

APPENDIX D

BIOLOGICAL OPINION



United States Department of the Interior

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April 28, 2005

Mr. John F. Sullivan, III P.E.
Division Administrator
U.S. Department of Transportation
Federal Highway Administration
310 New Bern Avenue, Suite 410
Raleigh, NC 27601

FWS Log No: 04-S249

Dear Mr. Sullivan:

This document is the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the proposed construction of the Fayetteville Outer Loop between Interstate 95 and N.C. Highways 24/87 (TIP No. U-2519), located in Cumberland, Hoke and Robeson Counties, North Carolina and its effects on the red-cockaded woodpecker (RCW, *Picoides borealis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Your September 9, 2004 request for formal consultation was received on September 9, 2004.

This biological opinion is based on information provided in the September 7, 2004, Biological Assessment (BA); field investigations, electronic mail, and other published and unpublished sources of information. This biological opinion will consider all clusters identified within the above documents. A complete administrative record of this consultation is on file at our Raleigh Field Office. Currently, the Service has listed six federally endangered and one threatened species within the project area. These include four plants, one butterfly, the RCW and one reptile (American alligator; *Alligator mississippiensis*; threatened due to similarity of appearance). The North Carolina Department of Transportation (NCDOT) submitted a separate BA to address the project's impacts to the five remaining federally endangered species on March 8, 2005. The Service concurred with NCDOT's "no effect" determinations for these species in our March 28, 2005 letter.

Consultation History

March 21, 1994 – Field meeting for the project with the Service, Federal Highway Administration (FHWA), NCDOT and Fort Bragg to discuss RCW issues in Fort Bragg's Green Belt Habitat Management Unit (Green Belt).

June 5, 1996 – Service provides comments stating concerns that project could have significant adverse effects to RCWs

August 23, 1996 – Service receives draft BA for a portion of project – from US 401 to Cliffdale Road

May 14, 1997 – Service receives revised BA and request from FHWA to initiate formal section 7 consultation

June 18, 1997 – Service responds to request for formal consultation with letter requesting additional information and clarification of several points in BA

February 23, 2001 – Service provides NCDOT a list of information needs for an updated BA

June 2001 – Service prepares draft MOU for purchase of Calaway Tract to offset direct losses of RCW clusters

January 30, 2002 – The Service, TNC and NCDOT have all signed MOU for purchase of Calaway Tract

February 2002 – NCDOT acquires Calaway Tract

August 13, 2004 – Service receives draft revised BA

September 9, 2004 – Service receives final BA and request for formal section 7 consultation

September 22, 2004 – Service responds that the formal consultation initiation materials and information are complete

November 1, 2004 meeting with NCDOT, Dr. J. H. Carter III and Associates (JCA), and Fort Bragg staff

November 16, 2004 – Service meets with NCDOT, JCA, The Nature Conservancy and the Sandhills Area Land Trust to discuss conservation measures and reasonable and prudent measures

February 15, 2005 – Service provides NCDOT with a draft Biological Opinion

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Project Background

The need for a freeway around Fayetteville is based on a combination of transportation demands, social demands, economic considerations and homeland security issues. The local thoroughfare plan includes a new roadway alignment in the project location to accommodate increased travel demand associated with projected growth in western Cumberland County. The freeway will provide access to existing radial routes leading into and out of the Fayetteville urban area and

will improve access to Fort Bragg, the area's largest employer. Fort Bragg officials have indicated a need to link the installation with Interstate 95 south and north of Fayetteville. The freeway will allow the military to easily access Interstate 95 in the event of an emergency deployment and would provide an additional transportation route for the nearly 25,000 soldiers and civilian workers commuting daily to and from Fort Bragg.

The NCDOT first identified requirements for a new highway conduit and an additional Cape Fear River crossing in its 1974 NCDOT Transportation Improvement Program (TIP). The purpose of the project, referred to as X-2 in the 1974 TIP, was to install a new river crossing and provide a more direct access to a proposed major industrial facility near the Town of Wade, in Cumberland County, North Carolina. The facility was never built and the X-2 project did not pass through the preliminary phase.

In 1976, a group of citizens appealed to NCDOT to proceed with the X-2 project to provide a new crossing of the Cape Fear River. Because the new facility would also benefit the military, the N.C. Secretary of Transportation requested that the Commanding General of the Fort Bragg Military Reservation (Fort Bragg) assist in the acquisition of Federal Defense Access Funds to help finance the road. These funds were denied. The X-2 project continued to be included in the TIP and in the late 1980s interest was once again raised in the project. In 1992, a Draft Environmental Impact Statement (DEIS) was published for a part of the X-2 project between the All American Freeway (SR 1007) and I-95 at U.S. Highway 13.

In the late 1980s, the Fayetteville Metropolitan Planning Organization foresaw the need to extend the proposed X-2 roadway from the All American Freeway around the western and southern portions of Cumberland County to complete the high-speed, multi-lane facility around the Fayetteville urban area. This project was identified as the Fayetteville Outer Loop (U-2519). Afterward, NCDOT conducted a preliminary evaluation to determine a potential location for the Outer Loop. This location for the Outer Loop was included in the Fayetteville Urban Area Thoroughfare Plan which was adopted by the City of Fayetteville in October 1991, Cumberland County in November 1991 and NCDOT in January 1992. The Fayetteville Outer Loop is also an essential part of the Cumberland County 2010 Land Use Plan which was adopted in 1996.

In May 1992, the NCDOT held a public hearing for the Fayetteville Outer Loop in accordance with the North Carolina Roadway Corridor Official Map Act. In the fall of 1992, a Roadway Corridor Official Map was adopted and recorded in Cumberland and Robeson counties. The Roadway Corridor Official Map Act protects the right-of-way of a portion of the proposed Fayetteville Outer Loop from development while environmental and engineering studies are completed. The Map Act applied to the portion of the project between I-95 in Robeson County and Cliffdale Road in Cumberland County.

Over the years (1989-1996), several letters authored by Fort Bragg Commanding Generals to the then-Secretary of Transportation and the State's Governor affirmed and reaffirmed Fort Bragg's commitment to the Fayetteville Outer Loop project. The Commanding Generals stressed that the Fayetteville Outer Loop project would be as important to the future of Fort Bragg as it would be to Fayetteville and surrounding communities. They felt that the proposed highway corridor would allow easy access to I-95 in the event of deployment.

Since the terrorist attacks on September 11, 2001, the Department of the Army (DOA) has taken great strides in lessening vulnerability to terrorism and increasing security on Fort Bragg. In a letter dated May 3, 2003, the DOA/Fort Bragg requested that a portion of Bragg Boulevard (N.C. Highway 24) that bisects eastern Fort Bragg be closed to civilian traffic. DOA requested that NCDOT turn over the right-of-way to the DOA. In order to efficiently handle the increase in traffic that would be diverted due to the Bragg Boulevard closure, DOA requested that NCDOT widen Murchison Road (N.C. Highway 210). In addition, DOA requested that the NCDOT design the Fayetteville Outer Loop highway to support three additional access control points (ACPs) and a network of security patrol roads that would parallel the Fayetteville Outer Loop on Fort Bragg property. Right-of-way acquisition for the Fayetteville Outer Loop is scheduled to begin in 2005. Construction would begin in the year 2007.

Project Description

The proposed highway is approximately 27 miles long and would be a four-lane, divided freeway with full access control. Grade separations or interchanges would be constructed at selected public crossroads. Design elements include a maximum right-of-way width of 350 feet, a depressed median width of either 46 feet or 70 feet and a collector/distributor roadway system between All American Freeway and Bragg Boulevard. Median width was minimized along portions of the proposed highway through Fort Bragg to lessen impacts to RCW foraging habitat and wetlands. Actual clearing limits will vary from about 201 to 350 feet (rarely). It is anticipated that the proposed project will be divided into six separate construction projects with right-of-way acquisition for the entire project continuing over four years.

Of the 13 original alternatives evaluated in the 1992 DEIS, Alternate D was selected as the Least Environmentally Damaging Practical Alternative. The U-2519 study corridor extends from just west of Ramsey Street (U.S. Highway 401) to I-95 in Robeson County and is generally 1,000 feet wide, except at the interchanges. Because both the X-2 and U-2519 involved examining corridor locations that would cross Fort Bragg and would be located in Fort Bragg's Green Belt Area and the Northeast Area, NCDOT in consultation with the FHWA decided to separate the X-2 project into two portions for implementation. The eastern portion the X-2 project, between All-American Freeway and U.S. Highway 401, was added to the U-2519 study corridor. The FHWA has determined that the project, as currently proposed, connects logical termini and is of sufficient length to address environmental matters on a broad scope, has independent utility and significance, and is usable and a reasonable expenditure even if no additional transportation improvements in the area are made.

Security patrol roads will be built along the perimeter fence on the Fort Bragg boundary. These dirt roads will also be used for forest management access and for tank movement between Canopy Lane and All American Freeway. The patrol roads will run from Canopy Lane to east of N.C. Highway 210 (Murchison Road). The patrol road/tank trail from Canopy Lane to east of All American Freeway will be 20 feet wide and will be able to accommodate tank traffic. The patrol road east of All American Freeway to N. C. Highway 210 will be 12 feet wide and be able to accommodate Hummer-type vehicles (no tanks). A separate tank trail will run under the All American Freeway and terminate at the railroad depot. Where possible, trails will follow existing trails/clearings or be immediately adjacent to the proposed highway corridor. A fence will separate the NCDOT right-of-way and the Fort Bragg installation boundary.

Three Access Control Points (ACPs) will be built at entrances to Fort Bragg at the intersections of Canopy Road, Gruber Road and Yadkin Road. The Canopy Road and Gruber ACPs will not require additional clearing of the right-of-way. During construction, the Yadkin Road ACP will have a three-lane detour that will traverse an existing cleared area. The existing ACP at Fort Bragg Boulevard/Knox Street will become a truck-only entrance. Impacts from the widening of N.C. Highway 210 will be assessed under a separate Biological Assessment.

To minimize direct impacts associated with the Fayetteville Outer Loop project on RCWs, NCDOT in its September 7, 2004 BA, proposed to establish one new "Conservation Credit" on the Calaway Tract in accordance with Exhibit F (RCW Credit Policy for the NCDOT's Calaway Tract, Hoke County, North Carolina) of the Original Calaway Tract Memorandum of Understanding between the NCDOT, U.S. Fish and Wildlife Service and The Nature Conservancy (MOU; NC TIP Agreement R-3858) to replace the "Project Credit" (Cluster FB 65) that will be temporarily debited in completion of the Fayetteville Outer Loop. Conservation bank procedures discussed in Exhibit F allow NCDOT to debit up to five project credits out of five currently present on Calaway to offset the direct take of Cluster 65. NCDOT will establish a new RCW group (a Compensation Credit) on the Calaway Tract (or other suitable nonfederal property within the Sandhills East recovery population) to restore the pre-project number of RCW groups in the recovery unit.

A Compensation Credit is intended to meet or surpass the loss of the demographic unit (solitary male, breeding pair, etc) from the population. A Compensation Credit would be recognized as such when one new group of equal or superior demographic composition is established and sustained on the Calaway Tract. A new group is considered established if evidence of breeding is detected or if the same potential breeding group remains in the mitigation cluster for six months including a breeding season (April – July). The baseline number of clusters to be managed for perpetuity (in accordance with the Recovery Standard) on the Calaway Tract would increase from five to six. The provisions of the RCW Credit Policy also allow NCDOT to establish a new RCW cluster on another non-federal tract of land, if the above conditions are met and the new cluster can be managed demographically as part of the Sandhills East recovery population.

The Service has described the action area to include a three-mile radius around the NCDOT highway corridor for the portion of the project between Cliffdale Road and U.S. Highway 401 and RCW clusters and their associated territories in the NEA that are outside the three-mile area (See Figure 1). The extent of the action area is based on information contained in the "Neighborhood Analysis" section of the BA for reasons that will be explained and discussed in the "Status of the species within the action area" and "EFFECTS OF THE ACTION" section of this BO.

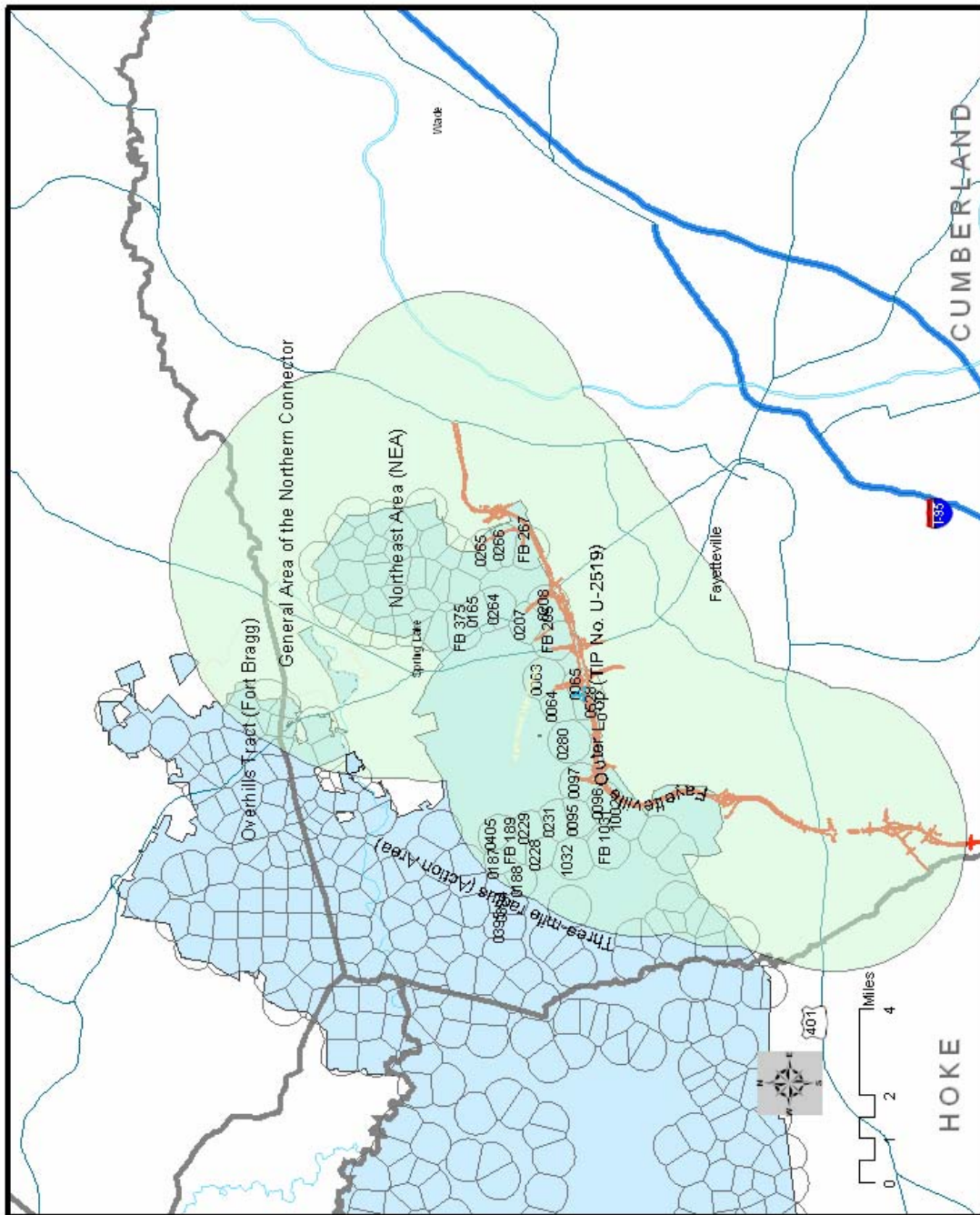


Figure 1. The Action Area defined for the Fayetteville Outer Loop Project.

STATUS OF THE SPECIES

Species description

The RCW is a territorial, non-migratory, cooperative breeding species (Lennartz et al. 1987, Walters et al. 1988) and is the only North American woodpecker that exclusively excavates its roost and nest cavities in living pines. In 1970, the Service listed the RCW as endangered (Federal Register 35:16047), and in 1973, the RCW was provided protection as an endangered species with the passage of the Endangered Species Act. No critical habitat has been designated for the RCW.

Historically, the RCW occupied a wide range throughout old-growth, fire-maintained pine ecosystems of the southern United States. Although still widely distributed, the range of the RCW is now limited and fragmented as a result of past and present human activities (e.g., resource extraction activities and urban development) and natural factors (e.g., hurricanes and pine beetle outbreaks). The remaining RCW populations exist primarily on Federal lands located in the Coastal Plain from North Carolina to Texas, the Piedmont of Georgia and Alabama, the Sandhills of North Carolina and South Carolina, and the interior highlands of Arkansas, Oklahoma, and until recently, Kentucky (Costa and Walker 1995).

Life history

The RCW has an advanced social system that revolves around family groups. A typical RCW group includes one pair of breeding birds, the current year's offspring (if any), and zero to four helpers. Helpers are usually male offspring from previous breeding seasons that assist the breeding pair by incubating eggs, feeding the young, excavating cavities, and defending the territory (Ligon 1970, Lennartz and Harlow 1979, Lennartz et al. 1987, Walters et al. 1988). The RCW nesting season occurs from April to July. Incubation lasts approximately 10 days, and the young fledge 24 to 26 days after hatching. Some juvenile males disperse from their natal territory prior to the next breeding season in an attempt to find vacant territories, or to establish their own (Hooper et al. 1980, Service 2003a). Others may remain and become helpers during subsequent nesting seasons. Most juvenile females disperse after fledging, although some may remain with the group as helpers (Walters et al. 1988). The average dispersal distance of fledgling males and females is about three miles (Walters 1991, Letcher et al. 1998).

Each group of RCWs occupies a discrete territory consisting of its cavity trees, called a cluster, and adjacent foraging habitat (Walters 1990). The RCW requires mature (usually 60 or more years old), live pine trees to excavate its nesting and roosting cavities. The cavity trees are essential to the RCW because they provide shelter and a place to nest and raise young (Ligon 1970). A typical cluster contains between one and 20 cavity trees, and the breeding male usually chooses the most recently excavated natural cavity as the nest tree, or selects cavity trees with higher resin yields (Conner and Rudolph 1989). Such cavity trees may enhance the survival of the nestlings by decreasing the parasite load of nestlings and incubating adults and providing a resin barrier to snake predation.

RCW cluster stands are typically less dense than surrounding stands and may be the least dense stands available (Service 2003a). For clusters, basal areas as low as 40 square feet (ft²)/acre in longleaf stands and from 40 to 60 ft²/acre in shortleaf/loblolly stands are suitable (Conner et al. 1991). Seedtree and shelterwood cuts with excessive pine or hardwood midstory, however, are

not acceptable as nesting habitat. Once established, clusters are often utilized for many consecutive years or even decades (Walters 1990). Hardwood midstory lessens the habitat quality, eventually leading to cavity abandonment when the hardwood midstory reaches cavity height (Conner and O'Halloran 1987, Costa and Escano 1989). Cluster abandonment may also occur as a result of displacement by competing cavity dwellers or stochastic events such as hurricanes (Conner and O'Halloran 1987).

The Recovery Plan for the Red-cockaded Woodpecker, Second Revision (RCW Recovery Plan; Service 2003a) establishes guidelines that if followed, are expected to increase RCW populations. These guidelines, referred to as the Recovery Standard are to be followed by all federal agencies and by all state land administrators for lands that are being managed to support recovery populations. To attain the Recovery Standard, the objective is to manage, at a bare minimum, 120 acres of good quality habitat per cluster. Good quality habitat is defined as having: (1) ≥ 20 ft²/acre basal area of pines ≥ 60 years in age and ≥ 14 in. DBH, (2) between 0-40 ft²/acre basal area of pines 10-14 in. DBH, (3) ≤ 10 ft²/acre basal area of pines < 10 in. DBH, (4) groundcover that is comprised of at least 40% herbaceous, pyrophytic species (5) hardwood midstory is nonexistent or sparse and less than 7 feet in height, (6) canopy hardwoods are either nonexistent or are 10% of canopy trees in longleaf forests or 30% in loblolly/shortleaf forests, (7) all habitat is within 0.5 miles of the cluster center, and (8) foraging habitat should not be separated by more than 200 feet of non-foraging areas. Although not always practicable, 50 % or more of the habitat managed for the recovery standard should be within $\frac{1}{4}$ mile of the cluster epicenter.

RCWs scale and probe bark on the trunks and limbs of living pine trees while foraging for insects. The amount of foraging area used by a group is dependant upon the quality of the habitat and population density. Research indicates that birds generally forage within one-half mile of the cluster (Service 2003a). RCW home ranges may vary seasonally and encompass 60 to 300 acres. Habitat typically consists of open pine and/or pine/hardwood forests. Although in some habitats RCWs will use smaller pine trees as foraging substrate (DeLotelle et al. 1987), they prefer pines greater than 10 inches in dbh (Service 2003a). Groups may forage on pines scattered through hardwood stands, but pure hardwood stands are of little value to the RCW (Conner and O'Halloran 1987). The highest populations of the birds occur on areas with active prescribed burning programs that control hardwoods. Many complex and interrelated factors, such as condition of the understory plant community, annual weather fluctuations, forest type, soils, physiographic province, season of the year, fire frequency and intensity are important in determining foraging habitat quality.

The RCW is territorial and defends its home range from adjacent groups (Hooper et al. 1982, Ligon 1970). Territories tend to be smaller in areas with few hardwoods, presumably because of higher quality habitat. Home range size is related to both habitat and demographic (e.g., group size and population density) variables (Hooper et al. 1982, Lennartz et al. 1987) and has been found to be inversely related to habitat quality (DeLotelle et al. 1987, 1995). Studies by Hardesty et al. (1997) and James et al. (2001) suggested that habitat structure, and not just the quantity of total resources, is an important determinant of home range size, territory quality, and reproductive success. The availability, quantity, and quality of foraging habitat affects RCW cluster status, group size, home range size, and reproductive success (Conner and Rudolph 1991, DeLotelle et al. 1987, 1995, Hardesty et al. 1997). Low-quality foraging habitat and large reductions in available foraging habitat can cause RCWs to abandon clusters, reduce fledging

rates and disrupt social interactions (Conner and Rudolph 1991, DeLotelle et al. 1995, Jackson and Parris 1995).

Population dynamics

According to the RCW Recovery Plan, the recovery of the RCW is directly linked to the viability of discrete populations within selected southeastern states. Populations required for recovery are distributed among 11 recovery units based on physiographic region to ensure the representation of broad geographic and genetic variation in the species. Viable populations within each recovery unit, to the extent allowed by habitat limitations, are essential to recovery of the species as a whole. Until recently, most RCW populations were considered stable at best or declining. RCW population trends since the early 1990's are improving, with an estimated 5,627 active RCW clusters range-wide (Service 2003a). The species can be delisted when five criteria are met that establish a tier of populations within the 11 recovery units that contain sufficient suitable nesting and foraging habitat and are not dependent on the installation of artificial cavities to remain stable.

Long-term viability of an RCW population, in genetic terms, depends on the presence of an adequate number of breeding individuals for the natural processes that increase genetic variability (e.g., mutation and recombination) to offset the natural processes that decrease genetic variability (e.g., genetic drift and inbreeding). Additionally, any prediction of a population's viability should also consider the population's ability to survive population fluctuations due to demographic and environmental fluctuations (Koenig 1988) or natural catastrophes. Reproductive rates, population density, and recolonization rates may influence RCW population variability more than mortality rates, sex ratios, and genetic viability. Therefore, dispersal of adult birds into breeding vacancies is essential for population persistence (Daniels et al. 2000, Schiegg et al. 2002).

Although the relationship between RCW population variability and density is not well understood, recent studies indicate spatial distribution of territories is important in long-term population stability. Conner and Rudolph (1991) found that, in sparse populations, RCW group size and the number of active clusters decreased as fragmentation increased. Hooper and Lennartz (1995) suggested that populations with less than 4.7 active clusters within 1.25 miles on average had critically low densities that inhibited population expansion. Results from a spatially explicit simulation model of RCW population dynamics suggest that population growth rate may depend more on the number and spatial distribution of territories, than on the initial composition of the population (Letcher et al. 1998). Achieving a self-sustaining population required fivefold more territories when territories were randomly spaced than when they were maximally clumped, and populations with as few as 49 territories were stable when those territories were highly aggregated. Populations of more maximally aggregated groups are likely to persist over the short term (i.e., 20 years) (Crowder et al. 1998).

Natural population growth (i.e., without recruitment clusters) occurs at extremely low rates (one to two percent per year) in this species (Walters 1991), and the availability of cavity trees is limiting (Copeyon 1990, Allen 1991). New groups or new territories arise by two processes, pioneering and budding (Hooper 1983). Pioneering is the occupation of vacant habitat by construction of a new cavity tree cluster and is relatively rare. Budding is the splitting of a territory, and the cavity tree cluster within it, into two. Budding is more common than pioneering in RCWs, since the new territory contains cavities from the outset (Service 2003a).

Inactive clusters are important to maintaining extant populations of RCWs and may provide a short-term opportunity to enhance habitat available to RCWs and, thus, increase the number of groups in populations (Doerr et al. 1989). After a territory is abandoned for two or more years, however, it is almost never reoccupied (unless habitat is improved and maintained), typically because cavities are unsuitable due to deterioration or hardwood encroachment (Beckett 1971, Conner and Locke 1982, Copeyon et al. 1991).

However, the technology to create new territories at desired locations exists and management for optimum territory clumping is therefore possible (Letcher et al. 1998). Artificial cavities can be installed in unoccupied habitat that is otherwise suitable (Copeyon 1990, Allen 1991), with subsequent occupancy by dispersing birds, typically subadults (Carrie et al. 1999, Conner et al. 1999). Adding artificial cavities to sites already occupied increases group size (Carrie et al. 1999). Artificial cavities provide additional roosting opportunities for subadult males, encouraging them to remain in their natal clusters and potentially inherit the territory (Carrie et al. 1999). Females may also benefit when additional cavities are provided because they are the most subordinate members of the RCW social group and, therefore, may not always be able to secure adequate roost cavities. RCWs exhibit relatively low adult mortality rates; annual survivorship of breeding males and females is high, ranging from 72 to 84 percent and 51 to 81 percent, respectively (Lennartz and Heckel 1987, Walters et al. 1988, DeLotelle and Epting 1992).

Inducing the formation of RCW groups in restored habitat with artificial cavities is an established and successful technique (Copeyon et al. 1991, Walters et al. 1992, Gaines et al. 1995, Watson et al. 1995). Within two years of restoring habitat and providing artificial cavities at 20 unoccupied territories in the Sandhills of North Carolina, 90 percent of the sites were occupied by RCWs (Copeyon et al. 1991). Translocating RCWs is another method successfully used to establish new groups (Rudolph et al. 1992, Allen et al. 1993, Hess and Costa 1995, Costa and Kennedy 1994, Franzreb 1999). Translocation can include augmenting a solitary-bird group or translocating a pair of subadult RCWs (i.e., unrelated male and female (Costa and Kennedy 1994)). Franzreb (1999) found that 63.2 percent of translocated birds (including adults and juveniles) remained at the release site for at least 30 days and 51.0 percent reproduced.

Status and distribution

The RCW was listed as endangered due to documented declines in local populations and massive reduction in foraging and nesting habitat. The life history of RCWs is closely tied to the occurrence of fire-maintained old growth pine forests that once dominated the southeastern United States. Only three million acres of longleaf pine forest remain of the estimated 60 to 92 million acres once in existence (Frost 1993). Timber clearing for agriculture, short timber rotations and the suppression of fire has reduced the amount and quality of RCW foraging and nesting habitat.

At the time of listing, the total number of individuals had declined to less than 10,000 in widely scattered and isolated populations (Service 2003a). Most RCW populations (regardless of location or land ownership) were considered stable at best, but were more likely declining (Costa 1995). Costa and Escano (1989) documented RCW population declines in at least ten, and perhaps as many as 17, populations on National Forests. James (1995) estimated that the number of active clusters range-wide declined 23 percent between the early 1980s and 1990. Recently,

numerous RCW populations have increased, particularly on Federal lands, as a result of management activities.

Currently, an estimated 14,068 RCWs inhabit 5,627 active clusters across 11 States in the southeast United States. National forests (NF), military installations, and national wildlife refuges (NWR) contain the majority of extant populations and most of the habitat that is potentially suitable for RCWs. Conservation of RCWs as a species will depend on prudent management of habitats on those federal lands. National forests support the majority of the core populations required for delisting of the species, and therefore, have a uniquely important role in the species' recovery. Prior to the 1980s, most populations on national forests were declining, but management efforts during the past decade, especially prescribed burning and cavity management, have stabilized most of those populations and led to increases in some (Service 2003a). Regardless of ownership, few if any populations can be sustained without active management (e.g. prescribed burning, midstory control, appropriate pine thinnings, cavity provisioning, etc.). Colonization of unoccupied habitat would be very slow without application of these activities.

The Service, in response to the apparent range-wide decline of the species on private lands, developed a private lands conservation strategy that has been aggressively implemented, modified as necessary based on new scientific findings, and regularly evaluated to ensure objectives are being achieved. The RCW recovery objectives of the private lands strategy are to increase the acreage of private land habitat being managed for RCWs, maintain or increase the larger existing RCW populations on private lands, rescue RCW groups from private lands that would be lost as a result of demographic and/or genetic uncertainty, foster and develop cooperative partnerships between and among federal, State and private parties responsible for and/or interested in RCW recovery, and increase the size of designated recovery and support populations while pursuing those objectives (Costa 1995). To achieve those strategic objectives, the Service has implemented three types of agreements involving private landowners: Safe Harbor Agreements, Habitat Conservation Plans (HCPs) and "no-take" management plans implemented via Memoranda of Agreement (Costa 1995).

In North Carolina, the largest and most stable RCW populations are on federal lands: Fort Bragg Army Reservation (396 active clusters in 2004; plus 12 active clusters on Camp Mackall), Marine Corps Base, Camp Lejeune (71 active clusters in 2002) and the Croatan National Forest (60 active clusters in 2003). Smaller populations also exist on the Alligator River and Pocosin Lakes NWRs (eight active clusters in 2003) and the Dare County Bombing Range, maintained by the U.S. Air Force (eight active clusters in 2003). At least eight landholdings belonging to the State of North Carolina support RCW populations.

Altogether, seven distinct RCW populations are found in NC. The five small populations of the Croatan National Forest, Marine Corps Base, Camp Lejeune, Holly Shelter Game Lands, Military Ocean Terminal Sunny Point and Alligator River/ Pocosin Lakes NWRs comprise the coastal region. The Sandhills region is composed of two meta-populations: Sandhills East and Sandhills West. In 2004, 629 or approximately eighty percent of North Carolina's RCW clusters were located in the Sandhills region. The Primary Core population of Sandhills East, which includes Fort Bragg, contained 472 of these clusters. The Essential Support population of Sandhills West consisted of 157 clusters. These meta-populations were historically linked, but

are now separated by a gap three to five miles across, and the rates of movement between the two are so low that they are now considered two separate populations (Walters et al. 2001).

The Service is managing an active and successful RCW Safe Harbor program for private landowners in the North Carolina Sandhills, covering all or parts of Cumberland, Harnett, Hoke, Moore, Richmond and Scotland counties. To date, lands that provide habitat supporting 59 baseline groups have been enrolled and the program has assisted in the creation of six new RCW groups. These six groups are not counted toward the regional recovery goal, however they are aiding in the persistence of the species.

RCWs on Fort Bragg and Surrounding Areas

Extensive research has been done on the RCW in the North Carolina Sandhills from 1973 to date (North Carolina State University (NCSU) RCW Research Project, Sandhills Ecological Institute (SEI) and Fort Bragg Endangered Species Branch). RCW groups located on Fort Bragg, Camp Mackall, the Sandhills Game Lands and on adjacent private lands (particularly around Southern Pines and Pinehurst, Moore County), collectively comprise the second largest metapopulation in existence, the long term viability of which is essential to the recovery of this species. The importance of the Sandhills RCW population has resulted in its designation as one of 13 Primary Core Recovery Populations by the Service (Service 2003).

RCWs in the Sandhills are divided into two populations: Sandhills East Primary Core Population (Sandhills East) and Sandhills West Essential Support Population (Sandhills West). Both populations are part of the Sandhills Recovery Unit (Service 2003) and are recognized as distinct populations in the RCW Recovery Plan (Service 2003). The RCW groups on Fort Bragg (exclusive of Camp Mackall), Overhills (now part of Fort Bragg), McCain, the Calaway Tract, the Carver's Creek Tract and Weymouth Woods Sandhills Nature Preserve are part of the larger Sandhills East population. The smaller Sandhills West population consists of RCW groups on Camp Mackall and the Sandhills Game Land. Both Sandhills RCW populations are well below the size (500 active clusters) that is required to be considered "recovered" (Service 2003).

The primary goal of the Fort Bragg Endangered Species Branch is to ensure that endangered species management and the training missions of Fort Bragg are fully integrated and compatible to the maximum extent (Fort Bragg 1997). The Fort Bragg and Camp Mackall Endangered Species Management Plan (ESMP; Fort Bragg 1997) is the principal document that directs the installation's conservation goals for the RCW. The Department of the Army's "Management Guidelines for the red-cockaded woodpecker on Army Installations" (Department of the Army 1996) established the means by which each Army installation is to determine its conservation goals for RCWs on their lands. Two standards are identified: (1) the Installation Regional Recovery Goal (IRRG) and (2) the Mission Compatible Goal (MCG). The IRRG represents the installation's share of the recovery goal within a recovery unit, which may include demographically-connected subpopulations on other federal or nonfederal lands. The MCG is the installation's RCW population objective, based on the installation's capacity to integrate RCW conservation with planned and on-going mission requirements. Both of these goals are established through cooperative efforts between each Army post and their respective Service field offices.

Fort Bragg's MCG is defined as 401 active, protected RCW clusters. The Fort Bragg Endangered Species Branch currently manages 315 baseline active (BLC) RCW clusters and 86 primary recruitment clusters (PRCs) toward this goal. Primary recruitment clusters are designated and managed for the purpose of attracting new RCW breeding groups (Fort Bragg 1997). Training restrictions apply in BLCs and PRCs. All managed clusters in the Green Belt are counted toward the MCG. Fort Bragg's Installation Regional Recovery Goal is set at 482 active clusters. This goal includes 315 BLCs, 86 PRCs and 81 Supplemental Recruitment Clusters (SRCs)(Fort Bragg 1997). A SRC is a cluster designated and managed for the purpose of attracting a new breeding group; however, there are no training restrictions for these clusters and these clusters do not count toward the MCG (Fort Bragg 1997).

The proposed action has the potential to adversely affect the RCW within the proposed project area. The effects of the proposed action on the RCW will be considered further in the remaining sections of this BO. Potential effects include the loss of foraging and nesting habitat related to highway construction activities, loss of cavity trees, habitat fragmentation and harassment in the form of disturbing or interfering with RCWs attempting to nest, forage, roost and immigrate/emigrate within the project action area (see "**Status of the Species within the Action Area,**" below).

ENVIRONMENTAL BASELINE

The Fort Bragg Green Belt was developed as a result of the Installation Materials and Maintenance Division (IMMD) Complex section 7 consultation with the Service in 1992 (Service 1992. Biological Opinion for the proposed construction of the Installation and Materials and Maintenance Division Complex on Fort Bragg, U.S. Fish and Wildlife Service, Atlanta, GA. 24 pp.). The IMMD development was proposed to be built in the main cantonment area (MCA) of Fort Bragg and would impact RCWs located in the area. During this consultation, in part to avoid a jeopardy biological opinion, Fort Bragg agreed to develop a corridor management plan within the MCA. The resulting biological opinion and conservation recommendations included a corridor management plan that became known as the Green Belt Plan. The Green Belt Plan was designed to "...maintain and provide habitat for RCW dispersal/immigration between the Northeast Training Area (NEA) and the main RCW population to the west, provide high quality clusters and cavity trees for establishment and retention of active clusters and provide high quality forage substrate for RCWs" (Fort Bragg 1992). Short-term and long-term objectives included: "...reforestation of non-forested land and conversion of off-site species where needed; fire management, emphasizing growing season burns and prohibition of pine straw harvest; mechanical and chemical hardwood treatments; soil erosion prevention and stabilization; nesting habitat improvements; translocation; additional management in residential areas with landscaping/reforestation opportunities; and measures to be developed to avoid encroachment" (Fort Bragg 1992).

The Green Belt is one of seven Habitat Management Units (HMUs) identified in the 1997 ESMP. Fort Bragg included many of the specific management activities of the Green Belt in the ESMP; however, some recommendations were intentionally not included in the ESMP (e.g., prescribed burning in some areas) because biologists considered them no longer biologically or logistically prudent. The Green Belt Plan identified 20 RCW clusters in the Green Belt and

concluded that by the year 2002 there would be sufficient foraging habitat available for 15 groups of RCWs (Fort Bragg 1992). Impacts associated with the construction of the Fayetteville Outer Loop within the Green Belt were described in the 1997 ESMP in terms of approximate acreage of pine and pine/hardwood stands that may be affected within the HMU (209 acres; Fort Bragg 1997). However, no detailed analysis of the highway's effects on RCW population dynamics (e.g. survivorship of Green Belt RCW groups, creation of recruitment clusters, contiguity of habitat, etc.) pertaining to the Green Belt's role in maintaining the demographic connectivity among Sandhills East's subpopulations was conducted. The Service's December 4, 1997, non-jeopardy biological opinion on the ESMP specifically addressed the strategies by which Fort Bragg would integrate protected species management with the installation's military training mission. Although the December 4, 1997 biological opinion discussed conservation measures outlined in the ESMP for all HMUs including the Green Belt HMU, project level impacts (e.g. the Fayetteville Outer Loop) were not addressed.

Since 1995, the Fort Bragg Endangered Species Branch and the Fort Bragg Natural Resources Division have conducted extensive management efforts including demographic monitoring, provisioning of artificial cavities, translocation of juvenile pairs, timber thinnings and prescribed burning in the Green Belt and have improved RCW foraging and nesting habitat. In 1990, five of 21 RCW clusters within the Green Belt were active. In 2004, 12 RCW clusters within the Green Belt were active and/or contained a breeding group (Fort Bragg, 2004).

Status of the species within the action area (AA)

According to Walters (1990), the average dispersal distance within the Sandhills East and West populations is less than 3.1 miles. It is reasonable to assume that the changes in the demography and distribution of groups affected by the project within three miles of the project corridor would also affect the outermost NEA groups. Where the physical connection between the NEA and the remainder of Fort Bragg's RCW HMUs might decline as a result of development pressure in the Green Belt, the potential for RCW emigration and immigration between Fort Bragg proper (and Overhills) and the NEA should not be discounted. Based on this information, the Service has described the AA for the proposed project to include the highway corridor between Cliffdale Road and U.S. Highway 401, a three-mile radius of the corridor, and a three-mile radius from the outermost RCW foraging partitions within Fort Bragg's NEA HMU (Figure 1). This AA determination is also intended to address the "neighborhood analysis" required in the RCW Recovery Plan. Of the 95 clusters/partitions within the AA (on both federal and nonfederal lands), 51 contain breeding groups, 26 are active (solitary male, captured or non-breeding pair), eight are inactive, four are abandoned clusters and six clusters have not yet been created. Thirteen clusters/partitions within the action area occur on private lands. These are occupied by six breeding groups and two non-breeding groups. One cluster was captured (A cluster that does not support its own group of red-cockaded woodpeckers, but contains active cavity trees in use or kept active by birds from a neighboring cluster; See Glossary of Terms) and four clusters were abandoned (JCA, unpublished data).

Based on information available to the Service, we estimate that the highway project may impact between three and seven percent of RCW territories in the Sandhills East population. The Fayetteville Outer Loop project will cause the loss of RCW foraging habitat in ten RCW territories in the Green Belt (FB 63, 64, 65, 96, 97, 205, 207, 208, 528 and 1002) and three in the NEA (FB 265, 266, 267). The proposed action will occupy 164.87 acres of land within foraging

partitions on Fort Bragg. The quality of habitat, in terms of tree species and stand densities /distribution that will be affected is described in the BA. The effects of the proposed construction will occur within Fort Bragg’s Green Belt, which currently contains all or part of 23 foraging partitions and 21 clusters, twelve of which are active. The NEA contains all or part of 39 RCW territories, about 35 of which are active (Walters et al. 2004). There are nine clusters on private lands adjacent to the NEA that are considered part of the NEA Habitat Management Unit. The majority of effects will occur in the Green Belt, which provides the most readily available suitable and potentially suitable habitat; therefore, the Green Belt is an essential link between the NEA and the rest of the Sandhills East population.

The September 7, 2004 BA provides a description of habitat conditions within the partitions of the clusters that will be directly affected by the proposed highway project. Habitat quantity and quality were assessed based on two standards: the Recovery Standard (RS) and the Standard for Managed Stability (SMS). The foraging habitat analyses performed by the consultant, Dr. J.H. Carter III and Associates (JCA) included collection of hardwood density/ height and ground cover data for the Fort Bragg clusters, both of which are identified in the RCW Recovery Plan as factors in determining RCW habitat suitability. Pine stand quality was separated into categories based on hardwood midstory characteristics. Pine stands may contain the requisite number and distribution of larger pine trees (≥ 14 inches diameter at breast height) but may still be generally unusable by RCWs if midstory conditions are unsuitable. Tables 1 – 3 below characterize both pine and hardwood midstory conditions within the foraging habitat to be affected.

Table 1: Available Acreage Based on Standard for Managed Stability

<i>Cluster Number</i>	<i>Cluster Status</i>	<i>Suitable Acreage¹</i>	<i>Unsuitable Acreage²</i>	<i>Potential Suitable Acreage</i>	<i>Proportion of Potential Suitable Acreage Available</i>
FB 63	Inactive	30.01	231.33	261.34	0.11
FB 64	Active	41.36	91.63	132.99	0.31
FB 65	Breeding	37.70	53.52	91.22	0.41
FB 96	Breeding	116.88	161.93	278.81	0.42
FB 97	Active	22.79	296.36	319.15	0.07
FB 205	Inactive	0.00	165.58	165.58	0.00
FB 207	Inactive	0.00	217.82	217.82	0.00
FB 208	Active	0.00	178.47	178.47	0.00
FB 265	Breeding	14.26	201.09	215.35	0.07
FB 266	Breeding	0.00	218.13	218.13	0.00
FB 267	Breeding	0.00	224.51	224.51	0.00
FB 528	Active	81.86	45.52	127.38	0.64
FB 1002	TBC	2.59	321.19	323.78	0.01

¹ = acreage that meets the guidelines in all criteria (pine basal area, hardwood presence, etc.).

² = acreage that does not meet the guidelines in all criteria, but could be managed to meet requisite standards.

Table 2: Available Acreage Based on Recovery Standard

<i>Cluster Number</i>	<i>Cluster Status</i>	<i>Suitable Acreage¹</i>	<i>Unsuitable Acreage²</i>	<i>Potential Suitable Acreage</i>	<i>Proportion of Potential Suitable Acreage Available</i>
FB 63	Inactive	0.00	261.34	261.34	0.00
FB 64	Active	0.00	132.99	132.99	0.00
FB 65	Breeding	0.00	91.22	91.22	0.00
FB 96	Breeding	0.00	278.81	278.81	0.00
FB 97	Active	0.00	319.15	319.15	0.00
FB 205	Inactive	0.00	165.58	165.58	0.00
FB 207	Inactive	0.00	217.82	217.82	0.00
FB 208	Active	0.00	178.47	178.47	0.00
FB 265	Breeding	31.58	183.77	215.35	0.15
FB 266	Breeding	13.44	204.69	218.13	0.06
FB 267	Breeding	0.00	224.51	224.51	0.00
FB 528	Active	0.00	127.38	127.38	0.00
FB 1002	TBC	0.00	323.78	323.78	0.00

¹ = acreage that meets the guidelines in all criteria (pine basal area, hardwood presence, etc.).

² = acreage that does not meet the guidelines in all criteria but could be managed to meet requisite standards.

Table 3: Description of General Habitat Conditions (JCA 2004)

<i>Cluster Number</i>	<i>Habitat Description</i>
FB 63	“The partition did not meet the minimum foraging habitat guidelines required by the SMS pre- or post-project due to a moderately dense to dense hardwood midstory that was tall.” / “Under the RSG, the partition had no suitable foraging habitat available and does not meet the minimum foraging habitat requirements. This is a result of a moderately dense to dense hardwood midstory that was tall in 6 of the partitions 7 forest stands.”
FB 64	“The partition did not meet the minimum foraging habitat guidelines required by the SMS due to a moderately dense to dense hardwood midstory that was tall.” / “Under the RSG, the partition had no suitable foraging habitat available and does not meet the minimum foraging habitat requirements...” “This was the result of a moderately dense to dense hardwood midstory that was tall and a basal area for pines <10” DBH that was greater than the minimum 10 ft ² per acre required by the RS.”
FB 65	“Pre-project and post-project [basal area] and acreage totals for FB Cluster 65 did not meet the minimum foraging habitat guidelines for either the SMS or the RSG. This was the result of a moderately dense to dense hardwood midstory that was tall. In addition, pre-project, the All American Freeway

Table 3: Description of General Habitat Conditions (JCA 2004)

<i>Cluster Number</i>	<i>Habitat Description</i>
FB 65 (continued)	causes a gap of > 200 feet between the eastern and western portions of the partition, making the eastern half of the partition non-contiguous. The partition has insufficient potentially suitable habitat to meet the SMS and/or RSG.”
FB 96	“Both pre- and post-project foraging habitat totals meet the minimum foraging guidelines required by the SMS.” /“Under the RS, the partition has no suitable foraging habitat requirements. This was a result of a moderately dense to dense hardwood midstory that was tall. In addition, eight of the 13 forest stands have the required number of pines ≥ 14 ” DBH per acre, however, these pine are not 60 years of age or older.”
FB 97	The partition did not meet SMS requirements due to “a moderately dense to dense hardwood midstory that was tall and a pine [basal area] that was either below the minimum 40 ft ² or above 70 ft ² for trees ≥ 10 ” DBH.”
FB 205	“The partition did not meet SMS (or RSG) guidelines because of a moderately dense to dense hardwood midstory that was tall and sparse pine [basal area] throughout the partition.”
FB 207	“Under both the SMS and RSG, the partition had no suitable foraging habitat and did not meet minimum foraging habitat requirements. The partition had a moderately dense to dense hardwood midstory that was tall and a sparse pine [basal area] across 7 of 9 forest stands. Also the partition had a low number of pines ≥ 14 ” DBH and a high number of pines <10” DBH.”
FB 208	“When evaluating the forested habitat under both the SMS and the RS, the partition had no suitable habitat and does not meet the minimum foraging habitat requirements. The partition had a moderately dense to dense hardwood midstory that was tall, a sparse pine [basal area] across three of five forest stands and a high [basal area] for pines, 10” DBH. Also the partition had a low number of pines ≥ 14 ” dbh and a high number of pines < 10” inches DBH, as well as a sparse pine [basal area] in four of the partition’s five forest stands.”
FB 265	“Pre-project and post-project BA and acreage totals for FB Cluster 265 do not meet the minimum foraging habitat guidelines for suitable habitat required for either the SMS or the RSG (Service 2003a) (Table 5, 6 and 36). However, there is sufficient potentially suitable acreage, if managed, to meet the SMS and/or RSG (Table 5, 6 and 36) (Service 2003a).
FB 266	“Pre-project and post-project BA and acreage totals for FB Cluster 266 did not meet the minimum foraging habitat guidelines for suitable habitat required for either the SMS or the RSG (Service 2003a) (Table 5, 6 and 36). This was a result of a moderately dense to dense hardwood midstory that was

Table 3: Description of General Habitat Conditions (JCA 2004)

<i>Cluster Number</i>	<i>Habitat Description</i>
FB 266 (continued)	tall and a pine BA that was below the minimum 40 sq. ft. per acre. However, there is sufficient potentially suitable acreage, if managed, to meet the SMS and/or RSG (Table 5, 6 and 36) (Service 2003a).”
FB 267	“Under both the SMS and RSG, the partition had no suitable foraging habitat and does not meet the minimum foraging habitat requirements. The partition had a moderately dense to dense hardwood midstory that was tall and a sparse pine basal area in five of its seven stands.”
FB 528	“Although the pre-project foraging habitat totals meet the minimum guidelines required by the SMS, post project foraging habitat totals do not meet the SMS guidelines. This was a result of a moderately dense to dense hardwood midstory that was tall, and a high pine [basal area] and number of trees per acre for pines < 10” DBH.”
FB 1002	“Pre- and post-project foraging habitat totals for FB cluster 1002 do not meet the minimum foraging habitat guidelines required by either the SMS or the RS. This is largely due in part to a moderately dense to dense hardwood midstory that was tall throughout the partition, and according to the RS, high pine [basal area] and number of trees per acre for pines <10” DBH.”

Factors affecting species environment in the action area

The Green Belt is located south of and adjacent to the Main Cantonment Area of Fort Bragg. The Main Cantonment Area contains most of the infrastructure supporting the installation’s military readiness mission. Some facilities and range maintenance activities are contained within the Green Belt, including access control points, tenant command headquarters, and storage shelters/buildings. Fort Bragg and the Service’s Raleigh Field Office have conducted at least 20 informal consultations (requests for concurrence with “not likely to adversely affect” determinations) on installation construction projects within the Fayetteville Outer Loop AA since December 2000. Thirteen involved impacts to single group territories, two were located in more than one foraging partition and five of these projects were constructed outside of identified foraging partitions. Most of these projects involved minor losses to timber and were outside of a 1/4 –mile radius of the epicenter of clusters Fort Bragg has identified as those the installation proposes to manage for sustaining the eastern part of the Sandhills East population. Correspondence addressing these projects is on file at the Service’s Raleigh Field Office.

The informal consultations document the coordination between Fort Bragg’s environmental planners and action sponsors during project design to minimize impacts of these construction projects on forest resources considered valuable to RCW conservation. Despite efforts to retain standing timber and replant appropriate pine species where possible, the Service and Fort Bragg recognize the need to more intensively consider the impacts infrastructural growth is having on RCW population fitness in the Green Belt and NEA Habitat Management Units. Concurrently

with the rendering of this Biological Opinion, the Service is working with Fort Bragg to develop a BA entitled “Biological Assessment for Fort Bragg’s Future Years Development Program (FYDP) in the Green Belt Area, Fort Bragg Military Reservation, North Carolina,” (Fort Bragg 2004). The construction projects addressed in Fort Bragg’s BA represent federal activities that are reasonably certain to occur within and adjacent to the Green Belt contemporaneously with the proposed Fayetteville Outer Loop project. The FYDP will affect 16 RCW territories in addition to the same 13 territories as the Fayetteville Outer Loop (29 clusters/partitions). The impacts associated with the FYDP will be considered part of the Environmental Baseline for this project. A thorough description of the location and background of the Green Belt is contained in Fort Bragg’s Draft BA.

The following is excerpted from the 2004 Fort Bragg Draft BA and underscores the importance of the Green Belt in maintaining the RCW clusters in the NEA as part of the Sandhills East population:

“In 2004 Walters et al. submitted a report to the Service and to the FB Endangered Species Branch (ESB) that attempted to quantify the frequency of significant RCW dispersal movements between and among the North Carolina Sandhill populations. RCW dispersal events between the NEA, Overhills, western FB and the remaining central portion of FB were analyzed using dispersal data through 2002. Only dispersal events in which the dispersing bird achieved breeding status in its new group were considered. In the early 1990s there was evidence suggesting the NEA RCW groups were at risk of being isolated from the rest of the FB population, but the results of this study show between three and four RCW immigrants per generation moved into the NEA from other portions of FB and five to seven NEA RCWs per generation immigrated into other portions of FB in more recent years. It is reasonable to expect that some of these movements were through the Green Belt. The observed rates appear to be sufficient to minimize the loss of genetic variability between the NEA and the rest of FB, thereby supporting the NEA as part of the Sandhills East population. Data in the Walters report also suggest the NEA and Overhills clusters are demographically linked to the rest of the Sandhills East population, although we do not have enough data to determine the extent of interactions of RCWs on Overhills with the rest of the FB population.

The NEA groups (n=35) (Walters et al. 2004) and adjacent private lands (n=9 active clusters, JCA unpublished) are “physically” connected to the rest of the FB population by the Green Belt. The NEA is otherwise isolated physically from the remainder of the FB population by highly developed areas up to approximately 4.3 miles wide (Walters et al. 2004). The Green Belt is fragmented, but may provide a mechanism for dispersal between the NEA and the main RCW population to the west by providing established RCW groups on the landscape, and suitable forage and dispersal habitat throughout the corridor, facilitating effective demographic and genetic linkage.”

In summary, the primary factors affecting the species environment in the AA are the landscape role of the Green Belt in maintaining the connectivity of the Sandhills East population, the efforts by Fort Bragg to manage and maintain that corridor, and the development pressures on the corridor. These factors have implications for RCWs within the Green Belt as well as for the survival and recovery of the Sandhills East population, which will be analyzed in the next section of the Biological Opinion.

EFFECTS OF THE ACTION

Factors to be considered

The September 7, 2004 BA (JCA 2004) identifies four cavity trees that will be removed from FB 65 in creating the highway corridor. Eight cavity trees in three managed clusters (FB 208, 267 and 528) on Fort Bragg will stand within 200 feet of the proposed highway project or patrol roads created on the installation. Three RCW cavity trees within two clusters on private lands (CC 10 and 17) will be removed, and one cavity tree on private land will be within 200 feet of the proposed project area (CC 17). The proposed highway corridor passes within the ¼-mile radius of the center of clusters FB 65, 97, 205, 208, 267 and 528. Table 4 shows the distance from the highway project's clearing limits to the geometric centers of the clusters directly affected.

Table 4: Distance from cluster epicenters to project clearing limits

<i>Cluster Number</i>	<i>Cluster Status</i>	<i>Distance (in feet)</i>
FB 528	Active	183
FB 65	Breeding	235
FB 267	Breeding	420
FB 97	Active	580
FB 205	Inactive	1,000
FB 265	Breeding	1,020
FB 208	Active	1,025
FB 207	Inactive	1,385
FB 266	Breeding	1,460
FB 96	Breeding	1,460
FB 63	Inactive	1,660
FB 64	Active	1,750
FB 1002	To be created	1,850

The RCW is the only federally listed species that will be addressed in this biological opinion and is, therefore, the only species considered in this analysis. The effects analysis considers various construction and roadway use impacts on individual RCWs and their foraging habitat, the ability of Fort Bragg to meet its RCW recovery goals, and various landscape-level impacts on RCW habitat and demographics. Effects on RCWs that could result in take in the form of harm and harassment from timber clearing and road construction on RCWs include loss of currently suitable nesting and foraging habitat. Effects on RCWs that could result in take in the form of harm and harassment from roadway use include degradation of potential and currently suitable nesting and foraging habitat. Effects on RCWs that could result in take in the form of harassment from both timber clearing/construction and roadway operation include disturbance resulting in behavioral modifications that cause increased mortality or reduced reproductive output and demographic disturbance due to habitat fragmentation causing potential dispersal impediments. Not all actions associated with the proposed project are expected to adversely affect RCWs; each action was evaluated to determine if impacts to RCWs would be reasonably certain to occur, either by affecting roosting, breeding and/or dispersal activities, or by significantly reducing foraging habitat. In addition, the conservation measure (debiting and crediting of the conservation bank on the Calaway Tract) offered by NCDOT in the BA for the

proposed project is part of the agency's action and, therefore, impacts resolved or minimized by this action were assessed. Changes in the ability to meet long-term and short-term recovery goals were based on examination of current population density and pre- and post-project habitat capabilities and are summarized at the end of the section **Species' response to the proposed action.**

Analyses for the effects of the action

Direct effects

The Fayetteville Outer Loop project will occupy 356.6 acres of land on Fort Bragg. Approximately 164.87 acres are contained within RCW foraging partitions that the installation is attempting to manage for RCW recovery. About 144.3 acres of forested habitat and 5,914.53 square feet of basal area for pine stems \geq 10 inches DBH within nine active territories will be removed. Based on the SMS evaluation performed by JCA, about 23 acres of suitable habitat will be removed as will 141.8 acres of currently unsuitable, potential habitat. The distribution of foraging habitat to be removed among the affected clusters is contained in Tables 5 through 7.

Table 5. Foraging habitat removals associated with the Fayetteville Outer Loop - Standard for Managed Stability

<i>Cluster Number</i>	<i>Suitable Acreage¹</i>	<i>Suitable Basal Area¹</i>	<i>Unsuitable Acreage²</i>	<i>Unsuitable Basal Area²</i>
FB 63	0.00	0.00	0.22	11.93
FB 64	1.76	112.64	0.16	8.93
FB 65	5.52	353.28	23.83	1,048.41
FB 96	0.00	0.00	20.95	662.44
FB 97	0.00	0.00	13.39	437.41
FB 205	0.00	0.00	6.48	174.34
FB 207	0.00	0.00	1.82	50.08
FB 208	0.00	0.00	30.94	877.48
FB 265	0.00	0.00	0.20	2.54
FB 266	0.00	0.00	0.84	18.31
FB 267	0.00	0.00	23.37	826.35
FB 528	15.75	1,050.62	7.59	516.12
FB 1002	0.00	0.00	12.05	478.01

¹ = acreage/basal area that meets the guidelines in all criteria (pine basal area, hardwood presence, etc.).

² = acreage/basal area that does not meet the guidelines in all criteria, but could be managed to meet requisite standards.

Table 6. Foraging habitat removals associated with the Fayetteville Outer Loop - Recovery Standard

<i>Cluster Number</i>	<i>Unsuitable, Potential Foraging Habitat Acreage</i>	<i>Potentially Suitable Pine Basal Area to be removed</i>
FB 63	0.22	11.93
FB 64	1.92	121.57
FB 65	29.35	1,401.69
FB 96	20.95	662.44
FB 97	13.39	437.41
FB 205	6.48	174.34
FB 207	1.82	50.08
FB 208	30.94	877.48
FB 265	0.20	2.54
FB 266	0.84	18.31
FB 267	23.37	826.35
FB 528	23.34	1,566.74
FB 1002	12.05	478.01

Table 7. Proportion of total foraging habitat removed by the Fayetteville Outer Loop—Both Standards

<i>Cluster Number</i>	<i>Proportion Acreage lost</i>	<i>Proportion Basal Area lost</i>
FB 63	0.00	0.00
FB 64	0.01	0.01
FB 65	0.32	0.30
FB 96	0.08	0.05
FB 97	0.04	0.03
FB 205	0.04	0.05
FB 207	0.01	0.01
FB 208	0.17	0.18
FB 265	0.00	0.00
FB 266	0.00	0.00
FB 267	0.10	0.10
FB 528	0.18	0.20
FB 1002	0.04	0.04

Based on the information contained in the BA, less than one percent of suitable and unsuitable foraging habitat acreage would be subtracted from the partitions supporting clusters 63, 64, 207, 265 and 266. Approximately four percent of manageable acreage would be removed from clusters 97, 205 and 1002. Clusters 96 would lose about eight percent; 267, about ten percent; 208 about 17%; and 528, about 18% of their respective foraging partitions. Cluster 65 would

lose approximately 30% of the partition being managed by Fort Bragg to support resident RCW groups. All clusters (except Cluster FB 65) will retain at least the minimum amount of foraging habitat that, if managed sufficiently, would support RCW groups in accordance with the SMS (Table 8). The acreage that would remain available for the management of Cluster 65 is about 62 acres which is 13.1 acres below the amount of territory needed for maintaining an active group. Cluster 65 would also lose four cavity trees. In the 2004 breeding season, two of those four had active cavities and two contained inactive starts. One of the active trees, tree number 10972 was the 2004 nest tree.

Table 8. Post Project Figures – Standard for Managed Stability

<i>Cluster Number</i>	<i>Potential Suitable Acreage</i>	<i>Potential Suitable Basal Area</i>
FB 63	261.12	13,180.79
FB 64	131.07	8,452.88
FB 65	61.87	3,337.15
FB 96	257.86	13,403.91
FB 97	305.76	16,370.19
FB 205	159.10	3,576.64
FB 207	216.00	6,978.59
FB 208	147.53	3,914.50
FB 265	215.15	9,208.90
FB 266	217.29	7,733.27
FB 267	201.14	7,376.91
FB 528	104.04	6,299.62
FB 1002	311.73	12,677.12

The recovery standard requires that each cluster has approximately 120 acres (or more) of good quality habitat. Good quality habitat is further defined as having (1) ≥ 20 ft²/acre basal area of pines ≥ 60 years in age and ≥ 14 in. DBH, (2) between 0-40 ft²/acre basal area of pines 10-14 in. DBH, (3) ≤ 10 ft²/acre basal area of pines < 10 in. DBH, (4) 40% of groundcover is herbaceous and pyrophytic, (5) hardwood midstory is nonexistent or sparse and less than 7 feet in height, (6) canopy hardwoods are either nonexistent or are $\leq 10\%$ of canopy trees in longleaf forests or $\leq 30\%$ in loblolly/shortleaf forests, (7) all habitat is within 0.5 miles of cluster center and (8) no acreage counted as foraging habitat should be separated by more than 200 feet of non-foraging areas. The Fayetteville Outer Loop foraging habitat analyses showed that none of the 13 clusters affected by loss of foraging habitat due to the proposed action met the recovery standard before timber clearing. All but two of the 13 clusters would retain 120 acres or more of habitat that could be managed for the recovery standard (See FB 65 and FB 528 in Table 9 below).

Table 9. Post Project Figures – Recovery Standard

<i>Cluster Number</i>	<i>Potential Suitable Acreage</i>	<i>Potential Suitable Basal Area</i>
FB 63	261.12	13,180.79
FB 64	131.07	8,452.88
FB 65	61.87	3,337.15
FB 96	257.86	13,403.91
FB 97	305.76	16,370.19
FB 205	159.10	3,576.64
FB 207	216.00	6,978.59
FB 208	147.53	3,914.50
FB 265	215.15	9,208.90
FB 266	217.29	7,733.27
FB 267	201.14	7,376.91
FB 528	104.04	6,299.62
FB 1002	311.73	12,677.12

Direct effects of timber removal and highway construction that will remove foraging and nesting habitat for RCWs are (1) disturbing foraging birds by reducing their resources (i.e., home range size increases as foraging resources decrease), (2) reduction of nesting success of RCWs by incubation disruption and nestling provisioning rates (i.e., adults travel further to obtain food for nestlings), (3) reduction in group size, and ultimately, (4) cluster abandonment as resources fall below a critical threshold (dependent on habitat quality, density of adjacent clusters, and demographic variables) (DeLotelle and Epting 1992, Hardesty et al. 1997, Service 1985, Service 2003a). Thirteen clusters (FB 63, 64, 65, 96, 97, 205, 207, 208, 265, 266, 267, 528, and 1002) will be directly affected by the proposed highway project. At a minimum, all of these will experience some loss in foraging habitat substrate. Clusters FB 65, 97, 205, 208, 265, 267 and 528 will lose foraging habitat within ¼ mile of their cluster epicenters. The ¼-mile radius polygon is where Service guidelines recommend foraging habitat should be managed to support at least 50% of all substrate available to each resident group. Two clusters (FB 65 and 528) will lose acreage below Recovery Standard Guidelines, considerably diminishing their ability to function as part of the Sandhills East population unit. Enough foraging substrate will be removed from Cluster 65’s foraging partition to further deplete foraging habitat below the Standard for Managed Stability. Four cavity trees, including the nest tree for the 2004 breeding season will be removed from Cluster 65’s cavity tree aggregation. The combination of the later two effects will cause complete, direct take of Cluster 65. To account for the taking of Cluster 65, NCDOT will debit one “project credit” from the Calaway Tract conservation bank, established in Hoke County, on the southwestern edge of Fort Bragg. The process by which debits and credits are administered in the conservation bank is outlined in Exhibit F of the Memorandum of Understanding, executed among the Service, The Nature Conservancy and the NCDOT concerning the future preservation and management of the “Calaway Tract” in Hoke County. The Calaway Tract serves NCDOT as an RCW conservation bank and contains up to five project credits that may be directly debited to offset the loss of groups in the Sandhills East population, based on review of demographic effects of the population by the Service. For each RCW group that is “taken” by a NCDOT project within the Sandhills East population unit, one

Calaway Tract Project Credit will be temporarily debited until one new, demographically equivalent group is established on the Calaway Tract.

Indirect effects

Earth moving and road construction can cause RCW cavity tree mortality due to sediment loads on cavity tree roots, further degrading RCW habitat. However, the loss due to sediment loads as compared to loss of acreage due to clearing for the project footprint is minimal and the detrimental effects of sediment loading on cavity tree roots is not expected to be immediately evident. Indirect effects may result from noise, restriction of necessary habitat management activities and habitat fragmentation. Noise disturbance could result in behavioral modifications that cause disturbance of behavior or reduced reproductive output. We expect the effects from noise to be minimal.

Habitat fragmentation can impede dispersal and complicate habitat management for the RCW and further contribute to interference with normal behavioral or demographic processes such as attainment of sufficient group sizes, survivorship of recruitment, and dispersal. Loss of habitat that reduces reproductive output and inhibits dispersal in the Green Belt can be expected to further isolate clusters in the NEA. Isolating groups existing in the NEA (35 active clusters) will force this subpopulation to behave more independently from the larger Sandhills East population, making it more vulnerable to problems commonly associated with smaller populations such as environmental stochasticity, catastrophic events, genetic drift and inbreeding. Demographic separation of NEA clusters from the other Fort Bragg Habitat Management Units would also inhibit/prolong cooperative efforts among Fort Bragg, the Army Environmental Center, The Nature Conservancy and the Service to recover the Sandhills East primary core population.

The North Carolina Sandhills Conservation Partnership's (NCSCP) RCW Recovery Working Group, comprised of scientists and agency representatives most knowledgeable of the Sandhills RCW populations identified the properties between Fort Bragg's Overhills Tract and the NEA as the most likely geographical area where long term RCW conservation could be exercised that could maintain demographic connectivity between NEA and the other habitat management units. The properties comprising this conservation area are referred to as the Northern Corridor. The RCW Recovery Working Group's determination of the importance of the Northern Corridor to RCW conservation has been adopted by the NCSCP. Of the three options presented in the BA for offsetting/minimizing the highway project's deleterious effects of habitat fragmentation on the RCW, minimization option 1 was identified as having the greatest potential for ensuring long-term demographic connectivity between the main Sandhills East population unit and the NEA. Option 1 would enroll NCDOT's financial support in the cooperative efforts currently being made by member organizations of the NCSCP to protect and conserve, by way of fee title or purchase of conservation easements, properties within the Northern Corridor. The Service believes that NCDOT's efforts to assist the NCSCP in establishing the Northern Corridor (See figure 2 below), as a means of minimizing the Fayetteville Outer Loop's impacts to the RCW groups in the action area, are appropriate for the scale of the project's detrimental impacts

Indirect effects associated with the project stem primarily from timber removal that reduces potential foraging and nesting habitat between clusters in the Green Belt and the NEA. Resource reduction may increase competition for remaining RCW habitat which may in turn affect group sizes and nesting success of groups within the action area. Immigration and emigration of RCWs

within the NEA population may decline. These effects may not be noticeable in the short term, but may be more evident in the years following completion of the Fayetteville Outer Loop. Additional information supporting the necessity to pursue RCW conservation in the Northern Corridor is contained in the “**Species Response to the Proposed Action**” section below.

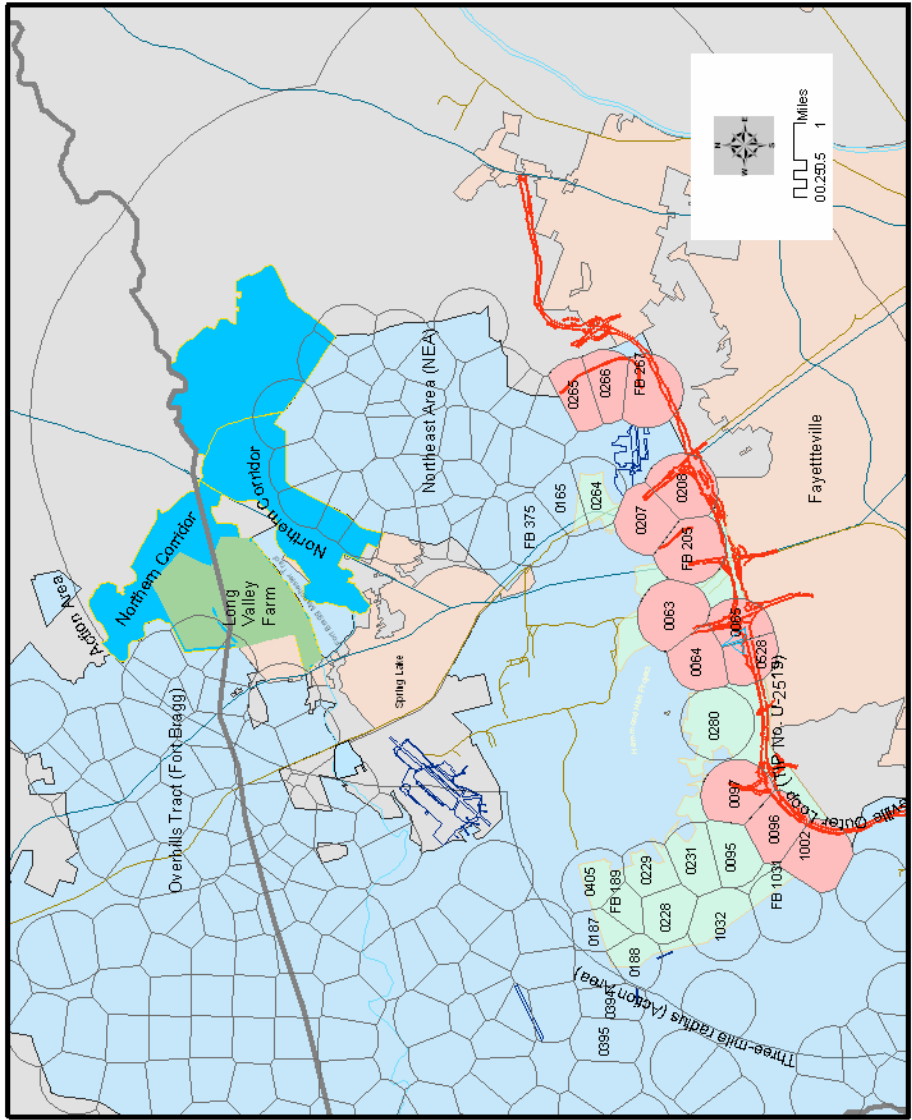


Figure 2. Location of high priority RCW conservation lands in the Northern Corridor

Figure 2. Location of high priority RCW conservation lands in the Northern Corridor.

Species Response to the Proposed Action

The AA contains 95 clusters and associated foraging partitions (in whole and/or in part) within Fort Bragg’s eastern Habitat Management Units, including the Northern Tier, Impact Area, Green Belt and NEA habitat management units. Of these, 51 contain breeding groups, 26 are active (occupied by solitary males or non-breeding pairs or captured by neighboring groups),

eight are inactive, four are abandoned and six have not been created. Ten clusters (clusters 63, 64, 65, 96, 97, 205, 207, 208, 528 and 1002) in the Green Belt Habitat Management Unit and three clusters (265, 266 and 267) in the NEA will be directly affected by loss of foraging/nesting habitat. Clusters and interstitial foraging/nesting habitat in the Green Belt are currently the only direct connection to clusters in the NEA outside of the project area (n=38) (approximately 35 active clusters; Walters et al. 2004).

Loss of an active territory (cluster abandonment) complicates RCW conservation and recovery efforts at the neighborhood level by reducing group densities. While helpers contribute to stabilizing population demographics in RCWs, dispersal behavior is spatially restricted and long-distance dispersal is uncommon (Daniels 1997, Daniels et al. 2000). This makes RCWs particularly vulnerable to demographic stochasticity from isolation of territories. Low density appears to affect small populations (≤ 25 groups) to a greater degree than large, although loss of isolated groups is a problem even in large populations (Conner and Rudolph 1991, Beyer et al. 1996), especially if the fragmentation is within 0.5 miles of the impacted cluster.

Groups adjacent to clusters with reduced foraging habitat can experience an indirect effect from timber removal due to increased intraspecies competition as resources within the neighborhood of clusters are reduced. Reduction of resources and increased competition can result in decreased nesting success of these clusters as resources for reproduction are re-allocated for territory defense. Clusters 65, 97, 208, 265, 267 and 528 are located within 0.25 miles of the proposed Fayetteville Outer Loop. Cluster abandonment (cluster 65) may lead to an inability to maintain an aggregation of clusters at the recommended density (e.g., 4.7 active clusters within 1.25 miles) and indirectly impact demography as clusters within 0.50 miles of the highway corridor get increasingly isolated (Conner and Rudolph 1991, Hooper and Lennartz 1995). The foraging habitat remaining post-project within the partition for cluster 65 may eventually be captured by the breeding group occupying cluster 528. With the projected loss of cluster 65, the density of active clusters directly affected by the Fayetteville Outer Loop will be reduced from an average of 2.7 active clusters per 1.25-mile radius to 2.4 active clusters per 1.25-mile radius. If demographic connectivity between the main Sandhills East subpopulation and Fort Bragg's NEA Habitat Management Unit is not maintained, and dispersals are hindered from landscape alterations resulting in demographic disruption, the ability to recover will be compromised, as this species does not readily establish new territories (Hooper 1983, Service 2003a).

Conservation implemented in the Northern Corridor will strengthen the demographic and genetic health of the Sandhills East primary core population by securing an additional connection between Fort Bragg's main habitat management units and the NEA, supplementing the contribution of nesting/foraging habitat being conserved in the Green Belt. The Green Belt is currently considered the primary conduit for demographic/genetic exchange between these two population units. However, there is potential for a wider, more robust distribution of suitable habitat in the Northern Corridor and the possibility exists for the Northern Corridor to supersede the Green Belt for ensuring long term recovery of the Sandhills East population unit in the future. This is not to say that the maintenance and management of the Green Belt will cease to be important. The Green Belt will remain an important link between the NEA and the rest of Sandhills East; particularly, while habitat is being protected and restored in the Northern Corridor. However, the effects of this project together with those proposed by Fort Bragg are such that we can no longer rely on the Green Belt as the only corridor to assure long term RCW conservation.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The RCW Recovery Working Group of the NCSCP identified the lands comprising the gap between the Fort Bragg Overhills Tract and the NEA HMU (the Northern Corridor) as some of the most valuable areas on which to focus land acquisition and management for effectively conserving the Sandhills East recovery population (Walters et al. 2001). The NCSCP has been working to acquire properties and conservation easements in the Northern Corridor and has met with some success (e.g., the recent acquisition of the Long Valley Farm in Cumberland County, North Carolina). Lands within the Northern Corridor are also being purchased for development. One 63-acre tract within this area was recently purchased (March 2005) and the owner is requesting to have it rezoned to allow construction of multifamily apartments.

The effects of future development within the Northern Corridor, in conjunction with the conservation of strategically positioned tracts being sought in this area would be difficult to fully quantify in the scope of this biological opinion. The purchase and rezoning of the single 63-acre tract is not expected to obviate the Northern Corridor's potential for significantly contributing to conservation of the Sandhills East population. The Service believes that continued efforts to conserve land within the Northern Corridor for providing suitable foraging habitat for RCWs will meaningfully contribute to maintaining the demographic connection between the NEA HMU and the greater Sandhills East population.

CONCLUSION

After reviewing the current status of the RCW, the environmental baseline for the action area, the effects of the proposed Fayetteville Outer Loop project, the effects of the minimization measures offered in the BA and the cumulative effects, it is the Service's biological opinion that the Fayetteville Outer Loop, as proposed, is not likely to jeopardize the continued existence of the RCW. No critical habitat has been designated for the RCW, therefore none will be affected. One RCW cluster (FB 65) will be immediately subject to "take" due to direct impacts of the project. That "take" will be accounted for through the debiting/crediting process for the Calaway Tract. The indirect harmful effects of the highway project will have more profound consequences to RCW persistence and recovery in the Sandhills East primary core population. These effects will be offset in the long term by cooperative efforts between NCDOT and other members of the NCSCP to strengthen and secure a demographic link for the RCW within the Northern Corridor.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly

impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered to be a prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the NCDOT so that they become binding conditions of any grant or permit issued to the NCDOT, as appropriate for the exemption in section 7(o)(2) to apply. The NCDOT has a continuing duty to regulate the activity covered by this incidental take statement. If the NCDOT (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permits or grant documents, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the NCDOT must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(1)(3)]

AMOUNT OR EXTENT OF TAKE ANTICIPATED

Construction of the Fayetteville Outer Loop will remove 144.3 acres of suitable and potentially suitable foraging habitat from nine active RCW territories, resulting in the cutting of 5,914.5 square feet of pines ≥10 inches DBH. The amount of acreage and basal area per cluster to be removed is listed in Table 10 below.

Table 10. Acreage and basal area removals from active foraging partitions directly affected by the Fayetteville Outer Loop

Cluster Number	Manageable acreage	Basal area of pines ≥10 inches DBH (ft ²)
FB 64	1.92	121.57
FB 65	29.35	1,401.69
FB 96	20.95	662.44
FB 97	13.39	437.41
FB 208	30.94	877.48
FB 265	0.20	2.54
FB 266	0.84	18.31
FB 267	23.37	826.35
FB 528	23.34	1,566.74

The Service anticipates that take of one group of RCWs will occur as a result of (1) cavity tree removal and (2) impacts to foraging habitat within a 1/2-mile radius of the cluster, associated with the construction of the Fayetteville Outer Loop. Four cavity trees, 29.35 acres and 1,401.7 ft² of pine basal area will be removed from the foraging habitat directly supporting the group occupying cluster 65 as a result of this project. The project will reduce the acreage of suitable foraging habitat available to cluster 65 below the SMS by about 13.1 acres.

The Service recognizes that some of the effects of the action on RCWs, when evaluated one cluster at a time, would not rise to the level of take based on effects to individual clusters and groups. However, the combined effects of habitat loss within the affected territories associated

with the project may have impacts that affect the function of the Green Belt HMU to demographically connect the NEA with the greater Sandhills East RCW population. The primary effects of this take are the diminished ability for demographic exchange of an undetermined number of individual RCWs between the NEA and Green Belt HMUs and the remainder of HMUs comprising the greater Sandhills East Primary Core Recovery Population, and the reduced potential for all-male groups and solitary males occupying territories in these HMUs to be naturally augmented by unrelated, breeding-age females. This take may result from one or more of the following: (1) harm due to loss of foraging habitat from timber clearing for road construction including loss of foraging habitat due to intraspecific competition, (2) harassment from the initial disturbance from construction, (3) harm from the diminished potential to use prescribed burning to maintain ecological functions in foraging habitat, (4) harassment from demographic isolation of clusters within 0.5 miles of the highway corridor due to the inability to aggregate clusters at a recommended density (i.e., a minimum of 4.7 active clusters within 1.25 miles), and (5) harassment from disrupted dispersal due to habitat fragmentation caused by the project footprint.

EFFECT OF THE TAKE

In the accompanying biological opinion, the Service determined that the above-estimated level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the impacts of incidental take of RCWs.

(1) NCDOT will work with the members of the NCSCP, with a reasonable effort, to acquire one piece of property in accordance with NCDOT and the Federal Highway Administration (FHWA) policies and procedures for property acquisition, in the area identified as the Northern Corridor (Figure 3). The identified property will contain approximately 75 acres of habitat that does or can support a southern yellow pine-dominated overstory and can be reasonably managed to create/maintain foraging habitat for the RCW.

(2) NCDOT will coordinate with Fort Bragg and the Service to establish and implement the best strategy for minimizing direct impacts of tree clearing and highway construction to Cluster FB 65, its resident RCW group and residual foraging and nesting habitat.

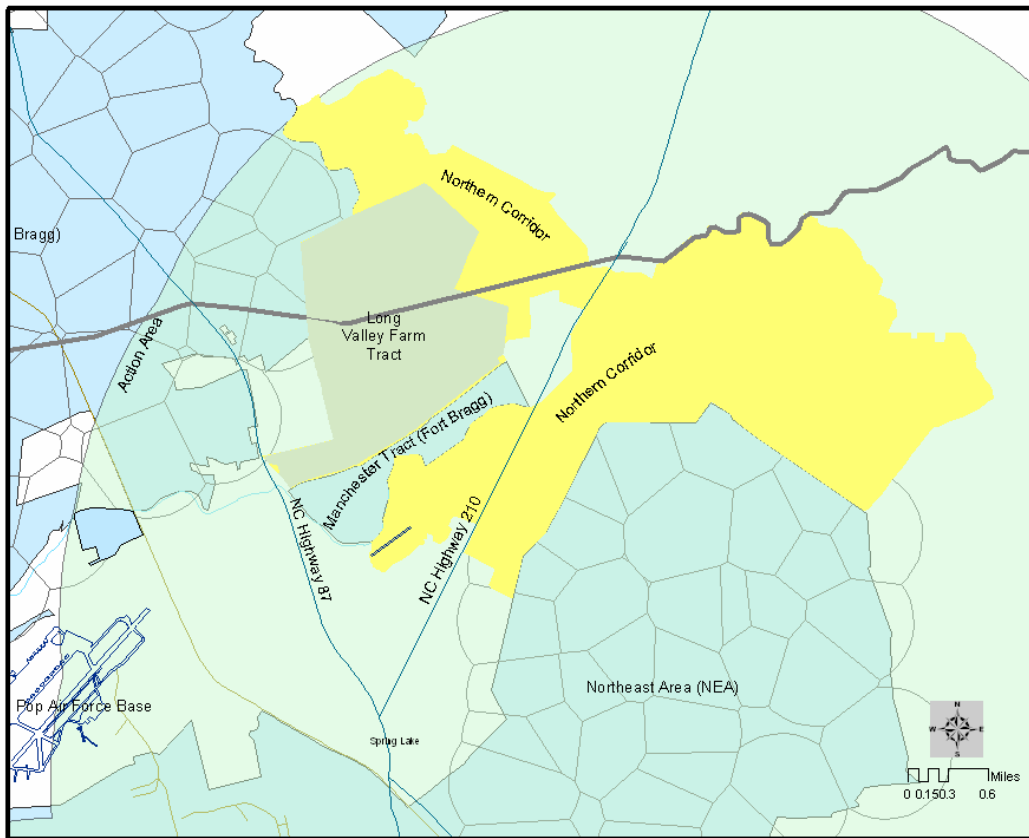


Figure 3: Northern Corridor Extent: Cumberland and Harnett Counties, North Carolina

Figure 3: Northern Corridor Extent, Cumberland and Harnett counties, North Carolina

TERMS AND CONDITIONS

In order to be exempt from prohibitions of section 9 of the Act, the NCDOT must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

(1) [RPM (1)] Upon acquisition of the conservation property, NCDOT will identify the entity or entities responsible for owning and managing the property and secure an agreement from the entity (or entities) that the property will be managed in accordance with a RCW conservation plan approved by the Service and the NCSCP. (NCDOT's obligations will not extend beyond the acquisition of the property, NCDOT's receipt of assurances from the responsible third party that the property will be managed in accordance with standards set by the NCSCP for RCW conservation, and subsequent transferal to the third party; it is not anticipated that the cost of NCDOT's obligation would exceed \$ 1.0 million).

(2) [RPM (1)] If the property is not acquired and transferred to a responsible third party at least six months prior to initiation of construction, then NCDOT, NCSCP and the Service will meet to determine an appropriate alternative that reasonably supports the objective of establishing the Northern Corridor as a demographic linkage between RCW subpopulations in the Sandhills East

primary core population (Overhills HMU) and NEA. In any case, conservation actions to fulfill this reasonable and prudent measure must occur prior to construction.

(3) [RPM (2)] Where NCDOT is able to program the timing of tree clearing and highway construction within the project area, NCDOT will, in the early stages of the planning process, schedule meetings with Fort Bragg's Directorate of Public Works and the Service to determine:

A. The best time to conduct tree clearing and/or construction activities in a manner that minimizes impacts to cluster 65 and its associated RCW group.

B. Determine the time and location where artificial cavities will be created to minimize the loss of RCWs associated with project activities.

C. Establish protective measures for trees selected and/or used to provision cavities for conserving RCWs associated with the Fayetteville Outer Loop project.

Upon locating a dead, injured, or sick individual of an endangered or threatened species, initial notification must be made to the Clemson Field Office. Additional notification must be made to the Raleigh, North Carolina Fish and Wildlife Ecological Services Field Office. Care should be taken in handling sick or injured individuals and in the preservation of specimens in the best possible state for later analysis of cause of death or injury. All procedural and reporting requirements as outlined in the Service's region-wide biological opinion on monitoring and management (Service 2003b) will be followed.

These reasonable and prudent measures, together with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than one RCW group will be incidentally taken. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking, and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on a listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend implementation of the following conservation recommendations:

(1) Coordinate/cooperate with Fort Bragg to address hardwood midstory and pine stand management issues identified in the September 7, 2004 BA where pine overstory is otherwise represented by suitable size/age classes.

(2) Fund a radio telemetry study to better understand dispersal events within the Green Belt, NEA and Overhills habitat management units on Fort Bragg Military Reservations and other appropriate RCW population units in the North Carolina Sandhills. This would assist in determining the best strategic locations for provisioning artificial clusters to encourage growth of subpopulations to meet recovery goals for the Sandhills East primary core population.

(3) Success of the Northern Corridor as a means of maintaining a demographic connection between the NEA HMU and the rest of the Sandhills primary core population would be enhanced if the gap between RCW territories in the southeast edge of the Overhills HMU and northwest NEA HMU were to close. Natural population growth for the RCW in the absence of strategically placed recruitment clusters occurs at a very low rate. By the creation and occupation of recruitment clusters in suitable foraging and nesting habitat occurring immediately adjacent to occupied RCW territories on the peripheries of these two population elements, recovery of the Sandhills East primary core population might be greatly advanced. Based on this assessment, a suitable conservation recommendation would then be to establish at least one new occupied RCW territory, adjacent to a baseline territory on either the southeast edge of the Overhills HMU and northwest NEA HMU, within the area identified as the Northern Corridor.

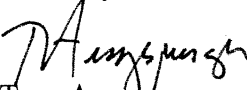
REINITIATION NOTICE

This concludes formal consultation on the action outlined in the September 7, 2004, request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary NCDOT involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species not considered in this opinion; or, (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operation causing such take must cease pending reinitiation of consultation. Because the likelihood of establishment of new groups or cavity trees increases over time, the Service strongly recommends that the NCDOT conduct an RCW survey within the year of start of construction for the Fayetteville Outer Loop. New groups or cavity trees that may be impacted by the proposed project represent new effects of the action not considered in this opinion, and would require reinitiation of consultation.

For this biological opinion the incidental take would be exceeded when the take exceeds one RCW group, which is what has been exempted from the prohibition of section 9 by this opinion. The duration of this biological opinion is from date of signature to five years after construction is complete.

The Service greatly appreciates the cooperation of the NCDOT during this consultation. We have assigned our log number Service ID# 04-S249 to this consultation; please refer to it in any future correspondence concerning this project. If you or your staff have any questions concerning this BO, please contact Mr. John Hammond of the Raleigh Field Office at (919) 856.4520 extension 28, or via email at john_hammond@fws.gov.

Sincerely,


Tom Augspurger
Acting Field Supervisor

cc: FWS, Atlanta, GA (ES/TE)
Ralph Costa, FWS, Clemson, SC
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Greg Thorpe, NCDOT Raleigh
Richard Spencer, USACE, Wilmington, NC
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Chris Militscher, USEPA, Raleigh, NC
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Glossary of Terms

Active cavity	A completed cavity or start exhibiting fresh pine resin associated with cavity maintenance, cavity construction, or resin well excavation by red-cockaded woodpeckers.
Active cavity tree	Any tree containing one or more active cavities.
Active cluster	A cluster containing one or more active cavity trees.
Augmentation	Increasing the size of a population by translocating individuals between populations.
Basal area	The area of a horizontal cross section of a tree's stem, generally measured at breast height.
Breeding dispersal	Movement of individuals between consecutive breeding locations.
Budding	One of two processes of new group formation in red-cockaded woodpeckers (see also pioneering), referring to the splitting of one territory into two.
Canopy	The uppermost layer of foliage in a forest or forest stand.
Captured cluster	A cluster that does not support its own group of red-cockaded woodpeckers, but contains active cavity trees in use or kept active by birds from a neighboring cluster.
Clearcut	An area in which all trees have been removed in one cutting.
Cluster	The aggregation of cavity trees previously and currently used and defended by a group of woodpeckers, or this same aggregation of cavity trees <i>and</i> a 61 m (200 ft) wide buffer of continuous forest. Here, the second definition is used. For management purposes, the minimum area encompassing the cluster is 4 ha (10 ac). Use of the term "cluster" is preferred over colony because colony implies more than one nest (as in colonial breeder).
Cluster, active	See active cluster.
Cluster, captured	See captured cluster.
Coastal Plain	In the United States, an ecoregion or physiographic province located near the Atlantic Ocean or Gulf of Mexico.

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Cooperative breeding	A breeding system in which one or more adults assist a breeding pair in rearing of young. These extra adults, called helpers, delay their own dispersal and reproduction and are generally related to the offspring of the breeding pair.
Dispersal	Movement of individuals from natal to first breeding location (natal dispersal), or between consecutive breeding locations (breeding dispersal).
Ecoregion	A system of classification based on physiography.
Effective population size	The size of the ideal, hypothetical population in which all individuals mate randomly and all contribute equally to reproduction. Variation in reproductive success and other processes in a real population affect how many genes are conserved in subsequent generations. The concept of effective population size is used to control for the effects of such processes when discussing genetic conservation.
Environmental stochasticity	Random changes in environmental conditions and their effects on populations.
Even-aged management	A silvicultural method designed primarily for timber production, in which all trees in a stand are of one age/size class. The forest is regulated by developing equal areas in each age/size class.
Extirpation	Loss of a population or all populations within a specified region.
Flatwoods	Mesic pine communities on the Gulf and Atlantic Coastal Plains with a well-developed woody shrub or midstory layer.
Floater	An adult bird not associated with a breeding group.
Forb	A herbaceous plant that has broad leaves; not a grass.
Fragmentation	Habitat loss that results in isolated patches of remaining habitat.
Gene flow	The movement of genetic material among populations or within a population.
Genetic drift	Random sampling of genetic resources within a population from one generation to the next. In populations of finite size, this sampling will always result in loss of variation. In populations of large size, such loss may be offset by new variation arising through mutation.

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Genetic stochasticity	Random changes in gene frequencies.
Group	The social unit in red-cockaded woodpeckers, consisting of a breeding pair with one or more helpers, a breeding pair without helpers, or a solitary male.
Habitat selection	Use of a resource above what is expected based on the availability of that resource.
Heartwood	The inner, un-living, inactive core of a tree.
Helper	An adult that delays its own reproduction to assist in the rearing of another breeding pair's young. Typically, helpers are related to the breeding pairs that they assist.
Herbs	Grasses and forbs.
Herbaceous	Non-woody.
Heterozygosity	Genetic diversity within an individual or population, as measured by the proportion of loci containing two different alleles.
Home range	The area supporting the daily activities of an animal, generally throughout the year.
Homozygosity	Genetic similarity within an individual or population, as measured by the proportion of loci containing two identical alleles.
Immigration	Movement of one or more individuals into a population.
Inbreeding	Mating between relatives.
Inbreeding depression	Loss of fitness due to the increase in homozygosity that results from inbreeding.
Increasing population trend, recommended rate of	Five percent increase in active clusters from one year to the next.
Kleptoparasitism	Theft by one species of resources procured by another species, resulting in positive effects for the parasite and negative effects for the species being parasitized. Generally this term is applied to theft of food, but has recently been expanded to include theft of spatial resources.

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Local adaptation	Traits conferring higher fitness in a local environment.
Metapopulation	A set of interacting populations.
Midstory	A layer of foliage intermediate in height between canopy and groundcover, litter layer, or soil surface.
Mission Compatible Goal	A military installation's known capacity to integrate RCW management with on-going/planned mission requirements, determined in consultation with the Service.
Mitigation	Reduction of negative impacts.
Mutation	A heritable change in a DNA molecule.
Natal dispersal	Movement of individuals from their place of birth to their first breeding location.
Partition	The geographic area, potentially extending out to a one half-mile radius from the center of a cluster, in which habitat is managed to support an RCW group. A partition boundary will not reach out to a half-mile where it abuts the partition of another cluster with an epicenter less than one mile from the first cluster.
Pioneering	One of two processes of new group formation in red-cockaded woodpeckers (see also budding), by which a group colonizes previously unoccupied areas. Because of the difficulty of cavity excavation, this process occurs at very low frequencies.
Plate	On a cavity tree, the area surrounding the cavity entrance where bark has been removed by red-cockaded woodpeckers. Newly completed cavities may not exhibit a well-developed plate.
Pocosin	A wetland dominated by a dense cover of evergreen and deciduous shrubs.
Population	A group of individuals of the same species occupying a given area. Methods of specifying such an area may differ according to purpose. A common specification is the area within which gene flow is sufficient to avoid genetic differentiation.
Population augmentation	Translocation between populations to increase population size.
Population dynamics	Properties of a population such as trend and regulation of population

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	size.
Population trend	See increasing population trend, decreasing population trend, and stable population trend.
Potential breeding group	An adult female and adult male that occupy the same cluster, whether or not they are accompanied by a helper, attempt to nest, or successfully fledge young.
Predation	The acquisition of food by killing and eating another organism.
Prescribed burning	Fire applied to the landscape to meet specific management objectives.
Primary cavity nester	Species that nest in cavities they created.
Primary core population	A population identified in recovery criteria that will hold at least 350 potential breeding groups at the time of and after delisting. Defined by biological boundaries.
Recovery	Species viability.
Recovery population	One of a set of populations designated as necessary for the recovery of the species.
Recovery Standard	A set of guidelines to direct forest management within foraging partitions for the conservation and recovery of the RCW. Implementing these guidelines should not only ensure that RCW populations remain stable but should result in increased population viability.
Recovery unit	One of a set of geographical areas, delineated according to ecoregions, that likely represent broad-scale geographic and genetic variation in red-cockaded woodpeckers. Viable populations in each recovery unit, to the fullest extent that available habitat allows, are considered essential to the recovery of the species.
Recruitment	The addition of individuals into a breeding population through reproduction and/or immigration and attainment of a breeding position.
Recruitment cluster	A cluster of artificial cavities in suitable nesting habitat, located close to existing groups.
Regeneration	A silvicultural method of simultaneously harvesting and establishing reproduction in a stand of trees.

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Regulation	A process of implementing silvicultural techniques to establish equal areas of tree size classes, to sustain a given level of timber production over time.
Reintroduction	Translocation of individuals from a captive or wild population to previously occupied, but currently unoccupied habitat.
Resinosis	A process through which injured sapwood in a pine tree becomes saturated with hardened resin, reducing and eventually preventing loss of resin.
Resin well	A wound in a pine tree's cambium, created and maintained by red-cockaded woodpeckers, for the purpose of resin production.
Restrictors	Metal plates used to prevent or repair enlargement of cavity entrances.
Rotation	In even-aged management of forests, the number of years between regeneration events.
Sandhills	Xeric and sub-xeric longleaf pine communities on deep sandy soils. Also, the ecoregion encompassing the Fall-line Sandhills communities, between the mid- and south-Atlantic Coastal Plains and Piedmont.
Sapwood	The outer, active layer of tissue in a tree, lying just inside the cambium.
Savanna	A mesic and seasonally wet pine community, often transitional between xeric pine systems and wetlands, characterized by diverse grass and forb groundcovers.
Secondary cavity nester	Species that inhabit cavities they did not create.
Secondary core population	A population identified in recovery criteria that will hold at least 250 potential breeding groups at the time of and after delisting. Defined by biological boundaries.
Seed-tree	A method of timber regeneration in which most trees in a site are cut, and tree seedlings become established under remnant large trees. Remnant large trees are retained at lower densities than under the shelterwood method.
Selection cutting	A method of timber regeneration in which single trees or patches of trees (0.8 ha or less, 2 ac or less) are cut.

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Shelterwood	A method of timber regeneration in which many, but not all trees in a site are cut, and tree seedlings become established under remnant large trees. Remnant large trees are retained at higher densities than under the seed-tree method.
Silviculture	The theory and practice of controlling the establishment, composition, structure, and growth of forests to achieve management objectives. Silviculture was developed primarily for the purpose of timber production, but can be used for other purposes including biological conservation.
Snag	A standing, dead tree.
Solitary male	An unpaired male that is the sole resident of a cluster.
Stable population	A population that exhibits neither an increasing or decreasing population trend.
Stand	A silvicultural term for an area of trees that is or has been treated as a single management unit.
Standard for Managed Stability	Guidelines for forest management that will result in the conservation of the bare minimum foraging and nesting resources required for sustaining an active cluster. Adherence to these guidelines would prevent a direct “take” of RCWs (as defined by section 9 of the ESA), but does not address the long term sustenance and recovery of RCW populations.
Start	An incomplete cavity.
Strategic recruitment	Placement of recruitment clusters in locations strategically chosen to enhance the spatial arrangement of breeding groups. Breeding groups aggregated in space rather than isolated are beneficial to population dynamics and viability.
Stochasticity	Random events.
Support population	All known populations not designated as a primary or secondary core are designated support populations. Support populations (other than essential supports) are defined by ownership rather than biological boundaries. There are three classifications for support populations: 1. Essential support populations are those populations, identified in recovery criteria, that represent unique or important habitat types that cannot support a larger, core population. They are located on federal and state lands and two private properties. 2. Significant support populations are populations, not identified in recovery criteria, that

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	<p>contain and/or have a population goal of 10 or more active clusters. They are located on federal and state lands and on private lands enrolled in agreements with the U.S. Fish and Wildlife Service. 3. Important support populations are populations, not identified in recovery criteria, that contain and have a population goal of less than 10 active clusters. They are located on federal and state lands and on private lands enrolled in agreements with the U.S. Fish and Wildlife Service.</p>
Take	<p>As defined by the Endangered Species Act, take means to “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (Section 3.18 of the Act). Habitat destruction and alteration are considered forms of take, following a Supreme Court ruling on this issue (Sweet Home vs. Babbitt).</p>
Taxonomy	<p>Hierarchical classification system for all life forms.</p>
Territory	<p>A region within an animal’s home range that is defended from conspecifics.</p>
Thinning	<p>A silvicultural treatment removing some trees in a stand to reduce tree density.</p>
Translocation	<p>The artificial movement of wild organisms between or within populations to achieve management objectives. Originally, translocation referred to the movement of animals from captive to wild populations, but the term has been expanded to include movements (by artificial means) within and between wild populations.</p>
Two-aged management	<p>A silvicultural method designed primarily for timber production, in which trees of two age/size classes are present in the same stand. The forest is regulated by developing equal areas in each age/size class.</p>
Uneven-aged management	<p>A silvicultural method designed primarily for timber production, in which trees of at least three age classes are present in the same stand. Stands are regulated by size class structure or volume.</p>
Viability	<p>The ability of a population or species to persist over time.</p>