Funds not subject to the suballocation are “flexible” and can be used for eligible projects in any area of the state.

Table G-3. Suballocation of Surface Transportation Program Funds

	2009	2008	2007	2006	2005
Tran Enhancement	\$23,717,379	\$23,625,451	\$23,660,847	\$23,625,451	\$23,625,451
Urban Area> 200k	\$43,576,884	\$42,453,736	\$43,473,015	\$34,152,243	\$35,584,872
Urban Area< 200k	\$69,837,728	\$67,522,368	\$69,623,602	\$56,840,764	\$59,546,736
Areas pop < 5000	\$19,995,645	\$19,995,645	\$19,995,645	\$19,995,645	\$19,995,645
Any Area	\$80,046,154	\$114,418,542	\$123,095,059	\$68,527,463	\$108,830,076

Finally, Table G-4 provides a summary of those program funds for which replacement of the Bonner Bridge would meet the eligibility criteria. The Federal share of the cost of the Pamlico Sound Bridge Corridor Alternative exceeds one-year of eligible funds. The NCDOT would likely have to commit up two years of eligible program apportionments to the Pamlico Sound Bridge Corridor Alternative. As a result, NCDOT would have to defer replacing all other deficient bridges in state for those years. Currently NCDOT statewide transportation improvement program (STIP) has 838 deficient bridges that are programmed for replacement in the years 2009-2015, at a total cost of \$1 billion. Additionally, NCDOT would have to defer improvements on the remainder of the National Highway System in those years. The National Highway System includes about 5,400 miles of the major roadways in North Carolina over which 36 percent of the travel occurs. Using the traditional method of federally funding the Pamlico Sound Bridge Corridor Alternative would drastically limit the number of transportation improvement projects that are programmed for the remainder of the National Highway System in North Carolina.

Table G-4. Federal Highway Funds Available for Bonner Bridge Replacement

	2009	2008	2007	2006	2005
National Highway System	\$207,688,264	\$203,242,297	\$206,781,440	\$181,838,229	\$186,864,719
STP Any Area	\$80,046,154	\$114,418,542	\$123,095,059	\$68,527,463	\$108,830,076
Bridge Replacement	\$146,290,683	\$140,563,218	\$133,254,026	\$108,916,741	\$116,492,030
Equity Bonus	\$87,017,985	\$87,041,256	\$97,920,150	\$98,324,366	\$92,386,941
Subtotal	\$521,043,086	\$545,265,313	\$561,050,675	\$457,606,799	\$504,573,766

While Federal-aid highway apportionments are distributed through the Highway Bill Authorization process, Congress further controls federal highway programming or annual use of federal funds through the establishment of an Obligation Limitation in the Appropriation process. The obligation limitation is the amount of federal funds that the state can actually use to authorize or commit funding for projects in a given year. Table G-5 provides the North Carolina Obligation Limitation for the past five years. Based on the range of the Federal share of the project cost, it is likely that NCDOT would have to commit all its available obligation limitation for at least one-year to fully authorize construction of the Pamlico Sound Bridge Corridor Alternative. The effect would be that NCDOT could not commit to use federal highway funds to advance any other Federal-aid project using the traditional authorization process during that year.

Table G-5. Obligation Limitation to North Carolina

	2009	2008	2007	2006	2005
General use	\$929,798,673	\$888,473,966	\$885,753,590	\$774,973,260	\$795,223,400
Specified use	\$92,058,602	\$125,847,081	\$101,378,816	\$161,131,568	\$50,313,261
Subtotal	\$1,021,857,275	\$1,014,321,047	\$987,132,406	\$936,104,828	\$845,536,661
Exempt from OL	\$21,070,289	\$21,075,924	\$23,710,108	\$23,807,984	\$21,978,691
Available General Use	\$950,868,962	\$909,549,890	\$909,463,698	\$798,781,244	\$817,202,091

In conclusion, it would not be prudent to use the traditional finance method of using apportioned Federal-aid highway funds to authorize the Pamlico Sound Bridge Corridor Alternative, as it would likely consume two years of eligible apportionments and about one year of obligation limitation for the entire state. As a result, NCDOT would have to defer addressing other transportation improvement and safety needs on the National Highway System and would have to defer replacing all of its other deficient bridges in the state using Federal highway funds for nearly two years.

Financing with Cash Flow Use of Federal-Aid Highway Funds

A second method to finance the Pamlico Sound Bridge Corridor Alternative with Federal highway funds would be for NCDOT to use its “advance construction”⁷ authority to begin the project with state funds and later convert to federal aid. This would allow NCDOT to begin the project by committing state funds for the entire contract amount. NCDOT would authorize federal funds at an annual rate to cover only the anticipated expenditures over that specific year. Each year, NCDOT would use part of its obligation limitation to convert the previous advance construction project to federal funding. NCDOT currently uses the advance construction cash flow management authority for other projects. The current amount of projects approved under advance construction is \$1,691,559,723.⁸

Currently, NCDOT is planning replacement of the Bonner Bridge as a cash flow project in conjunction with Federal-Aid Grant Anticipated Vehicles Bonds. This means part of federal highway funds will be used to reimburse NCDOT for actual expenses, and other federal highway funds will be used to reimburse NCDOT for debt service associated with bonds proceeds used for construction. NCDOT is pursuing the bridge replacement project as a design-build contract. If the NCDOT had to construct the Pamlico Sound Bridge Corridor Alternative, it would likely use a design-build contract as well. Contract time for a design-build of the Pamlico Sound Bridge Corridor Alternative would likely be four and one-half to five years. For cash flow analysis purposes, it is assumed that payout of the contract would be about 20 percent of the total estimated cost per year. Therefore, the estimated annual expenditures over the five-year period for the Pamlico Sound Bridge Corridor Alternative would range from \$188,585,800 (low estimate \$942,929,000*0.20) to \$288,231,400 (high estimate \$1,441,157,000*0.20).

The federal share of those estimated annual costs would range from \$150,868,640 to \$230,585,120. The annual construction costs are roughly 28 percent (low estimate) to 44 percent (high estimate) of all eligible federal funds depicted in Table G-4 for the entire state. NCDOT would have to commit a significant portion of eligible funds annually for the construction contract period of five years. As a result, over this five-year period, NCDOT would have to cut spending on all of its other National Highway System and bridge replacement projects by 28 to 44 percent. It would not be a reasonable use

⁷ 23 USC. §115(b).

⁸ FHWA, Fiscal Management Information System, Report FMISW10A, September 30, 2009.

of the federal highway trust fund to reduce the funds for other transportation needs so drastically for a single project.

It should be mentioned that the last five years of federal funding are at record high levels that may not be replicated in next highway authorization law. Apportionments and obligation limitations distributed under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU) exceeded revenue collected in the highway account of the Highway Trust Fund over the same time period. Congress had to transfer \$8 billion from the General Fund to cover shortfall in the Highway Account balance during September 2008. Receipts into the Highway Account were \$32.9 billion in FY 2006, \$33.8 billion in FY 2007, and \$31.3 billion in FY 2008 (excluding the transfer from the General Fund). As of 2009, receipts are down from the previous fiscal year and Congress had to transfer \$7 billion in August 2009 to cover another shortfall in the account. It is possible, unless Congress raises additional revenue, that available federal funds will be cut substantially from the record levels of highway funding that were authorized in SAFETEA-LU.

Financing with Federal-Aid Grant Anticipated Vehicles (GARVEE) Bonds

Section 311 of the National Highway System Designation Act of 1995 (NHS Act) significantly expanded the eligibility of bond and other debt instrument financing costs for Federal-aid reimbursement. This change to the Federal-aid program was codified into permanent highway law as an amendment to Section 122 of Title 23, United States Code. Since enactment of the NHS Act, a number of states, including North Carolina, either have issued or are considering project financing that utilizes bond or other debt instrument financing mechanisms involving the payment of future Federal-aid highway funds to retire debt. Bonds issued based upon the pledge of future Federal-aid highway apportionments for debt service payments are called Grant Anticipation Revenue Vehicles or "GARVEE" bonds. When a state government issues GARVEE bonds, it is able to build more projects initially than it otherwise could, but its future highway funds will be less since the GARVEE bonds must be repaid out of the state's future apportionments.

Reimbursements of bond-related costs are paid on an annual schedule based upon the amount of GARVEE bond proceeds applied to Federal-aid projects. The federal share (80 percent) of the Pamlico Sound Bridge Corridor Alternative would range from \$754,343,200 to \$1,152,925,600. A North Carolina statute, enacted in 2005, allows NCDOT to use GARVEE bonds to fund needed transportation projects, but places limitations on the amount of GARVEE bond proceeds it could use for transportation projects. One limitation is that the outstanding principal amount of such bonds does not exceed the amount of federal transportation funds that were authorized to the state in the immediately prior Federal Fiscal Year. This limitation in the state GARVEE Act will allow the issuance of bonds in a total aggregate principal amount of approximately average income \$1 billion if Congress continues authorization of Federal Transportation funds at recent levels and the interest rates do not change from current patterns.⁹ Because of this limitation, it is not reasonable to anticipate that GARVEE bond proceeds could be used to fund the Pamlico Sound Bridge Corridor Alternative when comparing the outstanding principal amount of bonds to the estimated federal share of the cost of the alternative.

A second limitation in the State statute is the maximum annual principal and interest of such debt do not exceed 15 percent of the expected average annual federal revenue shown for the seven-year period in the recently approved STIP. The current 2009-2015 expected annual federal revenue is about \$963 million (\$6739.7 ÷ 7). Therefore, the maximum debt service for GARVEE bonds, based on the statute and current STIP, would be around \$144 million. Table G-6 shows debt-related annual payments based on the

⁹State of North Carolina, \$287,565,000 Grant Anticipation Revenue Vehicle Bonds, Series 2007, Official Statement, September 27, 2007.

estimated range of the federal share of project costs for the Pamlico Sound Bridge Corridor Alternative. The interest rates shown were based on rates as of July 1, 2009, for 15- and 20-year term AA rated revenue bonds. One may note that the GARVEE Bond issuance in the NCDOT Program is based on a 12-year repayment schedule (which is two Federal highway authorization periods). However, for this analysis the repayment term was extended to 20 years as other States have used longer repayment schedules to fund major transportation projects.

Table G-6. Estimated GARVEE Bond Debt Related Annual Payments

Federal Share Project Costs	Principal	Annual Rate	Bond Term (years)	Annual Debt Payment
\$754,343,200	\$760,000,774	4.75%	15	\$71,988,135
\$754,343,200	\$866,123,570	5.33%	20	\$62,702,390
\$1,152,925,600	\$1,161,572,542	4.75%	15	\$110,025,469
\$1,152,925,600	\$1,161,572,542	5.33%	20	\$95,833,291

The annual debt-related expenses for a GARVEE bond for the Pamlico Sound Bridge Corridor Alternative based on a various scenarios in the table would fall within the maximum debt service limitation. However, GARVEE Bond debt service for bond proceeds used for the Pamlico Sound Bridge Corridor would use about 44 to 86 percent of the debt service limitation for the single project. NCDOT has already programmed about \$950 million in GARVEE Bond proceeds in the 2009-2015 STIP for various other transportation projects across the state. While the current GARVEE program includes flexibility to move projects in and out of the program, NCDOT has already committed the proceeds to other projects around the state. NCDOT has obtained \$287,565,000 in GARVEE Series 2007 bonds for use on other transportation projects. The NCDOT is using those bond proceeds to advance 38 projects located in various geographic areas of the state, per the STIP. NCDOT anticipates using \$13,000,000 of the bond proceeds to fund repairs to the existing Bonner Bridge to maintain the safe use of the bridge during the construction of the replacement bridge. In addition, the NCDOT plans to use \$70,000,000 of bond proceeds for replacement of the existing Bonner Bridge.¹⁰ It is not likely that NCDOT could use the remainder of its \$950 million bonding authority for the Pamlico Sound Bridge Corridor Alternative because it is likely that the debt service maximum limitation would be exceeded.

In conclusion, the amount of GARVEE proceeds that could be used to finance a Pamlico Sound Bridge Corridor Alternative is insufficient since NCDOT has already committed substantial GARVEE bond funds to other projects in the state. The statutory limitation on the total outstanding principal prevents NCDOT from issuing GARVEE bonds in the amount that would be needed to fund the federal share of the Pamlico Sound Bridge Corridor. Adding debt service for GARVEE proceeds to build the Pamlico Sound Bridge Corridor to the debt service for other programmed projects would likely exceed the State's statutory debt service limitation.

Use of State-Only Funding to Construct the Pamlico Sound Bridge Corridor Alternative

The previous analysis focused on the use of federal funds to construct the Pamlico Sound Bridge Corridor Alternative. Federal funds are not the only funding available to NCDOT for its budgeting and programming purposes. The NCDOT budget is established by the General Assembly. NCDOT, through

¹⁰ State of North Carolina, \$287,565,000 Grant Anticipation Revenue Vehicle Bonds, Series 2007, Official Statement, September 27, 2007.

the Office of State Budget and Management, and the Governor’s office, provides input on system needs and use of funds. The General Assembly also establishes appropriations for different highway purposes. Similar to the federal highway program, many of the state-appropriated highway programs have unique factors for distribution of funding to address needs across the state. Figure G-1 shows projected uses of NCDOT appropriations for the state Fiscal Year 2008-2009.

NCDOT uses its projected appropriations to address the many needs across the state. NCDOT is responsible for the development, operation and maintenance of 79,067 miles of roads in the state, as well as other transportation modes. Compared to the other states, NCDOT is responsible for the 2nd largest state highway system in the country. A comparison of revenue use per mile of state-administered highways shows that NCDOT has the fourth lowest revenue per mile for state-maintained highways in the country. Table G-7 compares the revenue use by each state for construction, operation and maintenance of state-maintained highways based on information provided in the latest version of Highway Statistics. NCDOT is responsible for 18,161 structures within its state highway system. This includes 12,768 bridges. Replacement of the Bonner Bridge would normally be funded out of the “TIP Construction” slice of NCDOT appropriations.

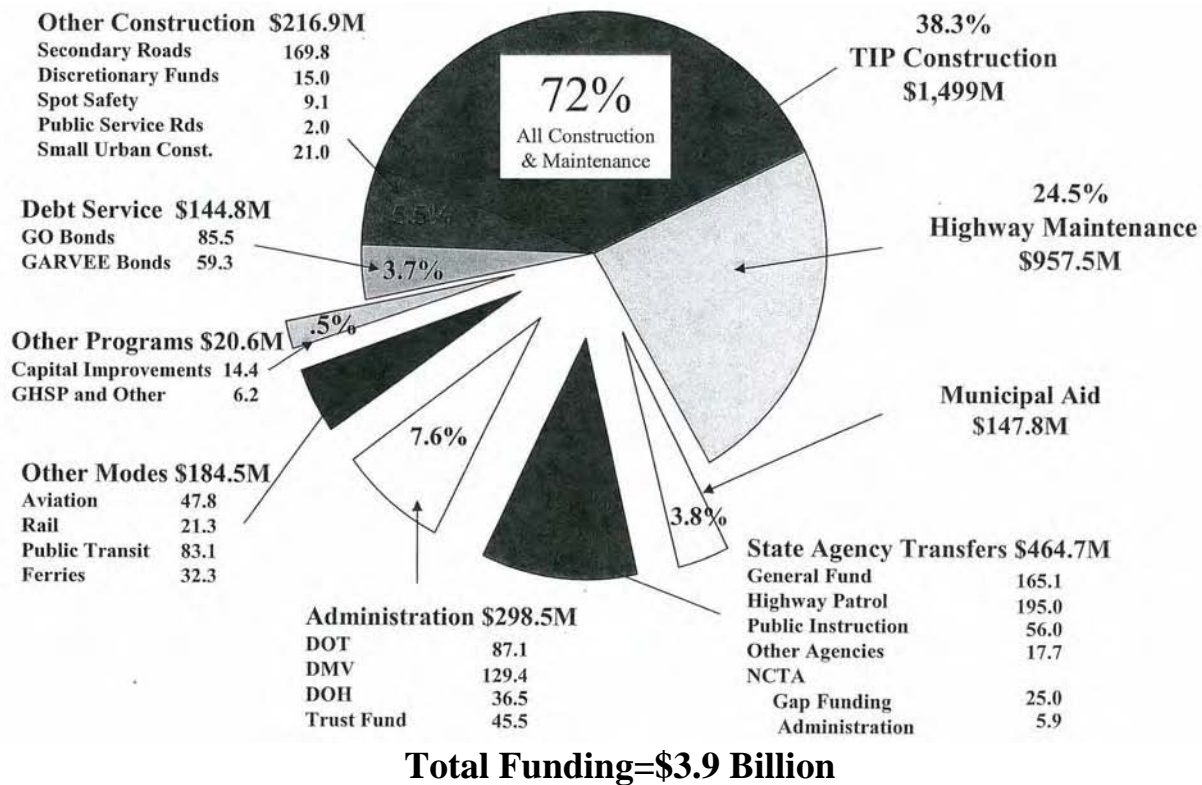


Figure G-1. Projected Uses of NCDOT Appropriations for the State Fiscal Year 2008-2009

Table G-7. Revenue Use By State

	Highway Miles of State Ownership HM-10	Revenues for State-Administered Highways SF-3 (thousands \$)	Revenues per Mile of State-Administered Highway
South Carolina	41,430	\$1,318,756	\$31,831
West Virginia	34,087	\$1,085,171	\$31,835
Montana	10,780	\$429,881	\$39,878
North Carolina	79,067	\$3,251,332	\$41,121
New Mexico	11,994	\$592,823	\$49,427
Virginia	57,481	\$3,151,199	\$54,822
South Dakota	7,843	\$439,357	\$56,019
Wyoming	6,753	\$386,151	\$57,182
Arkansas	16,432	\$958,900	\$58,356
North Dakota	7,384	\$436,066	\$59,056
Missouri	33,681	\$2,055,260	\$61,021
Nebraska	9,956	\$613,723	\$61,644
Maine	8,547	\$553,325	\$64,739
Kentucky	27,530	\$1,896,582	\$68,891
Iowa	8,909	\$805,495	\$90,414
Mississippi	10,970	\$1,089,531	\$99,319
Texas	79,849	\$8,416,199	\$105,401
Vermont	2,633	\$278,507	\$105,776
Louisiana	16,687	\$1,769,681	\$106,051
Tennessee	13,836	\$1,487,545	\$107,513
Kansas	10,368	\$1,117,070	\$107,742
Alaska	5,674	\$643,873	\$113,478
New Hampshire	3,981	\$502,225	\$126,155
Alabama	10,978	\$1,396,585	\$127,217
Georgia	17,910	\$2,299,582	\$128,397
Minnesota 5/	11,926	\$1,540,282	\$129,153
Indiana 4/	11,183	\$1,456,526	\$130,245
Wisconsin	11,771	\$1,552,768	\$131,915
Idaho	4,959	\$664,207	\$133,940
Pennsylvania	39,843	\$5,550,976	\$139,321
Delaware	5,275	\$808,666	\$153,302
Utah	5,848	\$932,769	\$159,502
Ohio	19,266	\$3,144,076	\$163,193
Oklahoma	12,287	\$2,017,202	\$164,174
Nevada	5,381	\$1,013,296	\$188,310
Colorado	9,110	\$1,799,435	\$197,523
Oregon	7,532	\$1,499,343	\$199,063
Michigan	9,696	\$2,187,299	\$225,588
Arizona	6,813	\$1,828,731	\$268,418
Illinois	16,083	\$4,645,175	\$288,825
New York	15,549	\$4,789,451	\$308,023
Hawaii	928	\$286,497	\$308,725
Washington	7,043	\$2,189,866	\$310,928
Maryland	5,150	\$1,765,704	\$342,855
Connecticut	3,716	\$1,335,008	\$359,259
Rhode Island	1,104	\$608,915	\$551,553
Florida	12,069	\$7,237,708	\$599,694
Massachusetts	2,830	\$1,886,895	\$666,747
California	15,234	\$10,581,429	\$694,593
New Jersey	2,326	\$6,431,547	\$2,765,067

The Bonner Bridge replacement project is located in Division 1. NCDOT previously demonstrated to the Merger Team that the Pamlico Sound Bridge Corridor Alternative would exceed the entire 2007-2013 STIP funding allocated to Division 1.

The 2009-2015 STIP provides approximately \$1.1 billion over the seven-year period for the distribution region, which includes Division 1 and Division 4. The \$1.1 billion is planned to fund 139 projects across 20 counties. The amount available over a five-year period would be about \$812 million ($\$1,137 \text{ billion} \div 7 \times 5$). The low range of the estimate of the Pamlico Sound Bridge Corridor Alternative could not be funded based on the funding allocated to Division 1 and Division 4 over the five-year contract period. NCDOT could not fund the high range of the Pamlico Sound Bridge Corridor Alternative with 2009-2015 STIP funding allocated to Division 1 and Division 4. If NCDOT funded the project, it would result in no other construction improvements in Division 1 (5,136.96 miles of highways) and Division 4 (6,280.33 miles of highways) for a six to seven-year period.

The STIP contains about \$1 billion for bridge projects across the state, which is generally an average of \$140 million per year. This includes \$300 million for replacement of the Bonner Bridge. The range of the cost estimates to fund the Pamlico Sound Bridge (see Table G-1) is \$943 million to \$1.15 billion, which is approximately the same as the amount programmed in the STIP for bridges. FHWA used its National Bridge Investment Analysis System (NBIAS) to forecast the effects of funding one bridge replacement instead of the funding for statewide bridge replacement, rehabilitation and preservation. Figure G-2 represents the results of the NBIAS scenario which compares the number of deficient bridges projected under a \$140 million annual program optimized for bridge replacement, rehabilitation and preservation versus no annual funding for bridge projects. The no funding option represents all bridge funding going to the Pamlico Sound Corridor Bridge. The figure shows that the number of deficient bridges in North Carolina would increase by about 2000 bridges by the year 2015 under this scenario. Committing all the funding currently programmed for bridge projects to the Pamlico Sound Bridge Corridor would create a drastic burden on the state's ability to maintain the other bridges on the North Carolina State Highway System.

Other Financing Options

General Obligation Bonds

The use of state general obligation bonds is not a viable source of funds, as the bonds would have to pass a bond referendum, which requires approval of the citizens of the state.

Toll Revenue Bonds

NCDOT did not consider the use of bond proceeds issued with toll revenue debt service as a funding option of the Pamlico Sound Bridge Corridor Alternative. NCDOT's rationale was the limitation in current North Carolina Statute. In order to convert a route to a toll facility, legislation requires that a free route must also be available. Currently, NC 12 from Bodie Island is the only free route available to access Hatteras Island. The NCDOT nonetheless performed a preliminary toll feasibility analysis for the Pamlico Sound Bridge Corridor Alternative in August 2007. This analysis evaluated the feasibility of applying tolling to fund the Pamlico Sound Bridge Corridor Alternative. Its conclusion was that tolling was not feasible because toll revenues would not support the debt service of required bonds.

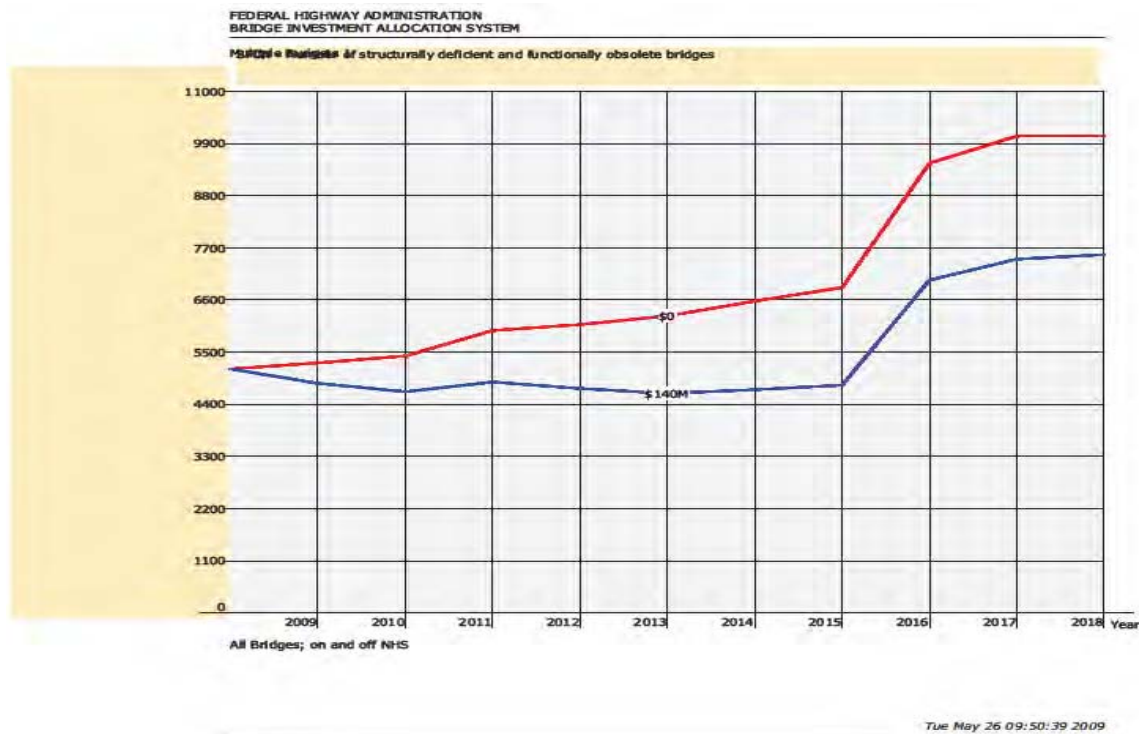


Figure G-2. Number of Structurally Deficient and Functionally Obsolete Bridges in North Carolina

FHWA performed additional analysis to evaluate the feasibility of financing the Pamlico Sound Bridge Corridor Alternative through tolls. Since many toll and major projects include multiple sources of funding, FHWA evaluated scenarios where toll revenue bond proceeds would not be required to finance the entire project cost. This evaluation estimated a minimum toll rate to provide adequate coverage for toll revenue bonds for the low- and high-cost estimates of the Pamlico Sound Bridge Corridor Alternative. The scenario analyses were performed using the following assumptions.

- The total project cost included the standard cost categories of preliminary engineering, right-of-way, construction, maintenance, operations, and financing.
- The interest and toll rate would be fixed over the life of the loan.
- The term of the debt service for toll revenue bonds would be 30 years.
- The facility would be open 365 days a year.
- There is not a reduction in trips or diversion of traffic due to the route being tolled.

One scenario evaluated by FHWA assumed that the NCDOT would commit the Phase I funding for the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge alternative to the Pamlico Sound Bridge Corridor. The STIP currently shows that Federal highway apportionments, GARVEE bond proceeds and state funds being used for the bridge over the Oregon Inlet. In our analysis, the high range of the cost of the short bridge is \$395,000,000, which was updated to include the extension of Phase I construction limits discussed in the November 2008 Merger Team meeting. Therefore, we assumed that \$325 million in Federal highway funds and State funds plus \$70 million in GARVEE bond proceeds would be committed to the Pamlico Sound Bridge Corridor. In this scenario, toll revenues would be used to make up the difference between the cost of the Pamlico Sound Bridge Corridor (low and high cost estimates) and the GARVEE bond proceeds with Federal highway and State funds. The FHWA evaluation (Tables G-8 through G-11) determined that a single-trip toll rate of approximately \$18 to \$31 in each direction

would be needed to provide adequate debt coverage to issue revenue bonds for the low and high end of the cost estimate of the Pamlico Sound Corridor Bridge. These individual toll rates are extremely high for a single trip and would likely be a severe hardship to area residents, considering the absence of other transportation choices available for those traveling NC12.

Another scenario evaluated by FHWA assumed that a Transportation Infrastructure Finance and Innovation Act (TIFIA) loan, backed by toll revenue, would be used in conjunction with funding already committed to the Phase I construction of the Parallel Bridge with Phased Approach plus some other gap funding not yet identified. This analysis evaluated the toll rate of an individual trip to support a TIFIA loan, which can be issued for up to one-third of the project costs. This evaluation (Tables G-12 through G-15) determined that a single-trip toll rate of approximately \$11 to \$14 in each direction would be needed to provide adequate debt coverage for a TIFIA loan for the low and high ends of the cost estimate of the Pamlico Sound Corridor Bridge. In addition, the State would have to find additional funding to bridge the gap between the cost of the bridge and use of available funding for the short bridge supplemented with a TIFIA loan. For example, available Federal highway funds and State funds supplemented by GARVEE bonds is \$395 million. A TIFIA loan would provide an additional \$342.1 million for the low end of the cost estimate for the Pamlico Sound Bridge. Thus, the State would have to find additional funding to bridge the gap in financing. These toll rates are relatively high considering that some form of other tax would be necessary to provide funding or revenue to support bonds to bridge the funding gap.

Cost Summary

In summary, the initial construction cost of the Pamlico Sound Bridge Corridor Alternative surpasses the threshold of construction cost of extraordinary magnitude and is therefore not a prudent alternative. The approximately 17.5-mile Pamlico Sound Corridor Bridge would be the second longest bridge in the United States. It also would be the most expensive single structure contract ever awarded in the country. Based on the range of the construction cost estimate (\$943 million to \$1.15 billion) the contract would use about one year of federal highway funding obligation limitation and about two years of eligible federal highway apportionments.

Funding the construction of the Pamlico Sound Bridge Corridor Alternative with GARVEE bonds, state bonds, toll revenue bonds, or financial package with a combination of funding sources was shown not to be reasonable. The construction cost of the Pamlico Sound Bridge Corridor Alternative is roughly similar to funding programmed for bridges in the STIP for the next seven years, statewide. Further, NCDOT could not fund the contract based on the distribution of construction funding to the funding region (Division 1 and Division 4). NCDOT could not fund the construction contract even if all sources of funding provided to Division 1 were committed to this one project. Funding the Pamlico Sound Bridge Corridor Alternative would require changes in legislation governing the state's allocation of funding to address its needs across the state or to increase the amount of indebtedness the state could incur with its GARVEE program. Based on the status of the federal highway program, this would not be a reasonable change. Additional financing through bonding backed by other revenue sources would also require State legislative action.

Unique Maintenance Problems Associated with the Pamlico Sound Bridge Corridor Alternative

Funding the construction of the Pamlico Sound Bridge Corridor Alternative would create unique maintenance problems of extraordinary magnitude for NCDOT. Using all of the bridge funding in the STIP for the Pamlico Sound Bridge Corridor Alternative would result in an increase in the number of deficient bridges in the state by around 2,000 by the year 2015. Further, the Pamlico Sound Bridge construction cost would likely exceed all available funding for highway construction, operation and maintenance to NCDOT Division 1 over the bridge construction period. Division 1 approximately

receives \$200 million per year, depending on State revenues, for all highway construction, operation and maintenance purposes. [Division 1's allocation for STIP programming purposes is \$837 million over the 2009 -2015 STIP 7 year period or about \$120 million per year. Projected allocations for Secondary Roads, Small Urban, and Economic Development are about \$21 million. Projected allocations for Standing Road Maintenance, Bridge Maintenance and Contract Resurfacing are \$52 million. Division 1 allocations for Spot Safety, System Preservation and Contingency are about \$10 million]. If Division 1 could commit all available resources, it would have to defer all other construction, maintenance, and operational activities for the four- to five-year construction contract. The roadway system in Division 1 (5136.96 centerline miles) would substantially degrade without any type of activity over a five-year bridge construction period.

Severe Impact to the Public's Access to the Refuge

One project need that supports replacement of the Bonner Bridge is the tourist use of Hatteras Island (including the use of Cape Hatteras National Seashore), use of the Pea Island National Wildlife Refuge, and Dare County's reliance on tourism as its primary industry.¹¹ Pea Island National Wildlife Refuge reports 2.7 million visitors annually. In addition, the State Historic Preservation Office is seeking improved interpretation of the historic attributes of the Refuge for visitors. This is planned as a mitigation measure for the Bonner Bridge replacement.

USDOJ indicated in its comments on the FEIS that visitor access to the Refuge is a very important consideration in the analysis of alternatives. In particular, USDOJ commented that the Phased Approach/Rodanthe Bridge (preferred alternative in the FEIS) impacts of noise, visual character, and access limitations would rise to the level of substantial impairment to result in a constructive use under FHWA regulations. USDOJ comments under the heading of "Access:" stated: *"As a result, even though the Preferred Alternative would nominally afford access to the Refuge, the Visitor's Center would no longer be available, and we anticipate that the quality of the visitor experience would be degraded to the point that the visitation may be reduced. This would represent a substantial loss to the American public."*

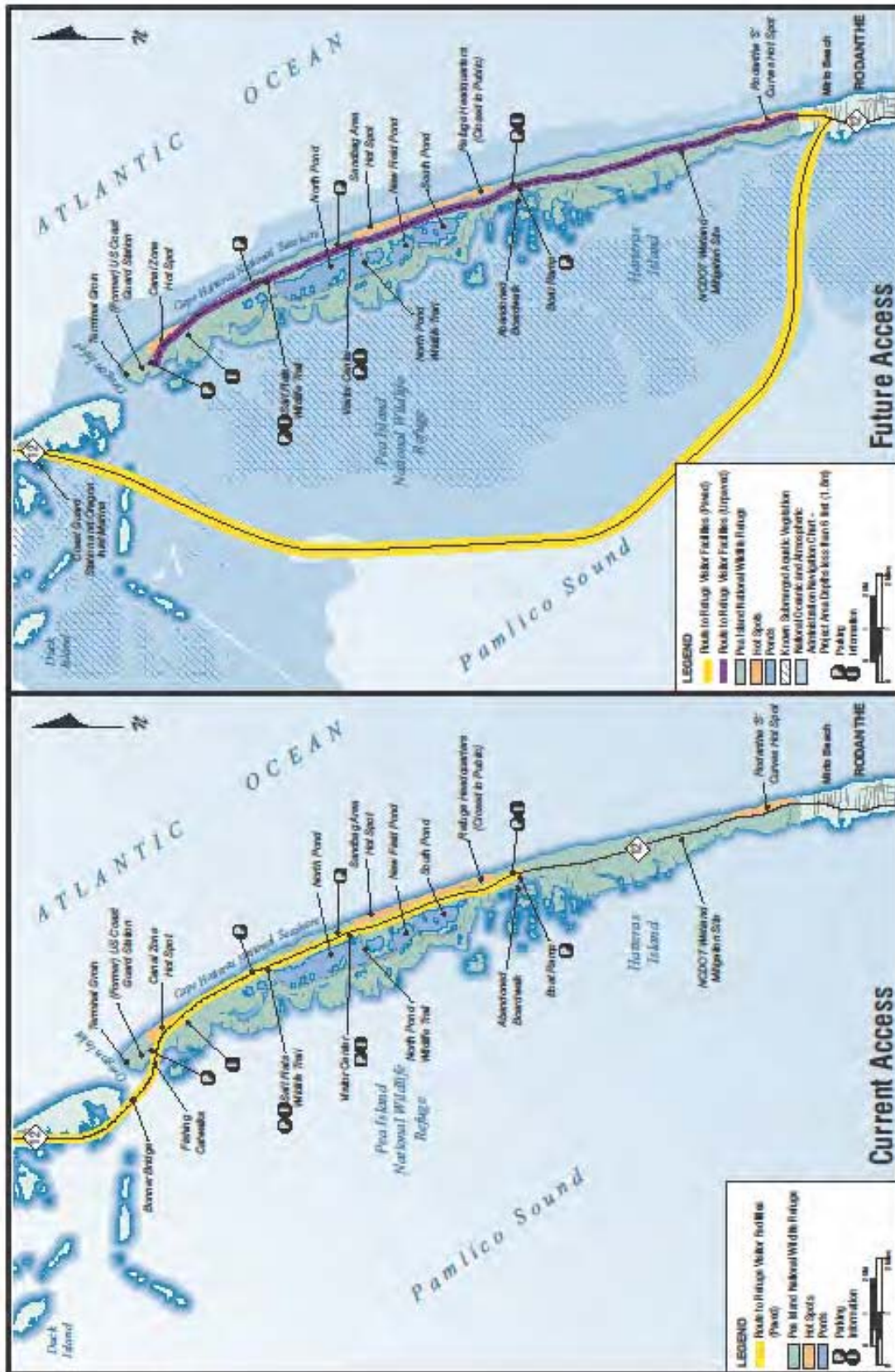
Implementation of a Pamlico Sound Bridge Corridor Alternative is expected to result in a severe access impact to Refuge visitors. The Pamlico Sound Bridge Corridor Alternative would eliminate vehicular access from Bodie Island to the north end of the Refuge since the Pamlico Sound Bridge Corridor Alternative would bypass the Refuge and touch down well south of the Refuge in Rodanthe. Should access remain passable at the south end of the Refuge, the Pamlico Sound Bridge Corridor Alternative would substantially increase individual one-way trips to the visitor center, the impoundments in the Refuge, fishing areas, and the historic Oregon Inlet Coast Guard Station by roughly 30 miles (Figure G-3). This would represent a substantial increase in vehicle-miles traveled for millions of annual visitors that travel to visit and enjoy the outstanding natural and scenic beauty afforded in the Refuge.

Additionally, work performed for the FEIS has shown that it is reasonably foreseeable that a breach through the island will occur by 2060 at the southern end of the project near Rodanthe, thereby severing vehicular access from the relocated highway corridor. This elimination of vehicular access from the south, plus the bridge bypassing the north end of the island, would significantly alter and reduce visitor access both in timing and distance.

If the Pamlico Sound Bridge Corridor Alternative had been selected as the Preferred Alternative, the Refuge and the National Park Service have indicated they would have intended to maintain some type of access for visitors to the Refuge, although the access would not likely be vehicular. Such access would be

¹¹ FHWA, Final Environmental Impact Statement and Section 4(f) Evaluation, NC 12 Replacement of the Herbert C. Bonner Bridge, Volume 1, September 17, 2008, Project Need.

much different than the current ease with which visitors can access and enjoy the Refuge via a State Highway Route currently included as an intermodal connector on the National Highway System.



CURRENT AND FUTURE ACCESS TO REFUGE VISITOR FACILITIES WITH THE PAMLICO SOUND BRIDGE CORRIDOR

In summary, the Pamlico Sound Bridge Corridor Alternative would have a severe adverse impact on access to the island. While this impact alone may not be so severe as to make the alternative imprudent for Section 4(f) purposes, in conjunction with the increased costs of extraordinary magnitude described above, the alternative is not a prudent alternative.

Conclusion

Feasible and prudent avoidance alternative decisions are intended to be fact-specific decisions that consider the totality of the circumstances, including the type, function, and significance of the Section 4(f) property. The historical review of how present-day NC12 and the Refuge/Seashore have developed together caused FHWA and NCDOT to reassess the prudence of staying within the bounds of the existing right-of-way at all costs. The previously perceived need to strictly stay within the existing right-of-way—which drove the selection of the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the LEDPA/Preferred Alternative—is an artificial and imprudent constraint that is inconsistent with the preservation purpose of Section 4(f).

As has occurred throughout the history of the National Seashore and Refuge, a prudent Bonner Bridge Replacement Alternative can be provided that maintains the transportation need for a safe NC 12 while at the same time protecting the important activities, features, and attributes of the Refuge. In order to protect the road from the eroding shoreline, the NCDOT working with the USFWS has relocated NC 12 to the west of the original easement in the Refuge four times in the past without any documented significant environmental impacts. The relocations amount to approximately six (6) miles of road relocations along this segment of NC 12, which is nearly half the length of NC 12 from Rodanthe to Oregon Inlet.

The construction cost of the Pamlico Sound Bridge Corridor Alternative would be of extraordinary magnitude in consideration of the funding available to the NCDOT to operate, improve and maintain its state highway system. Implementation of the Pamlico Sound Bridge Corridor Alternatives in a single construction contract would create a unique maintenance problem of extraordinary magnitude for NCDOT as it would have to defer much needed improvements on the remainder of the state highway system in North Carolina for a significant period of time. The Pamlico Sound Bridge Corridor Alternatives would also result in severe adverse impacts to access to the Refuge.

In summary, FHWA has determined that the Pamlico Sound Bridge Corridor Alternative would not be a feasible and prudent avoidance alternative as defined in 23 CFR 774.17.

Table G-8

PRELIMINARY TOLL FEASIBILITY ANALYSIS			
Low Range Cost Estimate for Pamlico Sound Bridge Corridor			
Low Estimate (2006 \$)			
Project Description			
Limits:	North of Oregon Inlet to Rodanthe		
County(s):	Dare		
Existing Parallel Route:	US 264 / NC 306 / NC 101 / US 70		
Length (miles)	17.5		
Number of Lanes:	2		
Projected Traffic	9600	vehicles per day in year	2025
Effective Toll	\$ 18.00		
Assumptions			
Preliminary Engineering Cost	* 10% of Construction Cost if not known		
Right-of-way Acquisition Cost	5,245,000		
Maintenance Cost / lane mile	\$470,000		
Toll Rate per mile	\$1.03		
Unit Transaction Cost for Toll Collection	\$0.40		
General Revenue Bond Interest Rate	5.50%		
TIFIA Interest Rate (As of 4/6/09)	3.61%		
Economic Inputs			
Preliminary Engineering Cost *	\$	93,768,400	
Right-of-way Cost **	\$	5,245,000	
Construction Cost	\$	937,684,000	
Project Cost	\$	1,036,697,400	
Federal-Aid, GARVEE and State Funds	\$	395,000,000	
Bond Debt	\$	696,536,073	
Economic Evaluation			
Annual Revenue	\$	63,072,000	
Annual Operations and Maintenance Cost	\$	17,851,600	
Annual Bond Payments	\$	43,237,383	
General Revenue Bond Coverage Ratio		1.86	
TIFIA Coverage Ratio		1.10	

Table G-9

PRELIMINARY TOLL FEASIBILITY ANALYSIS		
Low Range Cost Estimate for Pamlico Sound Bridge Corridor		
Project Description:	B-2500 - Bonner Bridge Replacement - Pamlico Sound Alternative	
County(s):	Dare	
Limits:	North of Oregon Inlet to Rodanthe	
NCDOT Planned Improvements:	Bridge Replacement	
Existing Parallel Route	US 264 / NC 306 / NC 101 / US 70	
Preliminary Engineering Cost (\$)	93,768,400	(Assumed 10% of Construction Cost)
Right of Way Cost (\$)	5,245,000	(Cost Included in Final EIS)
Construction Cost (\$)	937,684,000	(Cost Include: Bridge Demo., Pavement Removal, Bridge Const., & Wetland Mitig.)
Maintenance Cost per lane mile (\$)	470,000	(Cost Included in Final EIS)
Number of lanes	2	(Information From Final EIS)
Length of Loan (YR)	30	(Information From Final EIS)
TIFIA Bond Rate (%)	3.61%	
General Revenue Bond Rate (%)	5.50%	
Length of project (miles)	17.50	(Information From Final EIS)
ADT	9,600	
ADT Year	2025	
Toll Rate per mile	1.03	(calculated)
Federal-Aid, GARVEE and State funds (\$)	395,000,000	
Unit Transaction Cost (\$)	0.40	
Effective Toll (\$)	18.00	
Total Bond Debt (\$)	641,697,400	(calculated)
Senior Bond Dept (\$)	299,587,258	(calculated)
Debt Service Reserve Account (\$)	24,349,947.46	(Equal to Annual Senior Debt)
Bond Issuance Cost (\$)	29,958,726	(Assumed to be 10% of Annual Senior Debt)
Total Senior Bond Dept (\$)	353,895,931.26	(calculated)
Junior Bond Debt (\$)	342,110,142	(33% of Project Cost)
Cost of Issuance (\$)	500,000	(Estimated Cost)
Application Fee (\$)	30,000.00	(Defined by TIFIA)
Total Junior TIFIA Dept (\$)	342,640,142.00	
Daily Revenue (\$)	172,800	(calculated)
Annual Revenue (\$)	63,072,000	(calculated - based on 365 days/year)
Average Annual Maintenance Cost (\$)	16,450,000	(calculated)
Average Annual Operating Cost (\$)	1,401,600	(calculated - based on 365 days/year)
Average Annual O & M Cost (\$)	17,851,600	(calculated)
Annual Senior Debt Bond Payments (\$)	24,349,947.46	(calculated)
Senior Debt - Coverage Ratio	1.86	Coverage Ratio Goal - 1.7
Annual Junior Debt TIFIA Payments (\$)	18,887,435.66	(calculated)
Junior Debt - Coverage Ratio	1.10	Coverage Ratio Goal - 1.1

Table G-10

PRELIMINARY TOLL FEASIBILITY ANALYSIS			
High Range Cost Estimate for Pamlico Sound Bridge Corridor			
High Estimate (2006 \$)			
Project Description			
Limits:	North of Oregon Inlet to Rodanthe		
County(s):	Dare		
Existing Parallel Route:	US 264 / NC 306 / NC 101 / US 70		
Length (miles)	17.5		
Number of Lanes:	2		
Projected Traffic	9600	vehicles per day in year	2025
Effective Toll	\$ 31.40		
Assumptions			
Preliminary Engineering Cost	* 10% of Construction Cost if not known		
Right-of-way Acquisition Cost	6,890,000		
Maintenance Cost / lane mile	\$470,000		
Toll Rate per mile	\$1.79		
Unit Transaction Cost for Toll Collection	\$0.40		
General Revenue Bond Interest Rate	5.50%		
TIFIA Interest Rate (As of 4/6/09)	3.61%		
Economic Inputs			
Preliminary Engineering Cost *	\$	143,426,700	
Right-of-way Cost **	\$	6,890,000	
Construction Cost	\$	1,434,267,000	
Project Cost	\$	1,584,583,700	
Federal-Aid, GRAVEE, and State funds	\$	395,000,000	
Bond Debt	\$	1,310,966,710	
Economic Evaluation			
Annual Revenue	\$	110,025,600	
Annual Operations and Maintenance Cost	\$	17,851,600	
Annual Bond Payments	\$	83,039,756	
General Revenue Bond Coverage Ratio		1.70	
TIFIA Coverage Ratio		1.32	

Table G-11

PRELIMINARY TOLL FEASIBILITY ANALYSIS High Range Cost Estimate for Pamlico Sound Bridge Corridor		
Project Description:	B-2500 - Bonner Bridge Replacement - Pamlico Sound Alternative	
County(s):	Dare	
Limits:	North of Oregon Inlet to Rodanthe	
NCDOT Planned Improvements:	Bridge Replacement	
Existing Parallel Route	US 264 / NC 306 / NC 101 / US 70	
Preliminary Engineering Cost (\$)	143,426,700	(Assumed 10% of Construction Cost)
Right of Way Cost (\$)	6,890,000	(Cost Included in Final EIS)
Construction Cost (\$)	1,434,267,000	(Cost Include: Bridge Demo., Pavement Removal, Bridge Const., & Wetland Mitig.)
Maintenance Cost per lane mile (\$)	470,000	(Cost Included in Final EIS)
Number of lanes	2	(Information From Final EIS)
Length of Loan (YR)	30	(Information From Final EIS)
TIFIA Bond Rate (%)	3.61%	
General Revenue Bond Rate (%)	5.50%	
Length of project (miles)	17.50	(Information From Final EIS)
ADT	9,600	
ADT Year	2025	
Toll Rate per mile	1.79	(calculated)
Federal-Aid, GRAVEE, and State funds (\$)	395,000,000	
Unit Transaction Cost (\$)	0.40	
Effective Toll (\$)	31.40	
Total Bond Debt (\$)	1,189,583,700	(calculated)
Senior Bond Dept (\$)	666,671,079	(calculated)
Debt Service Reserve Account (\$)	54,185,901.81	(Equal to Annual Senior Debt)
Bond Issuance Cost (\$)	66,667,108	(Assumed to be 10% of Annual Senior Debt)
Total Senior Bond Dept (\$)	787,524,088.71	(calculated)
Junior Bond Debt (\$)	522,912,621	(33% of Project Cost)
Cost of Issuance (\$)	500,000	(Estimated Cost)
Application Fee (\$)	30,000.00	(Defined by TIFIA)
Total Junior TIFIA Dept (\$)	523,442,621.00	
Daily Revenue (\$)	301,440	(calculated)
Annual Revenue (\$)	110,025,600	(calculated - based on 365 days/year)
Average Annual Maintenance Cost (\$)	16,450,000	(calculated)
Average Annual Operating Cost (\$)	1,401,600	(calculated - based on 365 days/year)
Average Annual O & M Cost (\$)	17,851,600	(calculated)
Annual Senior Debt Bond Payments (\$)	54,185,901.81	(calculated)
Senior Debt - Coverage Ratio	1.70	Coverage Ratio Goal - 1.7
Annual Junior Debt TIFIA Payments (\$)	28,853,854.56	(calculated)
Junior Debt - Coverage Ratio	1.32	Coverage Ratio Goal - 1.1

Table G-12

PRELIMINARY TOLL FEASIBILITY ANALYSIS			
TIFIA LOAN			
Low Range Cost Estimate for Pamlico Sound Bridge Corridor			
Low Estimate (2006 \$)			
Project Description			
Limits:	North of Oregon Inlet to Rodanthe		
County(s):	Dare		
Existing Parallel Route:	US 264 / NC 306 / NC 101 / US 70		
Length (miles)	17.5		
Number of Lanes:	2		
Projected Traffic	9600	vehicles per day in year	2025
Effective Toll	\$ 11.00		
Assumptions			
Preliminary Engineering Cost	* 10% of Construction Cost if not known		
Right-of-way Acquisition Cost	5,245,000		
Maintenance Cost / lane mile	\$470,000		
Toll Rate per mile	\$0.63		
Unit Transaction Cost for Toll Collection	\$0.40		
General Revenue Bond Interest Rate	5.50%		
TIFIA Interest Rate (As of 4/6/09)	3.61%		
Economic Inputs			
Preliminary Engineering Cost *	\$	93,768,400	
Right-of-way Cost **	\$	5,245,000	
Construction Cost	\$	937,684,000	
Project Cost	\$	1,036,697,400	
Federal-Aid, GARVEE, State, and other funds	\$	694,587,258	
Bond Debt (TIFIA only)	\$	342,640,142	
Economic Evaluation			
Annual Revenue	\$	38,544,000	
Annual Operations and Maintenance Cost	\$	17,851,600	
Annual Bond Payments	\$	18,887,436	
General Revenue Bond Coverage Ratio			N/A
TIFIA Coverage Ratio			1.10

Table G-13

PRELIMINARY TOLL FEASIBILITY ANALYSIS TIFIA LOAN Low Range Cost Estimate for Pamlico Sound Bridge Corridor		
Project Description:	B-2500 - Bonner Bridge Replacement - Pamlico Sound Alternative	
County(s):	Dare	
Limits:	North of Oregon Inlet to Rodanthe	
NCDOT Planned Improvements:	Bridge Replacement	
Existing Parallel Route	US 264 / NC 306 / NC 101 / US 70	
Preliminary Engineering Cost (\$)	93,768,400	(Assumed 10% of Construction Cost)
Right of Way Cost (\$)	5,245,000	(Cost Included in Final EIS)
Construction Cost (\$)	937,684,000	(Cost Include: Bridge Demo., Pavement Removal, Bridge Const., & Wetland Mitig.)
Maintenance Cost per lane mile (\$)	470,000	(Cost Included in Final EIS)
Number of lanes	2	(Information From Final EIS)
Length of Loan (YR)	30	(Information From Final EIS)
TIFIA Bond Rate (%)	3.61%	
General Revenue Bond Rate (%)	5.50%	
Length of project (miles)	17.50	(Information From Final EIS)
ADT	9,600	
ADT Year	2025	
Toll Rate per mile	0.63	(calculated)
Federal-Aid, GARVEE, State, and other funds	694,587,258	
Unit Transaction Cost (\$)	0.40	
Effective Toll (\$)	11.00	
Total Bond Debt (\$)	342,110,142	(calculated)
Senior Bond Dept (\$)	0	(calculated)
Debt Service Reserve Account (\$)	-	(Equal to Annual Senior Debt)
Bond Issuance Cost (\$)	0	(Assumed to be 10% of Annual Senior Debt)
Total Senior Bond Dept (\$)	-	(calculated)
Junior Bond Debt (\$)	342,110,142	(33% of Project Cost)
Cost of Issuance (\$)	500,000	(Estimated Cost)
Application Fee (\$)	30,000.00	(Defined by TIFIA)
Total Junior TIFIA Dept (\$)	342,640,142.00	
Daily Revenue (\$)	105,600	(calculated)
Annual Revenue (\$)	38,544,000	(calculated - based on 365 days/year)
Average Annual Maintenance Cost (\$)	16,450,000	(calculated)
Average Annual Operating Cost (\$)	1,401,600	(calculated - based on 365 days/year)
Average Annual O & M Cost (\$)	17,851,600	(calculated)
Annual Senior Debt Bond Payments (\$)	0.00	(calculated)
Senior Debt - Coverage Ratio	#DIV/0!	Coverage Ratio Goal - 1.7
Annual Junior Debt TIFIA Payments (\$)	18,887,435.66	(calculated)
Junior Debt - Coverage Ratio	1.10	Coverage Ratio Goal - 1.1

Table G-14

PRELIMINARY TOLL FEASIBILITY ANALYSIS			
TIFIA LOAN			
High Range Cost Estimate for Pamlico Sound Bridge Corridor			
High Estimate (2006 \$)			
Project Description			
Limits:	North of Oregon Inlet to Rodanthe		
County(s):	Dare		
Existing Parallel Route:	US 264 / NC 306 / NC 101 / US 70		
Length (miles)	17.5		
Number of Lanes:	2		
Projected Traffic	9600	vehicles per day in year	2025
Effective Toll	\$ 14.15		
Assumptions			
Preliminary Engineering Cost	* 10% of Construction Cost if not known		
Right-of-way Acquisition Cost	6,890,000		
Maintenance Cost / lane mile	\$470,000		
Toll Rate per mile	\$0.81		
Unit Transaction Cost for Toll Collection	\$0.40		
General Revenue Bond Interest Rate	5.50%		
TIFIA Interest Rate (As of 4/6/09)	3.61%		
Economic Inputs			
Preliminary Engineering Cost *	\$	143,426,700	
Right-of-way Cost **	\$	6,890,000	
Construction Cost	\$	1,434,267,000	
Project Cost	\$	1,584,583,700	
Federal-Aid, GARVEE, State and other funds	\$	1,061,671,079	
Bond Debt (TIFIA only)	\$	523,442,621	
Economic Evaluation			
Annual Revenue	\$	49,581,600	
Annual Operations and Maintenance Cost	\$	17,851,600	
Annual Bond Payments	\$	28,853,855	
General Revenue Bond Coverage Ratio			N/A
TIFIA Coverage Ratio			1.10

Table G-15

PRELIMINARY TOLL FEASIBILITY ANALYSIS		
TIFIA LOAN		
High Range Cost Estimate for Pamlico Bridge Corridor		
Project Description:	B-2500 - Bonner Bridge Replacement - Pamlico Sound Alternative	
County(s):	Dare	
Limits:	North of Oregon Inlet to Rodanthe	
NCDOT Planned Improvements:	Bridge Replacement	
Existing Parallel Route	US 264 / NC 306 / NC 101 / US 70	
Preliminary Engineering Cost (\$)	143,426,700	(Assume 10% of Construction Cost)
Right of Way Cost (\$)	6,890,000	(Cost Included in Final EIS)
Construction Cost (\$)	1,434,267,000	(Cost Include: Bridge Demo., Pavement Removal, Bridge Const., & Wetland Mitig.)
Maintenance Cost per lane mile (\$)	470,000	(Cost Included in Final EIS)
Number of lanes	2	(Information From Final EIS)
Length of Loan (YR)	30	(Information From Final EIS)
TIFIA Bond Rate (%)	3.61%	
General Revenue Bond Rate (%)	5.50%	
Length of project (miles)	17.50	(Information From Final EIS)
ADT	9,600	
ADT Year	2025	
Toll Rate per mile	0.81	(calculated)
Federal-Aid, GARVEE, State and other funds	1,061,671,079	
Unit Transaction Cost (\$)	0.40	
Effective Toll (\$)	14.15	
Total Bond Debt (\$)	522,912,621	(calculated)
Senior Bond Dept (\$)	0	(calculated)
Debt Service Reserve Account (\$)	-	(Equal to Annual Senior Debt)
Bond Issuance Cost (\$)	0	(Assumed to be 10% of Annual Senior Debt)
Total Senior Bond Dept (\$)	-	(calculated)
Junior Bond Debt (\$)	522,912,621	(33% of Project Cost)
Cost of Issuance (\$)	500,000	(Estimated Cost)
Application Fee (\$)	30,000.00	(Defined by TIFIA)
Total Junior TIFIA Dept (\$)	523,442,621.00	
Daily Revenue (\$)	135,840	(calculated)
Annual Revenue (\$)	49,581,600	(calculated - based on 365 days/year)
Average Annual Maintenance Cost (\$)	16,450,000	(calculated)
Average Annual Operating Cost (\$)	1,401,600	(calculated - based on 365 days/year)
Average Annual O & M Cost (\$)	17,851,600	(calculated)
Annual Senior Debt Bond Payments (\$)	0.00	(calculated)
Senior Debt - Coverage Ratio	#DIV/0!	Coverage Ratio Goal - 1.7
Annual Junior Debt TIFIA Payments (\$)	28,853,854.56	(calculated)
Junior Debt - Coverage Ratio	1.10	Coverage Ratio Goal - 1.1

Appendix H: Draft Partnership Agreement

At the May 2009 Merger Meeting (Appendix D), the Merger team agreed on a need for some type of “memorandum of understanding or agreement” to document how project decisions will be made for future phases of the project.

The draft Partnership Agreement contained in this appendix represents the version discussed at the September 17, 2009 Merger Team meeting (Appendix D). Rather than solely relying on this one mechanism to address future decision-making, the Merger Team felt it would be better to limit the Partnership Agreement to (possibly) those agencies proposing the action (e.g. FHWA & NCDOT) and those land-managing agencies (e.g. NPS and USFWS). In addition to the Partnership Agreement, the Merger Team agreed to sign an amended Concurrence Point #3 form (CP#3 is the identification of the Least Environmentally Damaging Practicable Alternative). The Merger Team anticipates signing this concurrence form in October 2009.

FHWA and NCDOT will continue to work with the land managing agencies on the draft Partnership Agreement to produce an agreement that will allow the project to proceed in a manner that meets the requirements of all parties.

**PARTNERSHIP AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
UNITED STATES FISH AND WILDLIFE SERVICE,
UNITED STATES NATIONAL PARK SERVICE
UNITED STATES ARMY CORPS OF ENGINEERS,
NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL
RESOURCES,
AND
THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
FOR
THE REPLACEMENT OF HERBERT C. BONNER BRIDGE (BRIDGE NO. 11)
ON NC 12 OVER THE OREGON INLET
DARE COUNTY, NORTH CAROLINA
TIP PROJECT B-2500
FEDERAL AID PROJECT BRS-2358(15)**

WHEREAS, the Federal Highway Administration (“FHWA”), North Carolina Division; the U.S. Fish and Wildlife Service (“USFWS”); the National Park Service (NPS) the North Carolina Department of Transportation (“NCDOT”); the U.S. Army Corps of Engineers (“USACE”); and the North Carolina Department of Environment and Natural Resources (“NCDENR”) (collectively “the parties”), have determined that replacement of Bonner Bridge is necessary to

- Provide a new means of access from Bodie Island to Hatteras Island for its residents, businesses, services, and tourists prior to the end of Bonner Bridge’s service life.
- Provide a replacement crossing that takes into account natural channel migration expected through year 2050 and provides the flexibility to let the channel move.
- Provide a replacement crossing that will not be endangered by shoreline movement through year 2050;

and

WHEREAS,

This Partnership Agreement (PA) sets forth the cooperative policies and procedures that will guide the parties to manage the NC 12 highway corridor within the Pea Island National Wildlife Refuge (“the Refuge”) through the year 2050. The parties agree to work cooperatively as outlined in this PA to maintain a safe public road across the refuge in a manner that avoids, minimizes, and/or mitigates all adverse impacts to the refuge; and

WHEREAS, A Final Environmental Impact Statement (FEIS) and Environmental Assessment (EA) have identified the preferred alternative -- the Parallel Bridge/NC 12

Transportation Management Plan -- and its impact on the human and natural environment; and

WHEREAS, NCDOT and FHWA propose to proceed with the construction of Phase I of the Parallel Bridge/NC 12 Transportation Management Plan alternative as soon as possible. Phase I of the Parallel Bridge/NC 12 Transportation Management Plan alternative consists of a parallel replacement bridge structure on the west side of the existing Bonner Bridge in the immediate vicinity of Oregon Inlet. The Parallel Bridge/NC 12 Transportation Management Plan includes a phased-decision making process developed to address the dynamic and changing environment across the length of the study area corridor through the year 2050 for which the undertakings are planned; and

WHEREAS, the parties have worked together to develop this PA; and

WHEREAS, the Environmental Protection Agency (EPA), NOAA-Fisheries Service, and the State Historic Preservation Office (SHPO) have participated in the development of this PA and have been invited to concur in it; and

WHEREAS, concurrence in this PA indicates that party's views were taken into consideration by the signatories.

NOW, THEREFORE, the parties agree that the project alternative to be selected in the FHWA's Record of Decision, including all future phases, shall be administered in accordance with the following principles and stipulations in accordance with the following authorities as listed below.

AUTHORITIES

The authorities for this PA include, but are not limited to, the following:

- A. Various Federal Aid Highway Acts, included those codified at 23 U.S.C. §§ 101, 107, 138, 168, 204 & 317
- B. National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd-668ee)
- C. "Interagency Agreement between the U.S. Fish and Wildlife Service and the Federal Highway Administration Relating to Public Roads on the National Wildlife Refuge System," April 12, 1999
- D. National Environmental Policy Act of 1969 (Pub.L. 91-190, 83 Stat. 852), as amended (42 U.S.C. 4321 et seq.)
- E. Title IV of the Intergovernmental Cooperation Act of 1968 (Pub. L. 90-577; 82 Stat. 1098), as amended (31 U.S.C. 6501 et seq.)

F. Federal Grants and Cooperative Agreement Act of 1977 (Pub.L. 95-224; 92 Stat. 3), as amended (31 U.S.C. 6301 et seq.)

G. Executive Order 13352, "Facilitation of Cooperative Conservation," August 30, 2004

I. AGENCY RESPONSIBILITIES

- A. The FHWA is responsible for working with the States to provide the public with a safe and efficient National Highway System. FHWA is also responsible for administering grants-in-aid of public roads, including refuge roads and Scenic Byways. The section of NC 12 within the refuge is a public road that is part of the National Highway System and it is a Scenic Byway. As part of its grant administration responsibilities, FHWA must ensure that the scenic beauty of the refuge is preserved by minimizing and/or mitigating all unavoidable harm to the refuge caused by NC 12.
- B. The NCDOT is responsible for the design, construction and management of the highway system within North Carolina. The section of NC 12 within the refuge is part of North Carolina's highway system and is identified as a Strategic Highway Corridor (SHC). As a condition of Federal funding for the replacement of Bonner Bridge, NCDOT will be required to comply with the terms and conditions of FHWA's Record of Decision for the project. NCDOT understands that FHWA will incorporate this Partnership Agreement into its Record of Decision for the Bonner Bridge replacement project.
- C. The USFWS is responsible for the protection and management of lands and resources under its jurisdiction, and is vitally interested in the maintenance of a public refuge road system which will provide access for the protection, use and enjoyment of National Wildlife Refuge System areas and which will integrate with other transportation facilities.
- D. The NPS is responsible for national parks, a network of nearly 400 natural, cultural and recreational sites across the nation. The national parks have been set aside by the American people to preserve, protect, and share, the legacies of this land.
- E. The USACE is responsible for the regulation of impacts to the Waters of the United States. This includes the issuance of permits for compliance with Section 404 of the Clean Water Act.
- F. NCDENR is the lead stewardship agency for the preservation and protection of North Carolina's outstanding natural resources. NCDENR issues Section 401 certifications for impacts to streams and wetlands in compliance with Section 404 of the Clean Water Act.

II. MUTUAL AGREEMENTS

- A. The parties recognize that action must be taken in the near future to address the structural deficiencies of the existing Bonner Bridge which are outlined in Section 1.3.3 of the Final Environmental Impact Statement.
- B. The parties recognize that the Refuge has been, and is expected to continue to be, significantly affected by forces of nature that cannot be predicted with the degree of certainty required to make prudent decisions today that would cover a period of fifty-one years into the future.
- C. The parties recognize that while a segment of NC 12 nearly 16 miles long was studied as part of the Bonner Bridge replacement project, NCDOT will only seek to implement "Phase I" – as depicted in the conceptual plan appended to this PA – at this time. No action will be taken at this time to construct any of the build alternatives studied for the project corridor outside of Phase I. All parties recognize that Phase I alone does not meet the purpose and need of the project.
- D. The parties agree to work cooperatively in furtherance of NCDOT's expeditious completion of the environmental studies required to obtain the approvals and permits required to begin construction of Phase I as soon as possible.
- E. The parties agree that the section of NC 12 located within the Refuge but outside of the limits of Phase I prior shall be maintained and managed under a separate agreement between the NCDOT and FWS.
- F. The parties recognize a mutual responsibility to cooperate for the purpose of preventing and/or mitigating any adverse impacts to birds, fish and wildlife caused by Phase I of the Bonner Bridge replacement project, as well as any impacts caused by the maintenance, and possible future relocations of portions, of NC 12.
- G. The parties recognize that because a public road predated the establishment of the Refuge there is a mutual responsibility to maintain the existence of a safe public road. The parties further recognize the FWS' authority to designate reasonable conditions or restrictions on the maintenance, and possible future relocations of portions, of NC 12 in order to protect refuge resources.
- H. The agencies concur that the remaining phases of work present substantial challenges before the appropriate agencies will be satisfied in order to grant applicable permit and approvals. It will be incumbent on NCDOT to provide the necessary information designated under the Authorities listed in this PA to the permitting agencies to satisfy their needs before permits and approvals are granted. At the time of permit application, all reasonable, practicable and feasible alternatives will be considered and evaluated for each phase. This evaluation will

- include avoidance, minimization and compensatory mitigation considerations for each selected alternative.
- I. The Parties agree to meet as needed to discuss matters of mutual concern affecting the development and implementation the NC 12 Management Plan for the transportation system on the Outer Banks, or any other potential mutual benefit to the Partners.
 - J. Through evaluation of the benefits and problems in implementing this PA, the parties may determine whether the PA could serve as a model for other cooperative programs and projects that affect the Partners and other transportation and environmental agencies and groups.

III. COMMITMENTS

FHWA and NCDOT will ensure that the following measures are carried out as part of the NC 12 Transportation Management Plan:

- A. NCDOT will fund and implement a monitoring program on Hatteras Island in the project study area whose particulars would be developed in association with representatives of the Refuge, including development of decision-making criteria for translating monitoring findings into a decision to move forward with future phases. Planning for this monitoring program will be finalized prior to the start of physical construction of Phase I.
 1. Components of a monitoring program will include gathering of data (at appropriate time frames) related to:
 - Changing geomorphological characteristics (e.g., the width and elevation of the island, dune height, shoreline position, and nearshore bathymetry);
 - Relative distance from NC 12 to critical geomorphological features (e.g., shoreline, dune, estuarine shoreline)
 - Storm events and associated NC 12 maintenance activities.

After each 5 year period, a report will be prepared that merges these data with that of other geologic and biological datasets from other ongoing studies by others.

2. On an annual (or post-storm) basis, NCDOT will, in consultation with representatives of the Refuge, identify from these data geomorphological trends relevant to a decision to

move forward with future phases or refine their location. Areas will be identified deserving of extra scrutiny will be identified during the annual consideration of monitoring program findings and what they mean in terms of the timing and location of the implementation of future phases. Based on past experience, warning signs could include:

- A distance between the shoreline and the road of less than 650 feet (198 meters) (650 feet is based on measurements of the landward extent of washover fans that developed during Hurricane Isabel and should generally allow natural shoreline processes to occur without notable effects on NC 12 operations);
- Areas with weak dunes (e.g., low dunes that lack vegetation) that potentially require higher levels of storm-related NC 12 maintenance activity, proximity of the dune to NC 12, and the rate dunes may be advancing towards NC 12 (this recognizes that the frequency of dune maintenance is highest when a dune is less than 25 feet [7.6 meters] from the road);
- Increases in erosion rates over past trends
- Increases in NC 12 storm-related maintenance frequency or activity over previous years.
- Determine the shoreline and dune conditions under which the need for storm-related maintenance tends to escalate.

Annual monitoring findings and NCDOT conclusions on their relation to future phase planning, programming, and implementation shall be reported to the Refuge for discussion. The conclusions may be refined based on Refuge input.

3. The FHWA and NCDOT shall coordinate with the Refuge to develop the following objectives for implementing future phases:
 - Language establishing standard criteria, such as, (1) no loss to the quantity and quality of habitat due to proposed project activities and (2) maintenance of the biological integrity, diversity and environmental health of the Refuge.
 - Evaluation criteria based on monitoring and assessment of the appropriate ecological and geological processes and the status and trends of Refuge habitat, fish, wildlife, and plants.

B. Compliance with the National Environmental Policy Act (NEPA) and other Environmental Laws

- Prior to any construction activity beyond Phase I, FHWA and NCDOT will prepare any additional documentation that is required to comply with NEPA and Section 4(f), as well as any other applicable environmental laws, prior to taking any action.

- Prior to any construction activity beyond Phase I, FHWA and NCDOT will coordinate with all Signatory and Concurring Parties and comply with Section 106 in accordance with the Section 106 Programmatic Agreement.

IV. AMENDMENTS

Should any of the Signatories believe that the terms of this PA cannot be carried out or that an amendment to the terms must be made, that party(ies) shall immediately consult with the other party(ies) to develop an amendment. The amendment will be effective on the date a copy is signed by all of the original signatories. If the signatories cannot agree to appropriate terms to amend the PA, any signatory may terminate the agreement. Environmental conditions will be monitored for any changes prior to permitting of subsequent phases and the Parallel Bridge Corridor with NC 12 Transportation Management Plan may provide for any amendments that may result from environmental changes and need for permits at those times.

V. DURATION

This agreement shall be in effect until terminated in accordance with Section IV. Amendments, or until FHWA, in consultation with the other Signatory and Concurring Party(ies), determines that all phases of the project are completed. This PA is effective upon the signature and date of all parties.

SIGNATORIES:

By: _____ Date: _____
??????
US Fish and Wildlife Service

By: _____ Date: _____
??????
National Park Service

By: _____ Date: _____
McClendon
United States Army Corps of Engineers

By: _____ Date: _____
Gibson
North Carolina Department of Transportation

By: _____ Date: _____
??????
North Carolina Department of Environment and Natural Resources

By: _____ Date: _____
Gibson
North Carolina Department of Transportation

By: _____ Date: _____
Sullivan
Federal Highway Administration, North Carolina

CONCURRING PARTIES:

By: _____
xxx
Environmental Protection Agency

Date: _____

By: _____
xxxx
NOAA -Fisheries

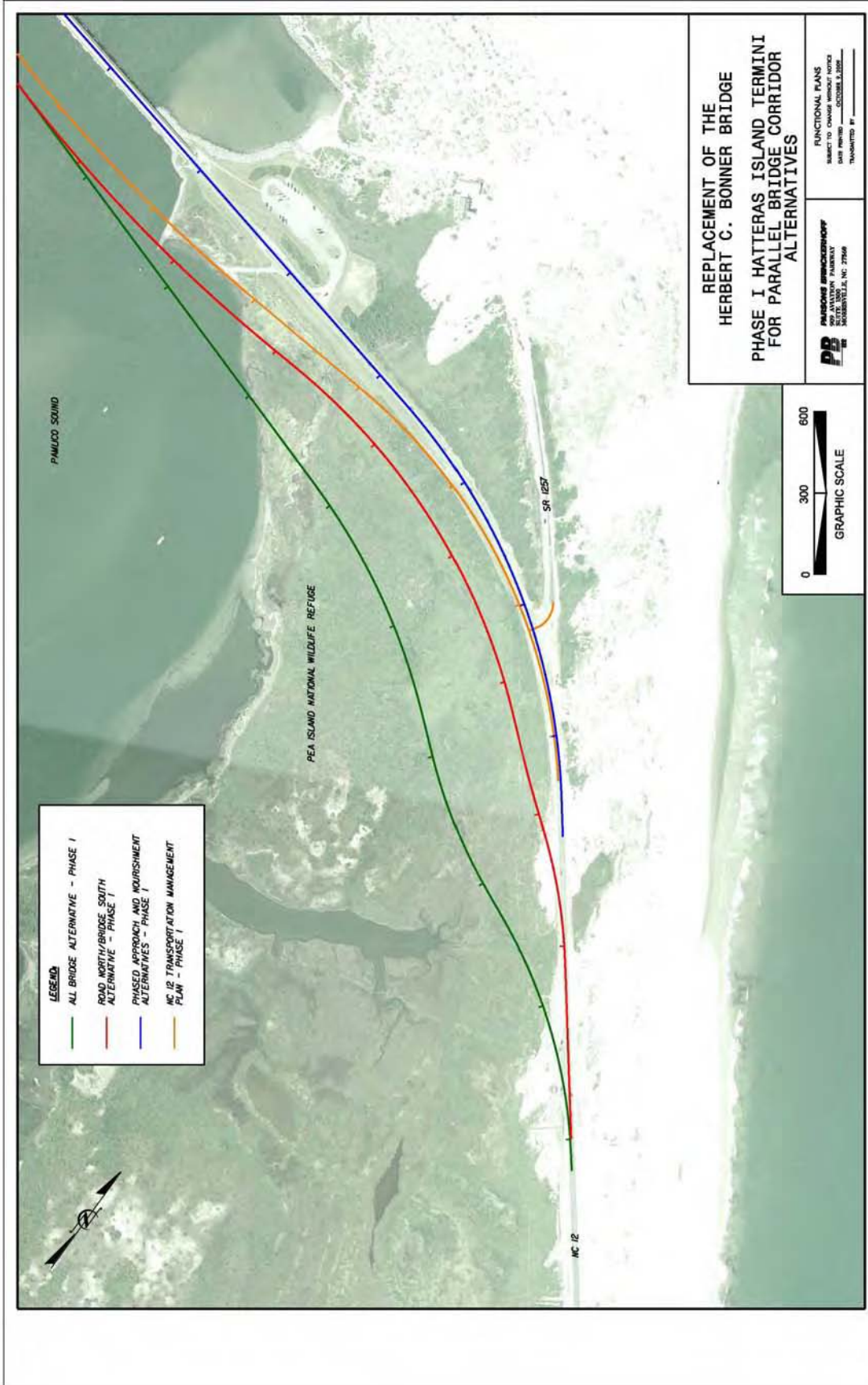
Date: _____

By: _____
xxxx
N. C. Department of Cultural Resources, State Historic Preservation Office

Date: _____

DRAFT

Appendix I: Phase I Hatteras Island Termini for Parallel Bridge Corridor Alternatives



Appendix A

**NEPA/404 Merger Team
Concurrence Forms**

A. NEPA/404 Merger Team Concurrence Forms

CONCURRENCE POINT 2A (BRIDGING DECISIONS AND ALIGNMENT REVIEW) AND CONCURRENCE POINT 4A (AVOIDANCE AND MINIMIZATION) AGREEMENT – REVISED NOVEMBER 13, 2008..... A-2

SECTION 404/NEPA MERGER 01 ISSUE BRIEF – US FISH AND WILDLIFE SERVICE, RALEIGH FIELD OFFICE A-3

SECTION 404/NEPA MERGER 01 ISSUE BRIEF – US FISH AND WILDLIFE SERVICE, PEA ISLAND NATIONAL WILDLIFE REFUGE A-4

CONCURRENCE POINT 4A ABSTENTION BRIEF – NC WILDLIFE RESOURCES COMMISSION..... A-5

CONCURRENCE POINT 2A/4A NON-CONCURRENCE BRIEF – US DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, NATIONAL MARINE FISHERIES SERVICE A-7

CONCURRENCE POINT 3 (LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE) AGREEMENT – AMENDED JANUARY 7, 2010..... A-9

**Section 404/NEPA Merger Project Team Agreement
 Concurrence Point No. 2A: Bridging Decisions and Alignment Review and
 Concurrence Point 4A: Avoidance and Minimization**

Project No./TIP No./Name/Description:

Federal Project Number: BRS-2358(15)

WBS No. 32635

TIP Project Number: B-2500

Description: Replacement of the Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet in Dare County

The Bonner Bridge Project Team has concurred on this date of November 13, 2008 with the Bridging Decisions and Alignment recommendations/ Avoidance and Minimization measures for Phase I of the LEDPA as stipulated in the merger team packet, dated October 27, 2008, with the following additions:

- Merger team members will be provided, prior to Concurrence Point 4B, with any major changes in wetland/ SAV impacts based on updated designs.
- The design-build contractor should minimize damage to wetlands/SAV/Oregon Inlet from jetting spoils.
- Table 2 currently shows temporary impacts from haul roads in SAV areas on Bodie Island. NCDOT will not allow haul roads within SAV.

The Project Team also concurred that combined Concurrence Point 2A/4A merger meetings should be held prior to the completion of the final design for each subsequent phase of the Preferred Alternative.

USACE William J. Biddlecome

NCDOT Elizabeth A. Smyre

USEPA Chris A. [Signature]

USFWS Abstain [Signature]

NCDWO B. L. [Signature]

NCWRC Abstain [Signature]

SHPO Renee Madholl-Earley

FHWA Clarence W. Cole, Jr.

NMFS Abstain [Signature]

NCDME [Signature]

NPS Donnell S. Edols

NCDCM [Signature]

USFWS-PINWR Abstain [Signature]

Section 404/NEPA Merger 01 Issue Brief

Submitted by: Gary Jordan, USFWS, Raleigh Field Office

1. **Project Name and brief description:** B-2500, NC 12 Replacement of Herbert C. Bonner Bridge over Oregon Inlet, Dare County
2. **Last Concurrence Point and Date:** CP 2A/4A – November 13, 2008
3. **Explain what is being proposed and your position including what you object to.**
NCDOT purports that avoidance and minimization has been taken into account throughout the development of this project. While the USFWS agrees that steps have been taken to avoid potential impacts to certain resources, the USFWS believes, given the many uncertainties, that avoidance and minimization measures may be insufficient for all potential outcomes.
4. **Explain the reasons for your abstention.** Given the phased nature of the project over a long period of time, unknown future conditions may not accurately reflect the assumptions made for this project. There are uncertainties regarding the terminal groin, the timing of future phases, the rate of shoreline erosion, the future funding stream, and several other factors. To avoid confusion over our overall position on this project, we choose to abstain from this specific decision point.
5. **List any relevant laws or regulations that you believe would be violated or jeopardized if the proposed action were implemented and explain the basis for violation.** If the project alignment should deviate from the existing 100-foot easement within Pea Island National Wildlife Refuge, the National Wildlife Refuge System Improvement Act of 1997 would be invoked.
6. **What alternative course of action do you recommend?**

Section 404/NEPA Merger 01 Issue Brief

Submitted by: Mike Bryant, USFWS, Pea Island National Wildlife Refuge

1. **Project Name and brief description:** B-2500, NC 12 Replacement of Herbert C. Bonner Bridge over Oregon Inlet, Dare County
2. **Last Concurrence Point and Date:** CP 2A/4A – November 13, 2008
3. **Explain what is being proposed and your position including what you object to.**
NCDOT purports that avoidance and minimization has been taken into account throughout the development of this project. Since NCDOT and the Federal Highway Administration (FHWA) consistently state throughout the FEIS and Section 4f Evaluation that all bridge construction and highway maintenance, including storm related maintenance will occur within the existing right-of-way, they further purport that there should be no further direct, indirect, or cumulative impacts on refuge resources. While the USFWS agrees that steps have been taken to avoid potential impacts to certain resources, the USFWS believes, given the many uncertainties, that avoidance and minimization measures may be insufficient for all potential outcomes.
4. **Explain the reasons for your abstention.** Given the phased nature of the project over a long period of time, unknown future conditions may not accurately reflect the assumptions made for this project. There are uncertainties regarding the terminal groin, the timing of future phases, the rate of shoreline erosion, the future funding stream, the ability to confine all construction and maintenance activities to the existing right-of-way, and several other factors. To avoid confusion over our overall position on this project, we choose to abstain from this specific decision point.
5. **List any relevant laws or regulations that you believe would be violated or jeopardized if the proposed action were implemented and explain the basis for violation.** If the project alignment or future construction and maintenance activities, (including storm-related maintenance and whether an emergency or not) should deviate from the existing 100-foot easement within Pea Island National Wildlife Refuge, the National Wildlife Refuge System Improvement Act of 1997 would be invoked. This would likely result in need for additional NEPA compliance.
6. **What alternative course of action do you recommend?** During the July 23, 2003 Merger Team a unanimous agreement between state and federal agencies found the Pamlico Sound Bridge Alternative to be a feasible and prudent avoidance alternative and agreed to further study as the preferred alternative. All factors considered the Pamlico Sound Bridge Alternative remains a feasible and prudent alternative. Another alternative would be to consider a modern, high-speed ferry system as suggested by Dr. Stanley Riggs, et al. in his publication “North Carolina’s Coasts in Crisis: A Vision for the Future” is also recommended.



⊠ North Carolina Wildlife Resources Commission ⊠

MEMORANDUM

TO: Beth Smyre, Project Planning Engineer, NCDOT
NC Department of Transportation
Project Development and Environmental Analysis
1548 Mail Service Center
Raleigh, NC 27699-1548

And

Bill Biddlecome, Merger Team Co-Chair, USACE
Washington Regulatory Field Office
P.O. Box 100
Washington, NC 27889-1000

FROM: David Cox, Technical Guidance Supervisor
Habitat Conservation Section

DATE: December 1, 2008

SUBJECT: Replacement of Herbert C. Bonner Bridge over Oregon Inlet in Dare County, North Carolina, TIP number B-2500. Concurrence point 4a, project minimization: Abstention Brief

The North Carolina Department of Transportation (NCDOT) has selected the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA). On November 13, NCDOT presented the merger team with avoidance and minimization measures intended to fulfill concurrence point 4a project minimization. Due to the phased planning and construction of this project in combination with the limited design associated with design build projects at this point in the planning process, impacts are uncertain. The NCWRC does not believe adequate project minimization measures can be accomplished until more detailed design and construction methods can be discussed. Therefore, WRC will abstain from signing concurrence point 4a.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721

Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

Ec:

Chris Militscher, USEPA
Ron Sechler, NMF
Pete Benjamin, USFWS
Mike Bryant, USFWS-PINWR
Brian Wrenn, DWQ
Jim Gregson, DCM
Ann Deaton, DMF
Mike Murray, NPS
Clarence Coleman, FHWA
Renee Gledhill-Earley, SHPO
Melba McGee, DENR



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5511
(727) 824-5317; FAX (727) 824-5300
<http://sero.nmfs.noaa.gov/>

December 5, 2008

F/SER4:RS/pw

Bill Biddlecome
Department of the Army, Corps of Engineers
Regulatory Division
P.O. Box 1890
Wilmington, North Carolina 28402-1890

Beth Smyre
North Carolina Department of Transportation
Environmental Analysis Branch
1548 Mail Service Center
Raleigh, NC 27699

Issue Brief: National Marine Fisheries Service Non-Concurrence with Concurrence Points 2A and 4A of Phase 1 of Replacement of the Herbert C. Bonner Bridge over Oregon Inlet in Dare County

Dear Mr. Biddlecome and Ms. Smyre:

On November 13, 2008, NOAA's, National Marine Fisheries Service (NMFS) participated in the Merger 01 Concurrence Team meeting in Raleigh, North Carolina, regarding phase 1 of the proposal by North Carolina Department of Transportation (NCDOT) and Federal Highway Administration (FHWA) to replace the Bonner Bridge (B-2500) over Oregon Inlet and associated improvements to North Carolina Highway 12 through the Pea Island National Wildlife Refuge (PINWR) to the town of Rodanthe on Bodie Island. Phase 1 is limited to replacing the bridge over Oregon Inlet; later phases will address Highway 12. As a member of the merger team, NMFS exercised its option to abstain on Concurrence Point 2A (CP-2A, Bridging Decision and Alignment Review) and Concurrence Point 4A (CP-4A, Impact Avoidance and Minimization). NCDOT requested that NMFS provide an explanation for the abstentions.

Background

In the Final Environmental Impact Statement, dated September 11, 2008, for the project, NCDOT selected the Parallel Bridge Corridor with Phased Approach/Rodanthe Bridge Alternative as the Least Environmentally Damaging Practicable Alternative (LEDPA). As indicated in past letters from NMFS and comments NMFS provided during meetings of the Merger 01 Concurrence Team, NMFS objects to the LEDPA because we believe alternatives within the Pamlico Sound Bridge Corridor would meet the project objectives in a manner that is less damaging to fishery habitat over the long term. Other resource agencies have the same conclusion, although the logic for their conclusion differs from ours due to differences in legislative authorities. NCDOT and FHWA selected the LEDPA after administration of a deliberative, dispute resolution process described in the charter of the Merger 01 Concurrence Team. While this process did not resolve the dispute, it did provide NCDOT and FHWA with the information that they believe is sufficient to select the LEDPA and move on to the next planning steps. While NMFS maintains its support for the Pamlico Sound Bridge Corridor, we are satisfied that NCDOT and FHWA administered the dispute resolution fairly and that our concerns were duly considered when NCDOT and FHWA selected the alternative they believe to be in the overall public interest.

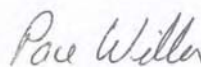


CP-2A (Bridging and Alignment) and CP-4A (Avoidance and Minimization)

Due to use of a design-build strategy for construction of the bridge over Oregon Inlet, all the information necessary to determine that adequate avoidance and minimization of impacts has occurred is unavailable at this time and deferred to later steps of project implementation. Based on this uncertainty, NMFS cannot agree that adequate impact avoidance and minimization measures have been included until more information on project design and construction methods are vetted by the Merger 01 Team. We note, however, that while construction of a new parallel bridge across Oregon Inlet would impact estuarine and marine habitats, including salt marsh, intertidal flats, and submerged aquatic vegetation, NMFS believes these impacts could be adequately mitigated, and we will work diligently with NCDOT, FHWA, and stakeholder agencies to develop the studies and plans necessary to complete the sequential mitigation process for the bridge across Oregon Inlet.

Thank you for the opportunity to provide this Issue Brief. Related questions or comments should be directed to the attention of Mr. Ronald Sechler at our Beaufort Field Office, 101 Pivers Island Road, Beaufort, North Carolina 28516-9722 or at (252) 728-5090.

Sincerely,



/ for

Miles M. Croom
Assistant Regional Administrator
Habitat Conservation Division

cc: (via electronic mail)

EPA, Chris Militscher <militscher.chris@epamail.epa.gov>
FWS, Gary Jordan <Gary_Jordan@fws.gov>
NCDCM, Cathy Brittingham <cathy.brittingham@ncmail.net>
COE, Scott McLendon <Scott.C.McLendon@usace.army.mil>
NCWRC, Travis Wilson <Travis.Wilson@ncwildlife.org>

**Section 404/NEPA Merger Project Team Agreement
Concurrence Point No. 3 – Least Environmentally Damaging
Practicable Alternative (Amended)**

Project No./TIP No./Name/Description:

Federal Project Number: **BRS-2358(15)**

WBS No. **32635**

TIP Project Number: **B-2500**

Description: **Replacement of the Herbert C. Bonner Bridge (Bridge No. 11) over Oregon Inlet in Dare County**

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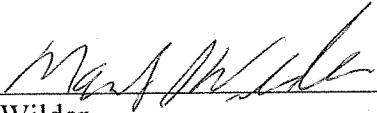
Least Environmentally Damaging Practicable Alternative:

The following agreement serves as an amendment to the August 27, 2007 Merger Dispute Resolution Board agreement and is based on discussions at merger team meetings held on May 21, 2009 and September 17, 2009. On 1/7/2010, the Merger Dispute Resolution Board agrees with the following:

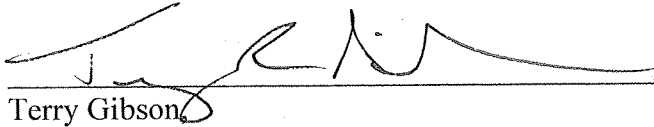
- Phase I of the project will be the construction of the replacement bridge over Oregon Inlet within the Parallel Bridge Corridor as soon as possible.
- Phase I of the project does not meet purpose and need of the project, and thus additional phases of work will be needed to meet purpose and need.
- NCDOT and FHWA have completed NEPA studies on a broad range of alternatives within the Parallel Bridge Corridor; these alternatives include bridging, roadway relocation, and beach nourishment.
- Each of the Detailed Study Alternatives within the Parallel Bridge Corridor has been adequately assessed for impacts to the natural and human environments.
- The best available science has been used to forecast shoreline erosion and potential inlet formation locations. However, it is difficult to reasonably and accurately predict future storm events and their magnitude, intensity, and duration. Extensive coastal engineering studies have been completed to date. Because of uncertainty regarding future storm events, additional coastal and natural resource data will be collected and analyzed to evaluate the available range of alternatives for future phases.
- At this time, there is no formally prescribed alternative for the remaining phases of the project south of Oregon Inlet. One or more of a combination of options, drawing from the alternatives previously studied, as well as any other alternatives determined at the time to be reasonable, practicable and feasible, will be evaluated, designed, and finalized prior to the implementation of actions beyond Phase I. Any option will be evaluated and selected with multi-agency input and concurrence as part of the Merger Process. The agencies do agree that permits will not be granted for the remaining phases of work until their applicable laws and regulations have been satisfied.

- NCDOT and FHWA will pursue an additional formalized Partnership Agreement with the USFWS and NPS to develop protocols and long-term strategies to follow prior to the implementation of future phases of the project.
- NCDOT and FHWA will reconvene the merger team when the data collected as part of the coastal and natural resource monitoring indicate that action on a future phase should occur.
- This amendment does not change the intent of the original August 27, 2007 Merger Dispute Resolution Board agreement beyond the understanding that the Phased Approach/Rodanthe Bridge Alternative is no longer considered and identified in the Record of Decision (ROD) as the LEDPA.

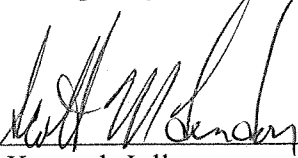
The signatures of the sponsor agencies below signify agreement to the above points:



Manly Wilder,
Chief Deputy Secretary, North Carolina Department of Environment and Natural Resources



Terry Gibson,
State Highway Administrator, North Carolina Department of Transportation



S. Kenneth Jolly,
Chief, Regulatory Division, Wilmington District, United States Army Corps of Engineers



Edward T. Parker,
Assistant Division Administrator, Federal Highway Administration- North Carolina Division