



NORTH CAROLINA OFFICE OF RECOVERY AND RESILIENCY

**NORTH CAROLINA DEPARTMENT OF PUBLIC SAFETY**  
OFFICE OF RECOVERY AND RESILIENCY

# Review of Climate Resilience Data Covering North Carolina

Climate Resilience DataPalooza  
December 15, 2021

In November and December 2021, state agencies, universities, nonprofits, and other entities submitted information about their datasets related to North Carolina climate and natural hazards resilience to the North Carolina Office of Recovery and Resiliency (NCORR). This document serves as a compilation of that information in preparation for NCORR's first Climate Resilience DataPalooza event.

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# LiDAR Elevation Data

## NC EMERGENCY MANAGEMENT - RISK MANAGEMENT OFFICE

The North Carolina LiDAR data are remotely sensed high-resolution elevation data collected by an airborne platform. The lidar sensor uses a combination of laser range finding, GPS positioning, and inertial measurement technologies. The lidar systems collect data point clouds that are used to produce highly detailed Digital Elevation Models (DEMs) of the earth's terrain, man-made structures, and vegetation.

### Relevance to Climate Resilience

LiDAR data point clouds are used to produce highly detailed Digital Elevation Models (DEMs) of the earth's terrain, man-made structures, and vegetation. They can be used to generate topography and vegetation height maps for flood modeling, loss of vegetation, debris deposits, and, in some cases, sea level rise.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Direct Download
<b>Data are located at:</b>	These data are available for download via clip-and-ship on the North Carolina Spatial Data Download page ( <a href="http://sdd.nc.gov">sdd.nc.gov</a> ). Larger datasets may be requested in writing to <a href="mailto:rmclipandship@ncdps.gov">rmclipandship@ncdps.gov</a> .
<b>Data are available for:</b>	2014-2017
<b>Data were last updated:</b>	2017

### Description

<b>Data status:</b>	Final
<b>Data source:</b>	Original Data
<b>File formats and approximate file sizes:</b>	LiDAR is available as fully classified LAS masspoints and DEM rasters. LAS files can range in size from a couple of MB to a couple of GB. DEM Rasters are significantly smaller.
<b>Data are measured at this interval:</b>	As needed and funds allow;
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Statewide
<b>Geographic coverage:</b>	The State of North Carolina

### Contact

Daniel Madding | IT Application/GIS Manager | NCEM Risk Management | [daniel.madding@ncdps.gov](mailto:daniel.madding@ncdps.gov) | 919-825-233

# North Carolina Orthoimagery

## NC CENTER FOR GEOGRAPHIC INFORMATION AND ANALYSIS

This data contains the most recent imagery collected by the NC Orthoimagery Program for any given area of North Carolina.

### Relevance to Climate Resilience

Data shows the geographic distribution of features on land at the specific time the photograph was taken. Different years of photography can be compared to show landform and structure change.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Maps; API; Direct Download

**Data are located at:**

<https://www.nconemap.gov/datasets/nconemap::latest-orthoimagery/about>

**Data are available for:**

2010 - all of NC. From 2012 to present 1/4 of the state is captured annually. See <https://www.nconemap.gov/pages/imagery> for details.

**Data were last updated:**

21-Feb

### Description

**Data status:**

Final

**Data source:**

Original Data

**File formats and approximate file sizes:**

Data currently in SID format. File sizes vary according to county, currently between 820MB and 27GB. Individual 5000ft x 5000ft tiles are also available. These are approximately 15MB in size.

**Data are measured at this interval:**

Annually

**Is this spatial data?**

Yes

**Spatial scale:**

County-level

**Geographic coverage:**

All of NC

### Contact

David Giordano | NC OneMap Database Administrator | NC Center for Geographic Information and Analysis | [david.giordano@nc.gov](mailto:david.giordano@nc.gov)

# North Carolina Parcels

## NC CENTER FOR GEOGRAPHIC INFORMATION AND ANALYSIS

This digital geospatial dataset represents parcel boundaries with standard core attributes for a collection of parcel data from North Carolina county data producers and the Eastern Band of Cherokee Indians. The aggregated dataset is intended to facilitate the sharing, display, and use of cadastral data across the state, with the goal of building a seamless parcel map for North Carolina.

### Relevance to Climate Resilience

Data shows property ownership (public and private) with related related data including land values that can be used for potential property loss estimates in response to natural disasters.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Maps; Charts; Tables; API; Direct Download

**Data are located at:**

<https://www.nconemap.gov/datasets/nconemap::north-carolina-parcels-polygons/about>

**Data are available for:**

The current year

**Data were last updated:**

Data are uploaded by counties every 6 months, some more frequently.

### Description

**Data status:**

Final

**Data source:**

Data aggregated from another source

**File formats and approximate file sizes:**

File sizes depend on number of parcels per county. ZIP file sizes range from 3MB to 240MB.

**Data are measured at this interval:**

(Not provided)

**Is this spatial data?**

Yes

**Spatial scale:**

County-level

**Geographic coverage:**

All of NC

### Contact

David Giordano | NC OneMap Database Administrator | NC Center for Geographic Information and Analysis | [david.giordano@nc.gov](mailto:david.giordano@nc.gov)

# Cardinal Data Retrieval System (climate dataset aggregator)

## NORTH CAROLINA STATE CLIMATE OFFICE

The Cardinal Data Retrieval System combines surface weather observations from a variety of sources (e.g., NOAA, USFS, NC Climate Office) into a 'one-stop-shop' for accessing recent and historic observations of atmospheric and near-surface (i.e. soil moisture, soil temperature) parameters.

### Relevance to Climate Resilience

By aggregating different datasets into one location, users can quickly and efficiently obtain historic observations for a range of parameters without having to navigate different systems. The data itself is available for historic periods all the way to the present, enabling users to examine changes to our climate system.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Charts; Tables; Direct Download
<b>Data are located at:</b>	<a href="https://products.climate.ncsu.edu/cardinal/">https://products.climate.ncsu.edu/cardinal/</a>
<b>Data are available for:</b>	1900-2021. Some locations will have data dating a little before this, while some are more recent.
<b>Data were last updated:</b>	Nov-21

### Description

<b>Data status:</b>	Final
<b>Data source:</b>	Data is original and aggregated from another source
<b>File formats and approximate file sizes:</b>	Excel spreadsheet; comma-delimited; tab-delimited; downloadable chart
<b>Data are measured at this interval:</b>	Some at hourly, some at daily
<b>Is this spatial data?</b>	No
<b>Additional information about the data:</b>	Data is publicly available and free, but does require users to create an account (using an email).

### Contact

Rebecca Ward | Assistant State Climatologist | North Carolina State Climate Office / NC State University | [rebecca\\_ward@ncsu.edu](mailto:rebecca_ward@ncsu.edu) | 919-513-2444

# CLOUDS API

## NORTH CAROLINA STATE CLIMATE OFFICE

A data repository of weather, climate, and water data across North Carolina

### Relevance to Climate Resilience

Contains both short-term and long-term historical weather observations across the state.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Maps; Charts; Tables; API; Direct Download

**Data are located at:**

<https://api.climate.ncsu.edu>

**Data are available for:**

1900s onward, most data is available 1980 - now

**Data were last updated:**

Today

### Description

**Data status:**

Provisional

**Data source:**

Data is original and aggregated from another source

**File formats and approximate file sizes:**

Raw data stored in MariaDB, output data available in various formats and sizes

**Data are measured at this interval:**

Subhourly, hourly, and daily

**Is this spatial data?**

Yes

**Spatial scale:**

Point based stations

**Geographic coverage:**

Entire state of NC, including some neighboring and offshore stations

### Contact

John McGuire | Data Manager and Applied Meteorologist | NC State Climate Office | [jamcguir@ncsu.edu](mailto:jamcguir@ncsu.edu) | 919-515-0412



# Coastal Roadway Inundation Simulator (CRIS)

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

This application was developed through a partnership with NCDOT and NCEM to simulate and quantify the effects of coastal flood inundation on our transportation system. This application leverages the latest NC QL2 LiDAR (2014-2015) to assign road centerline elevations (NAVD88FT) to the road network. Inundation boundaries are produced from the same bare earth LiDAR sources and are depicted as all points on the ground at or below the selected inundation elevation (NAVD88 FT). This application will compare the roadway elevations against the selected inundation profile and report depths of flooding at horizontal intervals of 50 feet. Total mileage and other length-based metrics are determined by totaling the number of queried inundation points and multiplying by 50.

### Relevance to Climate Resilience

This information can be a resource to identify potential areas that could flood in the future due to storm surge up to 17 feet based on the existing road elevation. This data could be used to plan for more resilient designs.

### Availability and Accessibility

<b>Accessible to the public?</b>	No
<b>Accessibility format:</b>	Not provided
<b>Data are located at:</b>	The data can be requested at <a href="mailto:resilience@ncdot.gov">resilience@ncdot.gov</a> . The data will be ready in early 2022.
<b>Data are available for:</b>	n/a
<b>Data were last updated:</b>	Dec-21

### Description

<b>Data status:</b>	Provisional
<b>Data source:</b>	Data aggregated from another source
<b>File formats and approximate file sizes:</b>	kml and csv
<b>Data are measured at this interval:</b>	Not provided
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Street level
<b>Geographic coverage:</b>	NC coastal counties only
<b>Additional information about the data:</b>	Data presented in this application should be considered for planning purposes only. Inundation data is not forecasted in real-time and may not be universally representative of the entire coast.

### Contact

Nastasha Earle-Young | Statewide Initiatives Engineer | NCDOT | [resilience@ncdot.gov](mailto:resilience@ncdot.gov)

# NC King Tides Project

UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL, UNIV OF DELAWARE, NOAA

Since fall 2015, the NC King Tides project (NCKT: <https://nckingtides.web.unc.edu/>) has two main datasets: (1) "daily" water level records from gauges referenced to NAVD88 reported by trained citizen scientists; and (2) imagery (photos, videos, aerial imagery) of coastal water levels, often during high water events, reported by all citizen scientists.

## Relevance to Climate Resilience

The NCKT database documents site- and time- specific water levels (relative to NAVD88) at numerous sites where such data does not otherwise exist. Our imagery database visually documents water levels, flooding, and coastal inundation and also includes geographic coordinates, date, and time data. Paring known water levels with visual data are highly impactful in communicating with public. Present-day king tide events enable people to visualize future-day 'normal' sea levels.

## Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Tables; Direct Download
<b>Data are located at:</b>	2015~2017: UNC <a href="https://nckingtides.web.unc.edu/whats-your-water-level-app-data-download/">https://nckingtides.web.unc.edu/whats-your-water-level-app-data-download/</a> 2017-2021: NOAA <a href="https://www.citizenscience.gov/catalog/463/#">https://www.citizenscience.gov/catalog/463/#</a> ; Apr 2021 fwd: U Del <a href="https://www.coastalobserver.net/">https://www.coastalobserver.net/</a>
<b>Data are available for:</b>	Sep 2015 to present
<b>Data were last updated:</b>	Present

## Description

<b>Data status:</b>	Provisional
<b>Data source:</b>	Data is original and aggregated from another source
<b>File formats and approximate file size:</b>	Varies and is somewhat dependent on source: .csv; .pdf; .jpg; .png; .mov. Data from NOAA can be downloaded in a range of formats, but the "Data Download" app can only be accessed by NOAA affiliates.
<b>Data are measured at this interval:</b>	Daily; Monthly; Annually; At irregular intervals
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Most is site-specific with geographic coordinates
<b>Geographic coverage:</b>	Mostly: the NC coastal region
<b>Additional information about the data:</b>	We have been working on a permanent and sustainable home for our databases since the NCKT project funding ceased in 2019.

## Contact

Christine Voss | Research Associate | UNC Institute of Marine Sciences | [c.m.voss.unc@gmail.com](mailto:c.m.voss.unc@gmail.com) | 252.717.3890

# NC Oceanfront Erosion Rates

## NC DIVISION OF COASTAL MANAGEMENT

These data represent long-term average annual shoreline change rates ("erosion rates") along NC's oceanfront, and are updated approximately once every five years since 1979 with the last update in 2020.

### Relevance to Climate Resilience

Shoreline change rates are influenced by both natural and manmade events/activities. These data are not meant to be predictive, but are helpful for learning more about NC's oceanfront areas most vulnerable to erosion.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Direct Download; Maps; Web services

**Data are located at:**

<https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=f5e463a929ed430095e0a17ff803e156>

**Data are available for:**

Varies: shorelines (early 1900s to present), erosion rates (1979-2020)

**Data were last updated:**

Nov-21

### Description

**Data status:**

Final

**Data source:**

Data is original and aggregated from another source

**File format and approximate file size:**

GIS Shapefiles (up to 22MB)

**Data are measured at this interval:**

Approximately once every five years, and as needed.;

**Is this spatial data?**

Yes

**Spatial scale:**

Data created by NC DCM are digitized at 1:800 to 1:2400

**Geographic coverage:**

Entire NC oceanfront

### Contact

Ken Richardson | Shoreline Management Specialist | NC Division of Coastal Management | [ken.richardson@ncdenr.gov](mailto:ken.richardson@ncdenr.gov) | 252-808-2808 ext. 225

# NC Sea Level Rise Impact Study (NCSLRIS), June 2014

## NC EMERGENCY MANAGEMENT

This dataset is from a NC Homeland Security funded study which occurred from 2009-2013 and looked at future coastal flooding risk using NC specific information with local data/DEMs and with a methodology/modeling framework guided by NC experts who worked on it – ensuring the methodology addressed NC issues and concerns, from geomorphology to meteorology/storm surge/waves. The study looked at sea level rise (SLR) scenarios of 20, 40, 60, 80, 100 cm, loss of land to inundation, change to floodplain extent with SLR as well as flood depth model results for 10, 25, 50, 100 (aka 1% annual chance), and 500 year plus Fran storm events with SLR.

### Relevance to Climate Resilience

Many coastal communities are noticing the challenge of anticipating combined flooding sources = precipitation + wind tide etc. The NCSLRIS did look at the combination of SLR + storm surge, other tools such as Climate Central, NOAA's SLR viewer were not vetted by NC experts and some other tools/data sets such as NOAA's SLR viewer is just sea level rise while the NCSLRIS project represents potential combined future flood risk (SLR+Storm Surge).

### Availability and Accessibility

**Accessible to the public?**

No

**Accessibility format:**

Not provided

**Data are located at:**

A portion of this data is available online through The Nature Conservancy's Coastal Resilience tool: <https://maps.coastalresilience.org/northcarolina>. The data is under the tool's Flood & Sea Level Rise app. A user can visualize risk from 20, 40, and 100 cm\* of sea level rise AND "future floodplains or coastal surge extent" which is sea level rise with a modeled storm surge for a 10-yr, 100-yr and Fran event.

**Data are available for:**

This is a predictive modeling data; not long term trends of ambient conditions

**Data were last updated:**

Study was complete in 2014 and improvements in a majority of the underlying modeling data such as DEMs/LiDAR probably wouldn't substantially alter outputs. But any damage estimates summarized in the final report: <https://media.coastalresilience.org/NC/Nor>

### Description

**Data status:**

Final

**Data source:**

Data aggregated from another source

**File formats and approximate file sizes:**

This study includes very large raster files.

**Data are measured at this interval:**

Not provided

**Is this spatial data?**

Yes

**Spatial scale:**

Raster and shapefiles

**Geographic coverage:**

The study and data sets cover the 20 CAMA counties

**Additional information about the data:**

The Nature Conservancy obtained access to this spatial data and report through a public records request and to our knowledge it has not been widely cited or used by NC Emergency Management.

\*Note again this is just a small selection of the end products that this study produced – also study included major Road Raster files = Depth of total stillwater flooding over road surface elevations for various scenarios

### Contact

Lora Eddy | Community Resilience Specialist | The Nature Conservancy | [lora.eddy@tnc.org](mailto:lora.eddy@tnc.org) | 252-441-2525

# Pocosin Wetland Status and Owner Type for North Carolina

## DUKE UNIVERSITY

To help identify opportunities for pocosin restoration and as a first step to improving estimates of carbon storage by pocosins, we created updated maps of pocosin status (vegetation and drainage) and owner type, building on the existing wetlands maps developed by the North Carolina Division of Coastal Management in 1999.

### Relevance to Climate Resilience

Pocosins are a unique wetland type in the North Carolina coastal plain that provide valuable wildlife habitat and store large amounts of carbon in their peat soils. Many pocosins in North Carolina have been altered by drainage, land clearing, or plantation forestry; drained pocosins are also susceptible to fires that release large amounts of carbon. There is increasing interest in pocosin restoration, with some restoration projects on both public and private land already underway. This dataset can be used to explore where pocosin conservation or restoration may be needed to reduce the vulnerability of these wetlands and surrounding lands to fire, while also preserving the many other benefits they provide.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Direct Download
<b>Data are located at:</b>	Data download: <a href="https://research.repository.duke.edu/concern/datasets/2z10wr05h?locale=en">https://research.repository.duke.edu/concern/datasets/2z10wr05h?locale=en</a> Web map: <a href="https://dukeuniv.maps.arcgis.com/apps/webappviewer/index.html?id=a52bb5da376f4699adc4f9514a39fb56">https://dukeuniv.maps.arcgis.com/apps/webappviewer/index.html?id=a52bb5da376f4699adc4f9514a39fb56</a>
<b>Data are available for:</b>	2019 (based on land cover year input; age of other data inputs varies)
<b>Data were last updated:</b>	21-Jun

### Description

<b>Data status:</b>	Final, but may be updated in the future if higher-quality input data become available
<b>Data source:</b>	Data aggregated from another source
<b>File formats and approximate file sizes:</b>	TIFF; 290 MB total
<b>Data are measured at this interval:</b>	Not provided
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	30-m raster
<b>Geographic coverage:</b>	Eastern North Carolina

### Contact

Katie Warnell | Policy Associate | Nicholas Institute for Environmental Policy Solutions, Duke University | [katie.warnell@duke.edu](mailto:katie.warnell@duke.edu) | 919-613-4362

# Resilient Coastal Sites for the South Atlantic and Gulf

## THE NATURE CONSERVANCY

This dataset is an assessment of over 5,000 individual coastal sites for the South Atlantic and Gulf that connects to a similar assessment of over 10,000 individual coastal sites for the Northeast and Mid-Atlantic. Focused around tidal marsh or complex of tidal habitats greater than two acres; Looked at migration space for sea level rise from 1 – 6 feet; Evaluated both the physical properties of the land like topography as well as upland physical barriers to habitat migration, lack of sediment supply, and excessive upstream pollutants; It does not prioritize sites for their protective service to human communities and exposed infrastructure but can be combined with other data to identify community resilience benefit and to prioritize the conservation, management, and restoration of coastal systems

### Relevance to Climate Resilience

Estimates the relative resilience or vulnerability of coastal sites in support of identifying and prioritizing conservation and restoration to sustain their natural benefits (aka ecosystem services-wave attenuation, shoreline buffering etc) in the face of rising sea levels.

### Availability and Accessibility

**Accessible to the public?** Yes

**Accessibility format:**

Direct Download; Maps

**Data are located at:**

Informational Website with report/methods, tool link, story map, & data download:

<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/reportsdata/climate/CoastalResilience/Pages/Resilient-Coastal-Sites--for-Conservation-across-the-South-Atlantic.aspx>

Tool Link: <https://www.arcgis.com/home/webmap/viewer.html?webmap=22cf8ad5efd5473e819d17adf0216271&extent=-92.4921,21.5104,-60.0385,37.8194>

**Data are available for:**

N/A

**Data were last updated:**

Completed in 2019

### Description

**Data status:**

Final

**Data source:**

Data is original and aggregated from another source

**File formats and approximate file sizes:**

Zipped ESRI ArcGIS shape and layer files

**Data are measured at this interval:**

Not provided

**Is this spatial data?**

Yes

**Spatial scale:**

Not provided

**Geographic coverage:**

Study covers the South Atlantic and Gulf coast of the US (all NC CAMA counties) and the resulting ranking (Resilience Score) is relative to the study area and to their estuary type (e.g. Lagoonal-Pamlico Sound vs. a riverine-Neuse River near Oriental).

### Contact

Lora Eddy | Community Resilience Specialist | The Nature Conservancy | [lora.eddy@tnc.org](mailto:lora.eddy@tnc.org) | 252-441-2525

# Southeast Coastal Communities Water Level Observing Network

AMERICAN SHORE AND BEACH PRESERVATION ASSOCIATION (ASBPA)

Hyper-local, real-time water level data and predictions. Critical elevation thresholds determined by communities can trigger notifications when flooding may reach or inundate infrastructure.

## Relevance to Climate Resilience

Helping communities prepare for, manage, and adapt to coastal flooding. Many communities are situated tens of miles from the nearest NOAA tide gauge. They have no idea what the actual water levels are in their backyard. The data can be used for short-term decision support (when to close roads, issue emergency orders, notify residents, etc.) as well as long-term planning.

## Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Tables
<b>Data are located at:</b>	<a href="https://www.hohonu.io/">https://www.hohonu.io/</a> . Sign up for a free account to view the data.
<b>Data are available for:</b>	The project just started in 2021
<b>Data were last updated:</b>	6 minutes ago

## Description

<b>Data status:</b>	Provisional
<b>Data source:</b>	Original Data
<b>File formats and approximate file sizes:</b>	We are working with our funding partner SECOORA, who will eventually serve the data through an API to the public.
<b>Data are measured at this interval:</b>	every 6 minutes per NOAA standards;
<b>Is this spatial data?</b>	No
<b>Spatial scale:</b>	N/A
<b>Geographic coverage:</b>	N/A

## Contact

Nicole Elko | Science Director | ASBPA | [nicole.elko@asbpa.org](mailto:nicole.elko@asbpa.org) | 843-371-7082

# Gridded Drought Events

## NORTH CAROLINA INSTITUTE FOR CLIMATE STUDIES

A gridded 5km drought event dataset was developed based on U.S. Drought Monitor conditions from 2000 to present. Each grid contains the frequency, intensity, timing, and longevity of every drought event across the U.S. (including AK and HI), Puerto Rico, and affiliated U.S. islands in the Pacific and Caribbean to support historical (since 2000) drought analysis.

### Relevance to Climate Resilience

Droughts are thought to have devastating impacts on communities far beyond agriculture including water quality, fire risk, and human health. A historical analysis of droughts events can improve our understanding of how droughts (i.e., their timing, rates of intensification, etc) result in adverse outcomes for communities across North Carolina, which is vital to drought resiliency efforts.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Direct Download
<b>Data are located at:</b>	<a href="https://www.ncics.org/pub/usdmDrtEvents/">https://www.ncics.org/pub/usdmDrtEvents/</a>
<b>Data are available for:</b>	January 2000 to July 2021
<b>Data were last updated:</b>	Jul-21

### Description

<b>Data status:</b>	Provisional
<b>Data source:</b>	Data aggregated from another source
<b>File formats and approximate file sizes:</b>	Rasters of aggregated results (frequency of occurrence, mean duration, etc) with a table documenting each raster's individual drought events.
<b>Data are measured at this interval:</b>	Weekly
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	5km resolution raster
<b>Geographic coverage:</b>	The U.S. and U.S. affiliated Islands
<b>Additional information about the data:</b>	We are currently developing an interactive web application to plot these data.

### Contact

Ronald D. Leeper | Research Associate | North Carolina Institute for Climate Studies | [rdleepe2@ncsu.edu](mailto:rdleepe2@ncsu.edu) | 270-791-6661



# Flood Zones

## NC EMERGENCY MANAGEMENT - RISK MANAGEMENT OFFICE

These data are a collection of feature classes representing the area within the flood mapping boundaries defined by the engineering models for the 100 year, 500 year, and floodway. The spatial tables contain information about the flood hazard within the study area. These zones are used by FEMA to designate the Special Flood Hazard Area (SFHA), identify areas of coastal high hazard flooding, and for insurance rating purposes. These data are the flood hazard areas that are or will be depicted on the Flood Insurance Rate Maps (FIRM).

### Relevance to Climate Resilience

These data were collected and derived by the North Carolina Floodplain Mapping Program ([www.ncfloodmaps.com](http://www.ncfloodmaps.com)) as part of its effort to modernize FEMA Flood Insurance Rate Maps (FIRM) statewide. The North Carolina Floodplain Mapping Program was established through a Cooperating Technical State (CTS) agreement with FEMA in response to the extensive damage caused by Hurricane Floyd in 1999.

### Availability and Accessibility

**Accessible to the public?** Yes

**Accessibility format:** Maps; Tables; Direct Download

**Data are located at:** County data are located at the North Carolina Flood Risk Information System: [www.fris.nc.gov](http://www.fris.nc.gov)  
 Statewide data are located on NC OneMap:  
<https://www.nconemap.gov/datasets/NCEM-GIS::flood-hazard-areas-1/explore?location=35.174971%2C-79.883633%2C7.62>  
 Rest service: [https://spartagis.ncem.org/arcgis/rest/services/Public/FRIS\\_FloodZones/MapServer](https://spartagis.ncem.org/arcgis/rest/services/Public/FRIS_FloodZones/MapServer)

**Data are available for:** Current effective

**Data were last updated:** Rolling updates by river basin

### Description

**Data status:** Both effective and preliminary data are available

**Data source:** Original Data

**File formats and approximate file sizes:** Shapefile and file geodatabase

**Data are measured at this interval:** At irregular intervals

**Is this spatial data?** Yes

**Spatial scale:** State level

**Geographic coverage:** The State of North Carolina

### Contact

Daniel Madding | IT Applications/GIS Manager | NCEM Risk Management | [daniel.madding@ncdps.gov](mailto:daniel.madding@ncdps.gov) | 919-825-2336

# Hurricane Flood Exposure and Resilience Opportunities Analysis

## THE NATURE CONSERVANCY

This dataset provides an estimate of inland flood extent under Hurricane Matthew (2016), and can help to inform planning efforts aimed at improving resilience to future storms. This is part of a collection of datasets produced as part of a study of the potential implications of repeated hurricanes for water quality in North Carolina. Datasets include: Hurricane Matthew (2016) and Hurricane Florence (2018) estimated flood extents, as well as opportunities for buyouts and watershed-scale nature-based solutions within flood-affected areas.

### Relevance to Climate Resilience

These datasets highlight areas of recent hurricane flood exposure as well as areas where specific landscape interventions could be pursued to reduce future flood risk and enhance resilience.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Direct Download

**Data are located at:**

The data products are hosted on NC OneMap. Hurricane Matthew Flood Extent - <https://www.nconemap.gov/datasets/hurricane-matthew-flood-extent-across-the-piedmont-and-coastal-plain-of-north-carolina/explore>  
Hurricane Florence Flood Extent – <https://www.nconemap.gov/datasets/hurricane-florence-flood-extent-across-the-piedmont-and-coastal-plain-of-north-carolina/explore>  
Intervention Opportunities to Improve Floodplain Resilience – <https://www.nconemap.gov/datasets/intervention-opportunities-to-improve-floodplain-resilience/explore>

**Data are available for:**

2016, 2018

**Data were last updated:**

Jul-20

### Description

**Data status:**

Final

**Data source:**

Data is original and aggregated from another source

**File formats and approximate file sizes:**

Data products are available as rasters in .TIF format, each <100MB.

**Data are measured at this interval:**

Specific hurricane events

**Is this spatial data?**

Yes

**Spatial scale:**

Raster

**Geographic coverage:**

Piedmont and Coastal Plain of NC

**Additional information about the data:**

This data was created as part of a NatureNet Science Fellowship project initiated in 2018 by The Nature Conservancy and the Arizona State University Center for Biodiversity Outcomes to assess risks and identify solutions for nutrient pollution under extreme events. The manuscript associated with the data is publicly available from: <https://pubs.acs.org/doi/abs/10.1021/acs.est.9b07815>.

### Contact

Danica Schaffer-Smith | Watershed Scientist | The Nature Conservancy | [d.schaffer-smith@tnc.org](mailto:d.schaffer-smith@tnc.org)

# USGS Flood Event Viewer

U.S. GEOLOGICAL SURVEY

Contains short-term data from individual storm events, including discharge, barometric pressure, water level sensors, wave height sensors, high water marks, peak summaries, and accessory data as applicable.

## Relevance to Climate Resilience

Flooding events, particularly from tropical storms and hurricanes, are expected to become more frequent and extreme. The Flood Event Viewer or FEV was created by the USGS to provide public access to coordinated, short snippets (lengths) of coastal and riverine water-level and highwater mark records corresponding to major storms or other short-term events.

## Availability and Accessibility

**Accessible to the public?** Yes  
**Accessibility format:** API; Tables; Direct Download  
**Data are located at:** <https://stn.wim.usgs.gov/FEV/>  
**Data are available for:** Earliest storm event available is from 1888, data quality/quantity varies by storm event.  
**Data were last updated:** Nov-21

## Description

**Data status:** Provisional  
**Data source:** Data is original and aggregated from another source  
**File formats and approximate file sizes:** .csv, .pdf, .png, .jpeg, .svg  
**Data are measured at this interval:** At irregular intervals  
**Is this spatial data?** Yes  
**Spatial scale:** Point data, extent varies by storm event  
**Geographic coverage:** Varies by storm event, but covers the lower 48 states (CONUS)

## Contact

Charles Stillwell | Hydrologist | U.S. Geological Survey | [cstillwell@usgs.gov](mailto:cstillwell@usgs.gov)

# 2010 Building Footprints - With Attributes

## NC EMERGENCY MANAGEMENT - RISK MANAGEMENT OFFICE

This dataset is a collection of polygons representing the roofline of built structures wholly or partially within the State of North Carolina political boundary. The building footprints are closed polygons with a unique identifier and have the calculated square footage. The polygons were not required to be rectilinear (i.e. interior angles = 90 degrees), but they should give an accurate representation of the building when viewed at a scale of 1:1500 in ArcGIS.

### Relevance to Climate Resilience

These data were derived by the North Carolina Floodplain Mapping Program ([www.ncfloodmaps.com](http://www.ncfloodmaps.com)) as part of its effort to modernize FEMA Flood Insurance Rate Maps (FIRM) statewide. Previous structure-specific geospatial data (where it existed) was typically shown spatially as a point at the center of a structure or parcel boundary. With a building centroid (or center) as a location, much of a building may be within a vulnerable zone of a hazard yet not be included in an evaluation. Good data is extremely important to hazard assessment. This need for accuracy enhances the need for building footprints to evaluate the hazard. The Statewide Building Footprint Layer was developed to meet that need.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Direct Download
<b>Data are located at:</b>	These data are available for download via clip-and-ship on the North Carolina Spatial Data Download page ( <a href="http://www.sdd.nc.gov">www.sdd.nc.gov</a> ). Larger datasets may be requested in writing to <a href="mailto:rmclipandship@ncdps.gov">rmclipandship@ncdps.gov</a> .
<b>Data are available for:</b>	Up to 2012
<b>Data were last updated:</b>	2012 (counties were updated at different times)

### Description

<b>Data status:</b>	Final
<b>Data source:</b>	Original Data
<b>File formats and approximate file sizes:</b>	Shapefile and ESRI filegeodatabase
<b>Data are measured at this interval:</b>	At irregular intervals
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	State level
<b>Geographic coverage:</b>	The State of North Carolina
<b>Additional information about the data:</b>	These data were created with the highest consideration of accuracy and data integrity. However, as with all other geospatial datasets, users must take into consideration the consequences of using the data for specific applications.

### Contact

Daniel Madding | IT Applications/GIS Manager | NCEM Risk Management | [daniel.madding@ncdps.gov](mailto:daniel.madding@ncdps.gov) | 919-825-2336

# 2020 Building Footprints - Composite Footprint Layer

## NC EMERGENCY MANAGEMENT - RISK MANAGEMENT OFFICE

This data set is a collection of polygons representing the roofline of built structures wholly or partially within the State of North Carolina political boundary. The building footprints are closed polygons with a unique identifier and no other attribute information. They are an unverified composite of several different data sources including Microsoft Buildings, Opens Street Map, and LiDAR extracted footprints.

### Relevance to Climate Resilience

With a building centroid (or center) as a location, much of a building may be within a vulnerable zone of a hazard yet not be included in an evaluation. Good data is extremely important to hazard assessment. This need for accuracy enhances the need for building footprints to evaluate the hazard.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps
<b>Data are located at:</b>	The data is available by special request from NCEM Risk Management by emailing <a href="mailto:rmclipandship@ncdps.gov">rmclipandship@ncdps.gov</a> .
<b>Data are available for:</b>	2020
<b>Data were last updated:</b>	2020

### Description

<b>Data status:</b>	Unedited or verified
<b>Data source:</b>	Data is original and aggregated from another source
<b>File formats and approximate file sizes:</b>	filegeodatabase
<b>Data are measured at this interval:</b>	At irregular intervals
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	State level
<b>Geographic coverage:</b>	The State of North Carolina

### Contact

Daniel Madding | IT Applications/GIS Manager | NCEM Risk Management | [daniel.madding@ncdps.gov](mailto:daniel.madding@ncdps.gov) | 919-825-2336

# Carolina Alternative Fuel Infrastructure for Storm Resilience Plan: Data Repository

## NC CLEAN ENERGY TECHNOLOGY CENTER (AND AFFILIATED PROJECT PARTNERS)

A collection of many different datasets related to alternative fuel resiliency planning in North Carolina and South Carolina compiled for a USDOE-funded project titled: "USDOE - Carolina Alternative Fuel Infrastructure for Storm Resilience Plan".

### Relevance to Climate Resilience

Datasets include raw and processed datasets related to environmental hazards, infrastructure, and alternative fuel vehicles. Many datasets are directly relevant to any hazard-related question, while others are specifically pertinent for transportation and vehicle-related questions.

### Availability and Accessibility

#### Accessible to the public?

Yes

#### Accessibility format:

Maps; Tables; Direct Download; Note that data are only available upon request currently, but they are planned for public release.

#### Data are located at:

The data are hosted on Google Drive, are currently available upon request at [nccleantech@ncsu.edu](mailto:nccleantech@ncsu.edu), and are planned to be accessible via a public facing interface in the future. An interactive demo map of a subset of the datasets can be found here: <https://ncsu.maps.arcgis.com/apps/webappviewer/index.html?id=4057d2b1174045f6bcb75a594d2842a9>

#### Data are available for:

Varies. Where possible, data are kept up-to-date.

#### Data were last updated:

Nov-21

### Description

#### Data status:

Some datasets are final, some are provisional.

#### Data source:

Data is original and aggregated from another source

#### File formats and approximate file sizes:

File formats vary and include CSVs, XLSXs, Shapefiles, Geodatabases, images, and more. There are also several very large datasets that we have collected sources and metadata for but that we do not personally host.

#### Data are measured at this interval:

At irregular intervals; Varies by dataset

#### Is this spatial data?

Yes

#### Spatial scale:

Varies by dataset.

#### Geographic coverage:

The State of North Carolina

### Contact

Alexander Yoshizumi | PhD Candidate | NCSU Center for Geospatial Analytics; NC Clean Energy Technology Center | [ayoshiz@ncsu.edu](mailto:ayoshiz@ncsu.edu) | 919-328-0260

# Drive NC

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

NCDOT's traveler information management system, which provides real-time information on events affecting travel across the state.

### Relevance to Climate Resilience

This can be used to identify which roads have a history of flooding, the length of the detour, and the length of time the road was closed.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Tables
<b>Data are located at:</b>	<a href="https://drivenc.gov/#adverse-weather">https://drivenc.gov/#adverse-weather</a>
<b>Data are available for:</b>	1996-2021
<b>Data were last updated:</b>	Dec-21

### Description

<b>Data status:</b>	Provisional
<b>Data source:</b>	Data aggregated from another source
<b>File formats and approximate file sizes:</b>	Excel file
<b>Data are measured at this interval:</b>	Not provided
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Street level
<b>Geographic coverage:</b>	The State of North Carolina
<b>Additional information about the data:</b>	You can request a excel spreadsheet of past weather related events. To learn more information about this go to <a href="https://www.youtube.com/watch?v=80ZDPKQQRJc">https://www.youtube.com/watch?v=80ZDPKQQRJc</a> .

### Contact

Nastasha Earle-Young | Statewide Initiatives Engineer | NCDOT | [resilience@ncdot.gov](mailto:resilience@ncdot.gov)

# Hazard Mitigation Acquisition Sites

## NC EMERGENCY MANAGEMENT

This dataset contains GIS data for the NC Hazard Mitigation's acquisition / buyout sites.

### Relevance to Climate Resilience

The acquisition / buyout sites would have a high likelihood of flooding during future events.

### Availability and Accessibility

**Accessible to the public?**

Yes, via Rest Service

**Accessibility format:**

Rest Service; Direct Download

**Data are located at:**

Rest Service:

[https://services1.arcgis.com/YBWrN5qiESVpqi92/arcgis/rest/services/Historic\\_EM\\_Mitigation\\_Properties/FeatureServer](https://services1.arcgis.com/YBWrN5qiESVpqi92/arcgis/rest/services/Historic_EM_Mitigation_Properties/FeatureServer)

Direct Download: email [rmclipandship@ncdps.gov](mailto:rmclipandship@ncdps.gov)

**Data are available for:**

Circa 2020

**Data were last updated:**

Dec-20

### Description

**Data status:**

It is final but its only 98% complete

**Data source:**

Data aggregated from another source

**File formats and approximate file sizes:**

Via a Rest Service or as a file geodatabase.

**Data are measured at this interval:**

N/A

**Is this spatial data?**

Yes

**Spatial scale:**

Parcel level

**Geographic coverage:**

The State of North Carolina

**Additional information about the data:**

It may be missing as many as 200 records.

### Contact

Daniel Madding | IT Manager for GIS and Aps | NC Emergency Management | [daniel.madding@ncdps.gov](mailto:daniel.madding@ncdps.gov) | 919-825-2336



# North Carolina Historic Architectural Resources

## NORTH CAROLINA HISTORIC PRESERVATION OFFICE

The dataset reflects the cumulative work of over fifty years' worth of survey of over 130,000 buildings, sites, objects, and districts that share some architectural and/or cultural significance. Included in the dataset are above-ground, human-made artifacts such as residential, commercial, industrial, and institutional buildings; bridges, dams, beach life-saving stations, and fire towers; ball parks, race tracks, and battlefields; and carousels, stone walls, and pedestrian suspension bridges, among many others.

### Relevance to Climate Resilience

The dataset is foundational to understanding which physical places and structures people value most and which will need special attention in resolving how to relocate or retrofit to withstand climate change.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Maps; Direct Download; Web map service

**Data are located at:**

<https://nc.maps.arcgis.com/home/group.html?id=d56ec9c8aa77423b931f4d359f103ae6&view=list&categories=%5B%22%2FCategories%2FHPOWEB%22%5D#content>; [https://gis2.ncdcr.gov/dncrgis/rest/services/NCHPO\\_Public](https://gis2.ncdcr.gov/dncrgis/rest/services/NCHPO_Public)

**Data are available for:**

1966-present, although it is a single, ever-evolving dataset.

**Data were last updated:**

Nov-21

### Description

**Data status:**

It is in a final form, but ever-changing

**Data source:**

Original Data

**File format and approximate file size:**

32 MB zipped shapefile

**Data are measured at this interval:**

At irregular intervals;

**Is this spatial data?**

Yes

**Spatial scale:**

Building

**Geographic coverage:**

The State of North Carolina

**Additional information about the data:**

The dataset is available through web mapping applications, as well as through public web map services.

### Contact

Andrew Edmonds | GIS Technical Support Analyst | North Carolina Historic Preservation Office | [andrew.edmonds@ncdcr.gov](mailto:andrew.edmonds@ncdcr.gov) | 919-814-6592

# Statewide Inlets Inventory (drop inlets, curb inlets, etc.)

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

This layer contains inlets, structures that provide storm water access, along NCDOT roadways. Types include curb inlets, curb and grate, drop inlets, funnel drains and yard inlets. The data in this layer originated from the Asset Inventory Collection Project at NCDOT, managed by the Operations Program Management Unit. It was an effort to build a statewide inventory of NCDOT owned inlets, maintenance pipes (crossline pipes that are open on both ends and are 48" and below), non-NBIS pipes (crossline pipes that are open on both ends and are over 48" but less than 20 feet in length along the centerline of the road plus culverts that are less than 20 feet in length along the centerline of the road), retaining walls and noise walls.

### Relevance to Climate Resilience

Curb inlets, curb and grate, and funnel drains could be an issue for regular storm events and could be addressed this way.

### Availability and Accessibility

**Accessible to the public?** Yes

**Accessibility format:** Maps; Tables; Direct Download

**Data are located at:** <https://ncdot.maps.arcgis.com/home/item.html?id=174840b88c8a4e158051ebbf270c54d8>

**Data are available for:** Initial data collection started in September 2017 and finished in August 2021.

**Data were last updated:** Oct-21

### Description

**Data status:** Data is updated on an ongoing basis, changes are made available through this layer on a quarterly publication cycle.

**Data source:** Original Data

**File formats and approximate file sizes:** ArcGIS online, shapefile, and available to open in ArcGIS Desktop

**Data are measured at this interval:** Not provided

**Is this spatial data?** Yes

**Spatial scale:** Street level

**Geographic coverage:** The State of North Carolina

**Additional information about the data:** 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 is representative of when the information was collected and is subject to change.

### Contact

Nastasha Earle-Young | Statewide Initiatives Engineer | NCDOT | [resilience@ncdot.gov](mailto:resilience@ncdot.gov)

# Statewide Maintenance Pipe Inventory

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

This layer contains maintenance pipes that are part of the NCDOT road network. Maintenance pipes are pipes that are 48" or less in diameter. Structures that were closed on one or both ends (connected to a drainage inlet) were excluded from the original inventory, though some have been added to the data over time. Maintenance pipes that are closed on both ends reside in the NCDOT Statewide Storm Drainage Pipes layer, if they have been inventoried. Driveway pipes are not included in the inventory. The data in this layer originated from the Asset Inventory Collection Project at NCDOT.

### Relevance to Climate Resilience

Every road that flood does not need to be elevated to improve the roadway. There could be improvements to retaining walls, slopes, and size of pipe under a roadway.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Direct Download; Tables
<b>Data are located at:</b>	<a href="https://ncdot.maps.arcgis.com/home/item.html?id=00cc017f649247d8816fd817e842606f">https://ncdot.maps.arcgis.com/home/item.html?id=00cc017f649247d8816fd817e842606f</a>
<b>Data are available for:</b>	N/A
<b>Data were last updated:</b>	Oct-21

### Description

<b>Data status:</b>	Although the data continues to be updated on an ongoing basis, changes are made available through this layer on a quarterly publication cycle.
<b>Data source:</b>	Original Data
<b>File formats and approximate file sizes:</b>	ArcGIS online, shapefile, and available to open in ArcGIS Desktop
<b>Data are measured at this interval:</b>	N/A
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Street level
<b>Geographic coverage:</b>	The State of North Carolina
<b>Additional information about the data:</b>	This data is representative of when the information was collected and is subject to change. NCDOT 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.

### Contact

Nastasha Earle-Young | Statewide Initiatives Engineer | NCDOT | [resilience@ncdot.gov](mailto:resilience@ncdot.gov)

# Statewide Non-National Bridge Inspection Standard (NBIS) Pipe Inventory

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

This layer contains infrastructure that is not a part of the National Bridge Inspection Standard (non-NBIS) that are part of the North Carolina Department of Transportation road network. Non-NBIS are structures that are bridges 20 feet and less span. The data in this layer originated from the Asset Inventory Collection Project at NCDOT, managed by the Operations Program Management Unit. It was an effort to build a statewide inventory of NCDOT owned inlets, maintenance pipes (crossline pipes that are open on both ends and are 48" and below), non-NBIS pipes (crossline pipes that are open on both ends and are over 48" but less than 20 feet in length along the centerline of the road plus culverts that are less than 20 feet in length along the centerline of the road), retaining walls and noise walls.

### Relevance to Climate Resilience

Every road that flood does not need to be elevated to improve the roadway. There could be improvements to size of pipe under a roadway.

### Availability and Accessibility

**Accessible to the public?** Yes

**Accessibility format:** Maps; Direct Download; Tables

**Data are located at:** <https://ncdot.maps.arcgis.com/home/item.html?id=5441b2e4ecc74f5ab0ca8927d77faa38>

**Data are available for:** Initial data collection started in September 2017 and finished in August, 2021.

**Data were last updated:** Nov-21

### Description

**Data status:** Although the data continues to be updated on an ongoing basis, changes are made available through this layer on a quarterly publication cycle

**Data source:** Original Data

**File formats and approximate file sizes:** ArcGIS online, shapefile, and available to open in ArcGIS Desktop

**Data are measured at this interval:** Not provided

**Is this spatial data?** Yes

**Spatial scale:** Street level

**Geographic coverage:** The State of North Carolina

**Additional information about the data:** This data is representative of when the information was collected and is subject to change. NCDOT 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.

### Contact

Nastasha Earle-Young | Statewide Initiatives Engineer | NCDOT | [resilience@ncdot.gov](mailto:resilience@ncdot.gov)

# Statewide Retaining Wall Inventory

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

This layer contains retaining walls that are part of the NCDOT road network. Retaining walls are structures designed to restrain soil, typically by a steep or near-vertical slope along NCDOT roadways. They are used in both cut and fill slopes for roadway and right of way support and also include bridge abutment walls. The layer data originated from the Asset Inventory Collection Project at NCDOT, managed by the Operations Program Management Unit. It was an effort to build a statewide inventory of NCDOT owned inlets, maintenance pipes (crossline pipes that are open on both ends and are 48" and below), non-NBIS pipes (crossline pipes that are open on both ends and are over 48" but less than 20 feet in length along the centerline of the road plus culverts that are less than 20 feet in length along the centerline of the road), retaining walls and noise walls.

### Relevance to Climate Resilience

Every road that flood does not need to be elevated to improve the roadway. There could be improvements to retaining walls, slopes, and size of pipe under a roadway.

### Availability and Accessibility

**Accessible to the public?** Yes  
**Accessibility format:** Maps; Tables; Direct Download  
**Data are located at:** <https://ncdot.maps.arcgis.com/home/item.html?id=e376c6f20afc4154a28fb26dc08158df>  
**Data are available for:** Initial data collection started in September 2017 and finished in August, 2021.  
**Data were last updated:** Nov-21

### Description

**Data status:** Data is updated on an ongoing basis, changes are made available through this layer on a quarterly publication cycle.  
**Data source:** Original Data  
**File formats and approximate file sizes:** ArcGIS online, shapefile, and available to open in ArcGIS Desktop  
**Data are measured at this interval:** Not provided  
**Is this spatial data?** Yes  
**Spatial scale:** Street level  
**Geographic coverage:** The State of North Carolina  
**Additional information about the data:** 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 is representative of when the information was collected and is subject to change.

### Contact

Nastasha Earle-Young | Statewide Initiative's Engineer | NCDOT | nbearle-young@ncdot.gov

# Statewide Storm Drainage Pipe Inventory

## NC DEPARTMENT OF TRANSPORTATION (NCDOT)

This layer contains storm drainage (closed system) pipes that are part of the NCDOT road network. Storm Drainage Pipes are non-NBIS and maintenance pipes that are part of a closed system and connect two drainage boxes. They do not have an exposed inlet or outlet. Pipes that are partially closed are stored within the Statewide Maintenance and Non-NBIS Pipe layers. NCDOT does not have a complete statewide inventory of storm drainage pipes. This layer contains the storm drainage pipes that have been inventoried and is sparsely populated. There is no current effort to build a statewide inventory of storm drainage pipes. The data in this layer originated from the Asset Inventory Collection Project at NCDOT, managed by the Operations Program Management Unit. It was an effort to build a statewide inventory of NCDOT owned inlets, maintenance pipes (crossline pipes that are open on both ends and are 48" and below), non-NBIS pipes (crossline pipes that are open on both ends and are over 48" but less than 20 feet in length along the centerline of the road plus culverts that are less than 20 feet in length along the centerline of the road), retaining walls and noise walls.

### Relevance to Climate Resilience

Drainage could be an issue for regular storm events and could be addressed this way.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Tables; Direct Download
<b>Data are located at:</b>	<a href="https://ncdot.maps.arcgis.com/home/item.html?id=1bc2689221d34cb284b8ce30a3fc493f">https://ncdot.maps.arcgis.com/home/item.html?id=1bc2689221d34cb284b8ce30a3fc493f</a>
<b>Data are available for:</b>	Initial data collection started in September 2017 and finished in August, 2021.
<b>Data were last updated:</b>	Oct-21

### Description

<b>Data status:</b>	Data is updated on an ongoing basis, changes are made available through this layer on a quarterly publication cycle.
<b>Data source:</b>	Original Data
<b>File formats and approximate file sizes:</b>	ArcGIS online, shapefile, and available to open in ArcGIS Desktop
<b>Data are measured at this interval:</b>	Not provided
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Street level
<b>Geographic coverage:</b>	The State of North Carolina
<b>Additional information about the data:</b>	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 is representative of when the information was collected and is subject to change.

### Contact

Nastasha Earle-Young | Statewide Initiatives Engineer | NCDOT | [resilience@ncdot.gov](mailto:resilience@ncdot.gov)

# Biodiversity and Wildlife Habitat Assessment

## NATURAL HERITAGE PROGRAM

The main focus areas for the Biodiversity/Wildlife Habitat assessment are aquatic and terrestrial habitats, landscape function, and connectivity. Other vital processes were included in the overall evaluation to address the roles that wetlands and stream buffers play in the ecosystem.

### Relevance to Climate Resilience

Developers, private landowners, and others benefit from having a clear understanding of where the most ecologically valuable lands are located and where targeted conservation activities will be directed. Citizens interested in increased stewardship activities will know where their efforts are most needed. Land planners and developers can use the maps as a reference in the development of site plans and management objectives. Local governments can use the CPT maps and data to enhance their efforts to provide open space, recreation lands, and natural areas that retain the unique character of their communities and rural landscapes.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Direct Download
<b>Data are located at:</b>	<a href="https://ncnhde.natureserve.org/content/data-download;">https://ncnhde.natureserve.org/content/data-download;</a> <a href="https://www.nconemap.gov/maps/NC::biodiversity-and-wildlife-habitat-assessment/about">https://www.nconemap.gov/maps/NC::biodiversity-and-wildlife-habitat-assessment/about</a>
<b>Data are available for:</b>	2021, with sporadic annual updates back to 2013
<b>Data were last updated:</b>	Jul-21

### Description

<b>Data status:</b>	Updated annually
<b>Data source:</b>	Data is original and aggregated from another source
<b>File formats and approximate file sizes:</b>	Raster, zipped approximately 100 MB
<b>Data are measured at this interval:</b>	Annually
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	30 x 30 meter raster
<b>Geographic coverage:</b>	The State of North Carolina
<b>Additional information about the data:</b>	The data used in the assessment are the best representations of spatial information for ecological functions statewide. Previously defined places, such as natural areas or Outstanding Resource Waters (ORW), or other intact large scale landscapes, represent the most important places to focus conservation action because they indicate high quality systems.

### Contact

Meredith Wojcik | Data Manager | Natural Heritage Program | [meredith.wojcik@ncdcr.gov](mailto:meredith.wojcik@ncdcr.gov)

# Element Occurrences

## NATURAL HERITAGE PROGRAM

Element Occurrences identifies occurrences of rare plants and animals, exemplary or unique natural communities, and important animal assemblages.

### Relevance to Climate Resilience

Element occurrences provide information about the locations of rare plants, animals, and unique communities in the state, which are important natural resource assets. These data can be used to detect change over time, especially for threatened, endangered, and at-risk plants and animals, and vulnerable natural communities. Making this information available to NC agencies helps ensure the long-term resilience of these populations and their habitat and informs conservation decisions.

### Availability and Accessibility

**Accessible to the public?**

No

**Accessibility format:**

N/A

**Data are located at:**

<https://ncnhde.natureserve.org/>, requires a subscription or membership in a governmental agency or conservation nonprofit; available for a fee for all others

**Data are available for:**

2021, archive to 2013

**Data were last updated:**

Oct-21

### Description

**Data status:**

Data updated continuously and released quarterly

**Data source:**

Data is original and aggregated from another source

**File format and approximate file size:**

Zipped shapefile, approximately 100 MB

**Data are measured at this interval:**

Quarterly

**Is this spatial data?**

Yes

**Spatial scale:**

N/A

**Geographic coverage:**

The State of North Carolina

**Additional information about the data:**

This is highly sensitive data that is shared only with vetted individuals or agencies/organizations. The minimum mapping unit is 9 meters.

### Contact

Meredith Wojcik | Data Manager | Natural Heritage Program | [meredith.wojcik@ncdcr.gov](mailto:meredith.wojcik@ncdcr.gov)



# Managed Areas

## NATURAL HERITAGE PROGRAM

Managed Areas are a collection of properties and easements where natural resource conservation is one of the primary management goals or are of conservation interest.

### Relevance to Climate Resilience

Managed areas represent areas of conservation which can help reduce vulnerability by protecting the natural resiliency of North Carolina ecosystems and by sequestering and storing carbon to reduce greenhouse gases in the atmosphere. Knowledge of the extent and location of these lands is crucial for planning a long-term ecosystem resilience strategy for North Carolina.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Maps; Direct Download

**Data are located at:**

<https://www.nconemap.gov/datasets/NC::managed-areas/about>; <https://ncnhde.natureserve.org/content/data-download>

**Data are available for:**

2021, archive going back to 2013

**Data were last updated:**

Oct-21

### Description

**Data status:**

We continually update this dataset

**Data source:**

Data is original and aggregated from another source

**File format and approximate file size:**

Zipped shapefile - approx. 40 MB

**Data are measured at this interval:**

Quarterly; At irregular intervals

**Is this spatial data?**

Yes

**Spatial scale:**

Parcel-level data

**Geographic coverage:**

The State of North Carolina

### Contact

Meredith Wojcik | Natural Heritage Program Data Manager | Natural Heritage Program | [meredith.wojcik@ncdcr.gov](mailto:meredith.wojcik@ncdcr.gov)

# Natural Areas

## NATURAL HERITAGE PROGRAM

Natural Areas are terrestrial and aquatic areas that are of special biodiversity significance and indicate action areas for the conservation of North Carolina's biodiversity. A Natural Area's significance may be due to the presence of rare species, high-quality natural communities, important animal assemblages, or other ecological features, collectively known as "Elements" of biodiversity. The North Carolina Natural Heritage Program (NCNHP) identifies and inventories these areas, evaluates and assigns conservation priority ratings to the Natural Areas based on the biodiversity within them, and works with many partners to implement voluntary protection for them. The Natural Area boundaries are drawn by NCNHP staff, based on field surveys, and are ecological in nature.

### Relevance to Climate Resilience

They represent the Natural Heritage Program's estimates of the best locations for supporting natural diversity in the state and are given priority ranks that indicate the degree of their importance for conservation. Information on natural areas is intended to help guide the conservation decisions affecting the state's biodiversity at multiple levels, including the actions of state agencies, local government planning offices, private conservation groups, and particular individual landowners.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps; Direct Download
<b>Data are located at:</b>	<a href="https://www.nconemap.gov/datasets/NC::natural-areas/about">https://www.nconemap.gov/datasets/NC::natural-areas/about</a> ; <a href="https://ncnhde.natureserve.org/content/data-download">https://ncnhde.natureserve.org/content/data-download</a>
<b>Data are available for:</b>	2021, archive to 2013
<b>Data were last updated:</b>	Oct-21

### Description

<b>Data status:</b>	The data are updated continuously and published as quarterly updates
<b>Data source:</b>	Original Data
<b>File format and approximate file size:</b>	Zipped shapefile, approximately 25 MB
<b>Data are measured at this interval:</b>	Quarterly
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	The spatial scale varies as the natural area boundaries are drawn to reflect ecological boundaries, which vary in scale from site to site.
<b>Geographic coverage:</b>	The State of North Carolina

### Contact

Meredith Wojcik | Data Manager | Natural Heritage Program | [natural.heritage@ncdcr.gov](mailto:natural.heritage@ncdcr.gov)

# Opportunity Assessment for Carbon and Resilience Benefits on Natural and Working Lands in North Carolina

## DUKE UNIVERSITY

These datasets show the biophysical extent of reforestation, restoration, and conservation opportunities for on-the-ground management actions for natural and working lands that sequester/store carbon and support habitat and community resilience in North Carolina. Management actions include conservation of existing forest land (including forests managed for harvest), reforestation, coordinated flood-related buyouts and floodplain restoration, and protection of coastal salt marsh migration corridors.

### Relevance to Climate Resilience

These data can be used to identify places within NC where there are opportunities to manage natural and working lands in ways that help to mitigate climate change (through increased carbon sequestration or reduced emissions) and enhance ecosystem and community resilience by conserving or enhancing ecosystems that reduce threats exacerbated by climate change (e.g., flooding and related water-quality issues). These data layers were used to estimate geographic scope, resilience potential, carbon sequestration and storage potential, and co-benefits for many of the recommendations in the North Carolina Natural and Working Lands Action Plan.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Direct Download; Maps
<b>Data are located at:</b>	Data download: <a href="https://research.repository.duke.edu/concern/datasets/4m90dw143?locale=en">https://research.repository.duke.edu/concern/datasets/4m90dw143?locale=en</a> StoryMap collection: <a href="https://storymaps.arcgis.com/collections/2154ab2816674f7d8c7429fe87f48830">https://storymaps.arcgis.com/collections/2154ab2816674f7d8c7429fe87f48830</a>
<b>Data are available for:</b>	Varies by dataset; the input data used to create each dataset vary, but in general the most recent data available in 2019 (when these datasets were created) were used
<b>Data were last updated:</b>	20-Mar

### Description

<b>Data status:</b>	Final, but related work is continuing and updated or adapted versions of some datasets may be available in the future
<b>Data source:</b>	Data aggregated from another source
<b>File formats and approximate file sizes:</b>	TIF, SHP, CSV; Entire repository is 3.23 GB
<b>Data are measured at this interval:</b>	Non-recurring datasets
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	Most datasets are 30-m rasters
<b>Geographic coverage:</b>	The State of North Carolina

### Contact

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# Resilient and Connected Landscapes

## THE NATURE CONSERVANCY

A resilience map that identifies areas best able to support plants and animals in a changing climate, and represents the diversity of environments up and down Eastern North America. Areas that scored above average resilience are places that are resilient and buffered from the effects of climate change because the site offers a wide range of micro-climates within a highly connected area.

### Relevance to Climate Resilience

Identifies the terrestrial (land) places where nature's own natural resilience is the highest due to physical features such as the land's diverse topography, bedrock, and soil. These climate-resilient sites are more likely to sustain native plants, animals, and natural processes into the future, becoming natural strongholds for diversity and these are the priority places we need to protect.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Maps; Direct Download

**Data are located at:**

Informational Website with report/methods, tool link, story map, & data download:

<http://www.conservationgateway.org/ConservationPractices/ClimateChange/Pages/Climate-Resilience.aspx>

**Data are available for:**

Completed in 2016

**Data were last updated:**

N/A

### Description

**Data status:**

Final

**Data source:**

Data is original and aggregated from another source

**File formats and approximate file sizes:**

Zipped ESRI ArcGIS shape and layer files

**Data are measured at this interval:**

Not provided

**Is this spatial data?**

Yes

**Spatial scale:**

Not provided

**Geographic coverage:**

Study covers the US (all NC counties) and. Resilient sites are those that scored greater than "Average".

**Additional information about the data:**

The results were published in a leading conservation science journal and have been connected to our Resilient Coastal Sites studies that followed and looked at sea level rise to create a representative, connected network of climate which if conserved, could help sustain biodiversity into the future as it moves and changes in order to protect nature and the ecosystem services it provides human communities e.g. clean water, materials, medicine, food etc.

### Contact

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# Submerged Aquatic Vegetation

NC DEPARTMENT OF ENVIRONMENTAL QUALITY – DIVISION OF MARINE FISHERIES

This dataset maps submerged aquatic vegetation.

## Relevance to Climate Resilience

Submerged Aquatic Vegetation (SAV) is a natural asset. As a plant it has value in storing carbon and removing greenhouse gases. Additionally, it can stabilize sediment, improve water quality, and provide fish habitat, benefiting coastal economies. Because SAV is sensitive to degrading water quality, knowing where it occurs and how its distribution is changing provides critical information on the status of the coastal vulnerability, and where to focus water quality and shoreline restoration (wetland buffers, etc) efforts.

## Availability and Accessibility

**Accessible to the public?** Yes

**Accessibility format:**

Maps

**Data are located at:**

DEQ ArcGIS Online (AGOL) – Composite of all data: <https://data-ncdenr.opendata.arcgis.com/datasets/nc-sav-mosaic-1981-to-2015/explore>

Most recent datasets: <https://data-ncdenr.opendata.arcgis.com/datasets/sav-2012-2014-mapping/explore>; <https://data-ncdenr.opendata.arcgis.com/datasets/sav-2006-2008-mapping-revised/explore>

**Data are available for:** 1981 - 2015. However not all areas were mapped at the same time. 2007-2008 was coastwide. 2012-2015 was coastwide for high salinity waters.

**Data were last updated:** 2012 for APNEP region, 2015 Bogue Inlet - Masons Inlet. 2019/2021 data in process of delineation

## Description

**Data status:**

Final

**Data source:**

Data is original and aggregated from another source

**File formats and approximate file sizes:**

(Not provided)

**Data are measured at this interval:**

At irregular intervals

**Is this spatial data?**

Yes

**Spatial scale:**

(Not provided)

**Geographic coverage:**

Estuarine waters from Currituck Sound to Masons Inlet

**Additional information about the data:**

Maps from the low salinity waters such as Albemarle Sound likely underestimate SAV abundance due to lower water clarity. More information is summarized with maps and information in the [Coastal Habitat Protection Plan 2021 Amendment](#).

## Contact

Anne Deaton | Habitat Program Supervisor | NCDMF | [anne.deaton@ncdenr.gov](mailto:anne.deaton@ncdenr.gov) | 910-796-7311

# USGS Water Data for the Nation

## U.S. GEOLOGICAL SURVEY

USGS Water Data for the Nation provides access to water-resources data collected at approximately 1.9 million sites in all 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, American Samoa and the Commonwealth of the Northern Mariana Islands. Online access to this data is organized around the following categories: Surface Water, Groundwater, Water Quality, and Water Use.

### Relevance to Climate Resilience

Long-term timeseries data provide information necessary to detect hydrologic, water-quality, and water use changes over time. Changes to climate and watershed characteristics (land use, population growth, etc.) may impact hydrology, water-quality, and water use, and these datasets are needed to better understand the effects of changes over time.

### Availability and Accessibility

**Accessible to the public?**

Yes

**Accessibility format:**

Tables; API; Direct Download; Charts

**Data are located at:**

<https://waterdata.usgs.gov/nwis>

**Data are available for:**

Earliest surface water stations date back to 1800s, period of record varies by station.

**Data were last updated:**

Nov-21

### Description

**Data status:**

Both; provisional status indicated online for data that has not yet been reviewed and approved

**Data source:**

Original Data

**File formats and approximate file sizes:**

.csv, .txt, .png, .gif,

**Data are measured at this interval:**

At irregular intervals; Annually; Monthly; Daily; Hourly

**Is this spatial data?**

Yes

**Spatial scale:**

Point data

**Geographic coverage:**

The lower 48 states (CONUS)

**Additional information about the data:**

The USGS investigates the occurrence, quantity, quality, distribution, and movement of surface and underground waters and disseminates the data to the public, State and local governments, public and private utilities, and other Federal agencies involved with managing our water resources.

### Contact

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# NC DEQ's Potentially Underserved Block Groups 2019

## NC DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ)

On the U.S. Census Block Group level, the data for Poverty and Race and Ethnicity were overlaid on the map of North Carolina. If the NC DEQ definition of Underserved Communities was met (meaning the following criteria was present in the block group), the block group was selected. This criteria for the block group was compared to both the County and the State.

### Relevance to Climate Resilience

This map can identify potentially underserved communities within North Carolina. Knowing these locations can assist in identifying vulnerable communities in regards to environmental justice, climate events, etc.. Which can also assist in climate resiliency planning around vulnerable communities.

### Availability and Accessibility

<b>Accessible to the public?</b>	Yes
<b>Accessibility format:</b>	Maps
<b>Data are located at:</b>	<a href="https://ncdenr.maps.arcgis.com/home/item.html?id=13a1aace03134969b8181c1f9f026960#overview">https://ncdenr.maps.arcgis.com/home/item.html?id=13a1aace03134969b8181c1f9f026960#overview</a>
<b>Data are available for:</b>	2019
<b>Data were last updated:</b>	23-Nov-21

### Description

<b>Data status:</b>	Final
<b>Data source:</b>	Data is original and aggregated from another source
<b>File formats and approximate file sizes:</b>	AGOL Layer
<b>Data are measured at this interval:</b>	As census data becomes available (ACS 2019 5-year estimates and 2010 US Census Bureau)
<b>Is this spatial data?</b>	Yes
<b>Spatial scale:</b>	U.S Census Block Group Level
<b>Geographic coverage:</b>	The State of North Carolina
<b>Additional information about the data:</b>	It is selected as a potentially underserved block group if it meets the following criteria for Race/Ethnicity and Poverty: Racial/Ethnic composition - Share of nonwhites and Hispanic or Latino (of any race) is over fifty percent OR Share of nonwhites and Hispanic or Latino (of any race) is at least ten percent higher than County or State share AND Poverty rate - Share of population experiencing poverty is over twenty percent AND Share of households in poverty is at least five percent higher than the County or State share.

### Contact

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