Tidal Extent - Wind Driven Water Levels (WDWL), August 2019 - NC Department of Transportation

Geodatabase Feature Class

Tags Tides, tidal, Wind Driven Water Levels, WDWL, high tide, astronomical tide, tidal effects, lunisolar tide, wind tide, wind-driven water, National Oceanographic and Atmospheric Administration, NOAA, Office of Coastal Management, OCM, QL2, LiDAR, Digital Elevation Model, US Geological Survey, USGS, Hydrologic Unit, HU, fresh water, salt water, flooding, Oceans, Transportation, NCDOT, Environment, Location, North Carolina, ATLAS

Summary

This dataset was originally created in July 2019 as part of the Project ATLAS initiative at NCDOT to support the Sweeping Environmental Group with project delivery in the development phase.
While tidal action is composed of many constituents, the most prevalent components are the gravitational forces of the sun and moon, which form the foundation of the semidiurnal tidal cycle. Additionally, wind is a key factor in tide formation. Areas represented in this layer are the extents of wind driven tides in the large open waters of Albemarle and Pamlico Sounds.
These data are used in the following workflows:
• NRTR
• PCE
• Mitigation
• Permitting
o Section 10, 401, 404 Permit Type
o Nationwide
o General,
o Individual,
o Water Quality Certifications
• US Coast Guard
• CAMA AECs
• CAMA Consistency,
• CAMA Major

Description

The Tidal Extent Wind Driven Water Levels (WDWL) dataset is a polygon layer depicting the areas of wind driven tidal impact.

The change in water levels due to wind were added to the MHHW elevation where this addition made a meaningful change to water elevation. A meaningful change was defined as raising the water elevation at least 0.5-foot higher than the predicted or observed MHHW elevation. It should be noted that, due to rounding, as little as a 0.25-foot rise in water elevation due to wind could change the predicted maximum water elevation by 0.5 foot.The combination of the MHHW level in conjunction with the additional wind-driven water rise (where applicable) was established for each 15-digit HU as the Maximum Water Elevation (MWE). 15-digit Hucs that are not subject to wind-driven tides have a

MWE that is equal to the MHHW level.
Datasets developed under Project ATLAS do not replace any Sweeping Environmental field work for future projects and may not be used as a replacement for site visits / field surveys by licensed professionals and hence should be used only as a supporting platform for decision making. Use of this dataset for project scoping or screening is merely pre-decisional.

Credits

The ATLAS Sweeping Environmental Group within NCDOT was tasked to create this dataset. Annual maintenance of this dataset is handled by the Sweeping Environmental Group. Support and maintenance of the enterprise spatial database where this data resides is handled by NCDIT's Transportation GIS Unit.

Use limitations

The North Carolina Department of Transportation shall not be held liable for any errors in this data. This includes errors of omission, commission, errors concerning the content of the data, and relative and positional accuracy of the data. This data cannot be construed to be a legal document. Primary sources from which this data was compiled must be consulted for verification of information contained in this data.

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Extent

West -78.575565
East -75.417405
North 36.589365
South 33.795245

Scale Range

Maximum (zoomed in) 1:5,000
Minimum (zoomed out) 1:625,000

Topics and Keywords

Themes or categories of the resource Oceans, Boundaries, Inland Waters, Location, Transportation, Environment

Content type Downloadable Data

Export to FGDC CSDGM XML format as Resource Description No

Theme keywords Tides, tidal, Wind Driven Water Levels, WDWL, high tide, astronomical tide, tidal effects, lunisolar tide, wind tide, wind-driven water, National Oceanographic and Atmospheric Administration, NOAA, Office of Coastal Management, OCM, QL2, LiDAR, Digital Elevation Model, US Geological Survey, USGS, Hydrologic Unit, HU, fresh water, salt water, flooding, Oceans, Transportation, NCDOT, Environment, Location, North Carolina, ATLAS

Thesaurus

Title User
Creation date 2019-07-23 00:00:00
Publication date 2019-08-28 00:00:00

Place keywords North Carolina

Thesaurus

Title User
Creation date 2019-07-23 00:00:00
Publication date 2019-08-28 00:00:00

Citation

Title Tidal Extent - Wind Driven Water Levels (WDWL), August 2019 - NC Department of Transportation

Creation date 2019-01-01 00:00:00

Publication date 2019-08-28 00:00:00

Presentation formats digital map

FGDC geospatial presentation format vector digital data

Citation Contacts

Responsible party - point of contact

Organization's name North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
Contact's position Environmental Program Consultant

Contact information

Phone
Voice 919-707-6136

Address
Type physical
Delivery point 4101 Capital Boulevard
City Raleigh
Administrative area NC
Postal code 27604
Country US
e-mail address ATLAS@ncdot.gov

Hours of service
9:00am – 5:00pm Monday - Friday

Contact instructions
Please send an email with any issues, questions or comments regarding the ATLAS Data Search Tool, ATLAS Screening Tool or ATLAS Workbench. If it is an immediate need, please call the contact number or indicate as such in the subject line in an email.

Responsible party - resource provider

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Responsible party - originator

Organization's name North Carolina Department of Transportation - Sweeping Environmental Group
Contact's position Environmental Program Consultant
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Resource Details

Dataset languages English (UNITED STATES)
Dataset character set utf8 - 8 bit UCS Transfer Format

Status completed
Spatial representation type vector

Processing environment Version 6.2 (Build 9200) ; Esri ArcGIS 10.5.1.7333

Credits

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Extents

Extent

Description

Data collection is complete.

Geographic extent

Bounding rectangle

West longitude -84.422111
East longitude -75.416034
South latitude 33.730557
North latitude 36.617257
Extent contains the resource Yes

Temporal extent

Beginning date 2019-07-23 00:00:00
Ending date 2019-07-23 00:00:00

Extent

Geographic extent

Bounding rectangle

Extent type Extent used for searching
West longitude -78.575565
East longitude -75.417405
North latitude 36.589365
South latitude 33.795245
Extent contains the resource Yes

Extent in the item's coordinate system

westBL 2128900.770501
eastBL 3052432.861753
southBL 34832.019113
northBL 1033754.499939
exTypeCode Yes

Resource Points of Contact

Point of contact - originator

Organization's name North Carolina Department of Transportation - Sweeping Environmental Group

Contact's position Environmental Program Consultant

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Resource Maintenance

Resource maintenance

Update frequency annually

Scope of the updates dataset

Other maintenance requirements

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This dataset should be updated on a regular cycle as:

1. Better data and models are developed (ongoing),
2. Input from natural resource agencies refines specific water elevations,
3. better input data becomes available in the form of LiDAR or other data to refine model accuracy (anticipated to be part of the regular 5-year collection cycle

Maintenance contact - originator

Organization's name North Carolina Department of Transportation - Sweeping Environmental Group

Contact's position Environmental Program Consultant

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Resource Constraints

Legal constraints

Limitations of use

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Security constraints

Classification unclassified

Classification system None

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Spatial Reference

ArcGIS coordinate system

Type Projected

Geographic coordinate reference GCS_North_American_1983

Projection NAD_1983_StatePlane_North_Carolina_FIPS_3200_Feet

Coordinate reference details

ProjectedCoordinateSystem

WKID 102719
XOrigin -121841900
YOrigin -93659000
XYScale 3048.0060960121928
ZOrigin -100000
ZScale 10000
MOrigin -100000
MScale 10000
XYTolerance 0.0032808333333333331
ZTolerance 0.001
MTolerance 0.001
HighPrecision true
LatestWKID 2264
VCSWKID 105703
LatestVCSWKID 6360
WKT
PROJCS["NAD_1983_StatePlane_North_Carolina_FIPS_3200_Feet",GEOGCS["GCS_North_American_1983",DATUM["
79.0],PARAMETER["Standard_Parallel_1",34.33333333333334],PARAMETER["Standard_Parallel_2",36.16666666666

Reference system identifier

Value 2264
Codespace EPSG
Version 6.12(9.0.0)

Spatial Data Properties

Vector

Level of topology for this dataset geometry only

Geometric objects

Feature class name WindDrivenWaterLevels
Object type composite
Object count 764

ArcGIS Feature Class Properties

Feature class name WindDrivenWaterLevels
Feature type Simple
Geometry type Polygon
Has topology FALSE
Feature count 764
Spatial index TRUE
Linear referencing FALSE

Data Quality

Scope of quality information

Resource level dataset

Data quality report - Completeness omission

Data quality measure reference

Measure description

After processing, the dataset is checked for drawing display and number of records and file sizes compared with source materials.

Conformance test results

Test passed Yes

Result explanation

Pass

Product specification

Title NCDOT Geospatial Data Specifications

Creation date 2019-07-23 00:00:00

Publication date 2019-08-28 00:00:00

Data quality report - Conceptual consistency

Data quality measure reference

Measure description

The dataset is converted to file geodatabase (FGDB) format using tools in ArcGIS. The geometry is checked, and if needed repaired.

Conformance test results

Test passed Yes

Result explanation

Pass

Product specification

Title NCDOT Geospatial Data Specifications

Creation date 2019-07-23 00:00:00

Publication date 2019-08-28 00:00:00

Data quality report - Quantitative attribute accuracy

Data quality measure reference

Measure description

Geometry checks were conducted using ESRI's Data Reviewer tool.

Conformance test results

Test passed Yes

Result explanation
Pass

Product specification
Title NCDOT Geospatial Data Specifications
Creation date 2019-07-23 00:00:00
Publication date 2019-08-28 00:00:00

Lineage
Lineage statement
In order to establish the range of regular effects generated by winds, wind data were obtained from the Natural Resource Conservation Service (NRCS) National Water and Climate Center (NWCC) in Wind Rose format (https://www.wcc.nrcs.usda.gov/climate/windrose.html). Relevant wind data are provided by the NRCS NWCC for Wilmington and Cape Hatteras and are based on hourly data generated from NOAA's Solar and Meteorological Surface Observation Network (SAMSON). These raw data are available from NOAA's National Climatic Data Center (NCDC) and are based on records from 1961 to 1990. Wind rose data provide wind direction and speed information for each month of the year. These data were plotted to determine mean wind speeds and directions for each month. For the purposes of this project, regular winds were determined to be those falling within one Standard Deviation of the monthly mean wind direction and speed. These regular winds were then used in conjunction with USGS water elevation change formulas to determine the change in water elevation for various points surrounding the Albemarle and Pamlico Sounds, the smaller open waters of sounds including Core Sound, Bogue Sound, and Back Sound, and large river systems including the Alligator River, White Oak River, New River, and Cape Fear River.

Process step
Description
Geodatabase was forwarded on to the GIS Unit for publishing as part of data for project ATLAS.

Process contact - originator
Organization's name North Carolina Department of Transportation - Sweeping Environmental Group
Contact's position Environmental Program Consultant
Contact information
Phone
Voice 919-707-6136
Address
Type physical
Delivery point 4101 Capital Boulevard
City Raleigh
Administrative area NC
Postal code 27604
Country US
e-mail address ATLAS@ncdot.gov
Hours of service
9:00am – 5:00pm Monday - Friday

Contact instructions

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Process step

Description

Data was reviewed in ESRI's Data Reviewer tool to verify geometry.

Process contact - originator

Organization's name North Carolina Department of Transportation - Sweeping Environmental Group

Contact's position Environmental Program Consultant

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Process step

Description

The combination of the MHHW level in conjunction with the additional wind-driven water rise (where applicable) was established for each 15-digit HU as the Maximum Water Elevation (MWE). 15-digit HUs that are not subject to wind-driven tides have a MWE that is equal to the MHHW level. Elevation contours reflecting the MWE values were generated from QL2 data for each 15-digit HU and were used (where possible) to assess the accuracy of the predicted elevation using 2012 aerial photography (latest imagery available at the time of wind-driven effect calculations). Elevation contours were compared specifically with areas containing docks, boat ramps, maintained lawns, and agricultural areas. Areas of discrepancy were noted, but ranged to 0.5-foot in only five (approximately 1.6%) 15-digit HUs, which were adjusted appropriately. Final MWE values range from 0.0 feet (NAVD88) to 2.5 feet (NAVD88).

Process contact - originator

Organization's name North Carolina Department of Transportation - Sweeping Environmental Group

Contact's position Environmental Program Consultant

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Distribution

Distributor

Contact information - distributor

Organization's name North Carolina Department of Transportation - EAU Mitigation and Modeling Unit

Contact's position Environmental Program Consultant

Contact information

Phone

Voice 919-707-6136

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Distribution format

Name File Geodatabase Feature Class
Version 10.5

Fields

Details for object WindDrivenWaterLevels

Type Feature Class
Row count 764
Definition
Extents of wind driven tides in the large open waters of Albemarle and Pamlico Sounds

Definition source
NCDOT

Field OBJECTID

Alias OBJECTID
Data type OID
Width 4
Precision 0
Scale 0
Field description
Internal feature number.

Description source
Esri

Description of values
Sequential unique whole numbers that are automatically generated.

Field Shape

Alias Shape
Data type Geometry
Width 0
Precision 0
Scale 0
Field description
Feature geometry.

Description source
Esri

Description of values
Coordinates defining the features.

Field HUcode8

Alias HUcode8
Data type String
Width 8
Precision 0
Scale 0
Field description
8-digit Hydrologic Unit

Description source
NCDOT

Field AreaInAcres

Alias AreaInAcres
Data type Double
Width 8
Precision 0
Scale 0
Field description
Area of polygon shapes, acres

Description source
NCDOT

Field AreaInSqmi

Alias AreaInSqmi
Data type Double
Width 8
Precision 0
Scale 0
Field description
Area of polygon shapes, square miles

Description source
NCDOT

Field StnMHHW

Alias StnMHHW
Data type Single
Width 4
Precision 0
Scale 0
Field description

MHHW Station datum for HU15 where available

Description source
NCDOT

Field MHHWElev

Alias MHHWElev
Data type Single
Width 4
Precision 0
Scale 0
Field description
MHHW water elevations, NAVD88, feet, 0.5-foot increments

Description source
NCDOT

Field MaxWElev

Alias MaxWElev
Data type Single
Width 4
Precision 0
Scale 0
Field description
Maximum wind-driven water elevations, NAVD88, feet, 0.5-foot increments

Description source
NCDOT

Field TIZSect

Alias TIZSect
Data type String
Width 12
Precision 0
Scale 0
Field description
General area of tidal mapping (northern, central, southern)

Description source
NCDOT

Field ElevDiff

Alias ElevDiff
Data type Single

Width 4
Precision 0
Scale 0
Field description
Difference in elevation between Max_W_Elev and MHHW Elev, feet

Description source
NCDOT

Field SaltFresh

Alias SaltFresh
Data type String
Width 12
Precision 0
Scale 0
Field description
Approximation of dominance by salt/fresh water

Description source
NCDOT

List of values
Value Salt
Description Salt
Enumerated domain value definition source NCDOT
Value Fresh
Description Fresh
Enumerated domain value definition source NCDOT

Field Shape_Length

Alias Shape_Length
Data type Double
Width 8
Precision 0
Scale 0
Field description
Length of feature in internal units.

Description source
Esri

Description of values
Positive real numbers that are automatically generated.

Field Shape_Area

Alias Shape_Area

Data type Double
Width 8
Precision 0
Scale 0
Field description
Area of feature in internal units squared.

Description source
Esri

Description of values
Positive real numbers that are automatically generated.

Field HUcode15

Alias HUcode15
Data type String
Width 15
Precision 0
Scale 0
Field description
15-digit HU (created for tidal extent)

Description source
NCDOT

Metadata Details

Metadata language English (UNITED STATES)
Metadata character set utf8 - 8 bit UCS Transfer Format

Scope of the data described by the metadata dataset
Scope name dataset

Last update 2020-02-05

ArcGIS metadata properties

Metadata format ArcGIS 1.0
Standard or profile used to edit metadata ISO19139
Metadata style ISO 19139 Metadata Implementation Specification
Created in ArcGIS for the item 2026-08-26 13:45:00
Last modified in ArcGIS for the item 2020-02-05 13:36:22
Automatic updates
Have been performed Yes
Last update 2020-02-05 13:36:22

Metadata Contacts

Metadata contact - point of contact

Organization's name North Carolina Department of Transportation - EAU Mitigation and Modeling Unit
Contact's position Environmental Program Consultant

Contact information

Phone

Voice 919-707-6136

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Metadata Maintenance

Maintenance

Update frequency as needed
Other maintenance requirements

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Maintenance contact - originator

Organization's name North Carolina Department of Transportation - Sweeping Environmental Group
Contact's position Environmental Program Consultant

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Metadata Constraints

Security constraints

Classification unclassified

Classification system None

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Thumbnail and Enclosures

Thumbnail

Thumbnail type

Image file