2022

CLIMATE CHANGE AND NATURAL HAZARDS VULNERABLITY ASSESSMENT FOR THE EASTERN CAROLINA REGION

Eastern Carolina Council

NCORR

RISE

Regions Innovating for Strong Economies and Environmen t

DPS DEPARTMENT OF PUBLIC SAFETY

EDA U.S. ECONOMIC DEVELOPMENT ADMINISTRATION

EQUAL HOUSING OPPORTUNITY

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LAND ACKNOWLEDGEMENT

We wish to acknowledge and honor the Indigenous communities native to this region and recognize that this vulnerability assessment covers communities and structures that are built on Indigenous homelands and resources. We recognize the Coree, Lumbee, Mánu: Yį Įsuwą, Neusiok, Pamlico (Pomouik), and the Skaruhreh/Tuscarora people as past, present, and future caretakers of this land. We also recognize the unnamed tribes that once oversaw these lands and have since relocated or been displaced.

EasternCarolinaCouncil
233 Middle Street; Ste 300
PO Box 1717
New Bern, NC 28560
Phone: 252.638.3185
Fax: 252.638.3187
www.eccog.org

Dear Residents:

Our region (encompassing Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, and Wayne Counties) is known for its history, vast tourism assets, a rich agricultural heritage, military resources and coastal way of life. However, historic flooding from events like Hurricanes Matthew and Florence had tremendous impacts in our region. Matthew caused the Neuse River to rise to 28 feet – twice as high as flood stage. Florence brought even more flooding, water was flowing in the street like a river; and we lost important infrastructure like cell phone towers, as the back-up generators ran out of diesel fuel. Additionally, the "normal" rain events seem to be getting more impactful each time they occur. We are also experiencing more heat waves, high heat nights, droughts, and wildfires. These events are impacting our entire region – not just isolated, individual communities – and yet, many of these impacts can be avoided or diminished.

Considering the challenges mentioned above, our goal for the Eastern Carolina Region is to take action, to strengthen our resilience. This can be accomplished by reducing the immediate and long-lasting risks that natural and climate disasters pose for people, property, infrastructure, and natural resources.

The Eastern Carolina Region Vulnerability Assessment uses rigorous technical analysis (combined with local knowledge) to outline the major gaps in our region's preparedness for future natural hazards, climate events and their impacts. The report is the result of numerous meetings with residents, elected officials, local leaders, the North Carolina Office of Recovery and Resiliency (NCORR), North Carolina Rural Center, and Tetra Tech. The findings in the report help us identify and prioritize efforts to become more resilient.

In the coming months, we will use this Assessment to develop a suite of proposed resilience projects for our 9-county region. However, the Vulnerability Assessment is made available for any use by the public, including the development of independent resilience efforts and grant applications.

As you read through this review of our region's susceptibility to climate impacts, I hope you will think about ways you can prepare neighborhoods, communities, and our region. We are proud to be a part of this important conversation, and we encourage you to do what you can to preserve our Eastern NC way of life for future generations.

Sincerely,

David Bone
Executive Director
Eastern Carolina Council

Serving Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico and Wayne Counties

DEFINITIONS

Vulnerability assessments involve the discussion of technical information and scientific information. While technical jargon was avoided, the following terms are defined in order to aid in the reader's understanding of the information presented in this vulnerability assessment document.

Accretion: The buildup of sediment within a certain location such as that occurring naturally across a beach/dune system (opposite of erosion) (Federal Emergency Management Agency n.d.).

Base Flood: The flood having a 1 percent chance of being equaled or exceeded in any given year. This is the regulatory standard also referred to as the "100-year flood." The base flood is the national standard used by the National Flood Insurance Program (NFIP) and all Federal agencies for the purposes of requiring the purchase of flood insurance and regulating new development. Base Flood Elevations (BFEs) are typically shown on Flood Insurance Rate Maps (FIRMs) (Federal Emergency Management Agency n.d.).

Climate Resilience: The capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation (Federal Emergency Management Agency n.d.).

Compound Flooding: Flooding arising from storms causing concurrent storm surge and precipitation. This compound flooding can severely affect densely populated low-lying coastal areas (nature.com 2020).

Critical Facility: A structure or other improvement that, because of its function, size, service area, or uniqueness, has the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if it is destroyed or damaged or if its functionality is impaired. Critical facilities include health and safety facilities, utilities, government facilities and hazardous materials facilities (CRS Community Self-Assessment n.d.).

Critical Infrastructure: Critical infrastructure includes the vast network of highways, connecting bridges and tunnels, railways, utilities, and buildings necessary to maintain normalcy in daily life. Transportation, commerce, clean water, and electricity all rely on these vital systems (U.S. Department of Homeland Security 2022).

Ecology: The branch of biology that deals with the relations of organisms to one another and to their physical surroundings (Merriam-Webster 2022).

Erosion: The process by which tides, strong wave action, and flood waters wear down or carry away rocks and sediment (soils, sands) along a shoreline (U.S. Climate Resilience Toolkit 2022).

Exposure: The representative value of buildings (in dollars), population (in both people and population equivalence dollars), or agriculture (in dollars) potentially exposed to a natural hazard occurrence (Federal Emergency Management Agency n.d.).

Flood Insurance Rate Map (FIRM): Official map of a community on which Federal Emergency Management Agency (FEMA) has delineated the Special Flood Hazard Areas (SFHAs), the Base Flood Elevations (BFEs), and the risk premium zones applicable to the community (Federal Emergency Management Agency n.d.).

Floodplain: A regulatory term used by the FEMA (also termed the “floodway” or “regulatory floodway”) to describe historic-based flooding. Specifically, it is the area next to a waterbody that historically experiences flooding either via tidal water or in a riverine system when water comes out of the banks of the main channel. FEMA generally described a floodplain as: “any land area susceptible to being inundated by flood waters from any source,” which is the broader term that can include projected future conditions (Federal Emergency Management Agency n.d.).

Flood Zone: Flood hazard areas identified on the Flood Insurance Rate Map are identified as a Special Flood Hazard Area (SFHA). SFHA are defined as the area that will be inundated by the flood event having a 1 percent chance of being equaled or exceeded in any given year. The 1-percent annual chance flood is also referred to as the base flood or 100-year flood. SFHAs are labeled as Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30. Moderate flood hazard areas, labeled Zone B or Zone X (shaded), are also shown on the FIRM, and are the areas between the limits of the base flood and the 0.2-percent annual chance (or 500-year) flood. The areas of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2-percent annual chance flood, are labeled Zone C or Zone X (unshaded) (Federal Emergency Management Agency n.d.).

Geology: The science that deals with the earth's physical structure and substance, its history, and the processes that act on it (Merriam-Webster 2022).

Groundwater: Water that exists underground in saturated zones beneath the land surface. The upper surface of the saturated zone is called the water table (United States Geological Survey n.d.).

Hazard: A regulatory term used by FEMA to describe the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources (Federal Emergency Management Agency n.d.).

Hydrography: The science of surveying and charting bodies of water, such as seas, lakes, and rivers (Merriam-Webster 2022).

Hydrology: The branch of science concerned with the properties of the earth's water and especially its movement in relation to land (Merriam-Webster 2022).

Impact: Effects on natural and human systems. Impacts generally refer to effects on lives, livelihoods, health, ecosystems, economies, societies, cultures, services, and infrastructure due to the interaction of climate changes or hazardous climate events (Federal Emergency Management Agency n.d.).

Land Use: The human use of land. It represents the economic and cultural activities (e.g., agricultural, residential, industrial, mining, and recreational uses) that are practiced at a given place (United States Environmental Protection Agency 2021).

Land Cover: The surface components of land that are physically present and visible (United States Environmental Protection Agency 2022).

Mean High Water: The average of astronomical high tides (Federal Emergency Management Agency n.d.).

Mean Return Period: The interval between events of similar size or intensity (Federal Emergency Management Agency n.d.).

Mitigation: Capabilities necessary to reduce loss of life and property by lessening the impact of disasters. Mitigation capabilities include but are not limited to community-wide risk reduction projects; efforts to improve the resilience of critical infrastructure and key resource lifelines; risk reduction for specific vulnerabilities from natural hazards or acts of terrorism; and initiatives to reduce future risks after a disaster has occurred (Federal Emergency Management Agency n.d.).

Non-Potable Water: Water that has not been examined, properly treated, nor approved by appropriate authorities as being safe for consumption (Federal Emergency Management Agency n.d.).

Potable Water: Water suitable for drinking (Federal Emergency Management Agency n.d.).

Runoff: That part of the precipitation that appears in surface streams (United States Geological Survey 2019).

Sea Level Rise: The increase currently observed in the average sea level trend, which is primarily attributed to changes in ocean volume due to two factors: ice melt and thermal expansion (NOAA 2020) (NOAA 2012).

Socially Vulnerable Populations: Populations with special needs that are especially at risk because of factors like socioeconomic status, household composition, minority status, or housing type and transportation (Agency for Toxic Substance and Disease Registry 2021).

Special Flood Hazard Area (SFHA): Areas designated by FEMA as historically having “special flood, mudflow, or flood-related erosion hazards, and shown on a Flood Hazard Boundary Map or a Flood Insurance Rate Map (Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone A99, Zone AR, Zone AR/AE, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30).” (Federal Emergency Management Agency n.d.).

Surface Water: Water sources above ground level, including streams and rivers, lakes and reservoirs, and oceans (United States Geological Survey 2019).

Topography: The arrangement of the natural and artificial physical features of an area (Merriam-Webster 2022).

Water Capacity: The ability of a water system to ensure it can provide safe and reliable drinking water now and into the future (Federal Emergency Management Agency n.d.).

Watershed: The land that water flows across or through on its way to a common stream, river, or lake (United States Environmental Protection Agency n.d.).

Water Quality: A measure of the suitability of water for a particular use based on selected physical, chemical, and biological characteristics (United States Geological Survey 2018).

Wildland-Urban Interface (WUI): The zone of transition between wilderness (unoccupied land) and land developed by human activity – an area where a built environment meets or intermingles with a natural environment (Federal Emergency Management Agency n.d.).

Vulnerability: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt (Federal Emergency Management Agency n.d.).

RISE PROGRAM OVERVIEW

A. North Carolina Office of Recovery and Resiliency Overview

In the wake of Hurricane Florence in 2018, the State of North Carolina established the North Carolina Office of Recovery and Resiliency (NCORR) to lead the state's efforts to rebuild smarter and stronger. At that time, eastern North Carolina communities were still recovering from Hurricane Matthew, which occurred in 2016. NCORR manages nearly $1 billion dollars in U.S. Department of Housing and Urban Development (HUD) funding in two grant types — Community Development Block Grant-Disaster Recovery (CDBG-DR) funds and Community Development Block Grant-Mitigation (CDBG-MIT) funds — aimed at making North Carolina communities safer and more resilient to future storms. Additional funding is provided through the State Disaster Recovery Acts of 2017 and 2018, the Storm Recovery Act of 2019, and the Economic Development Administration Disaster Supplemental Funds. NCORR manages programs statewide that include homeowner recovery, infrastructure, affordable housing, resiliency, and strategic buyouts. To learn more about NCORR programs, visit the ReBuild.NC.Gov website. NCORR is a division of the Department of Public Safety.

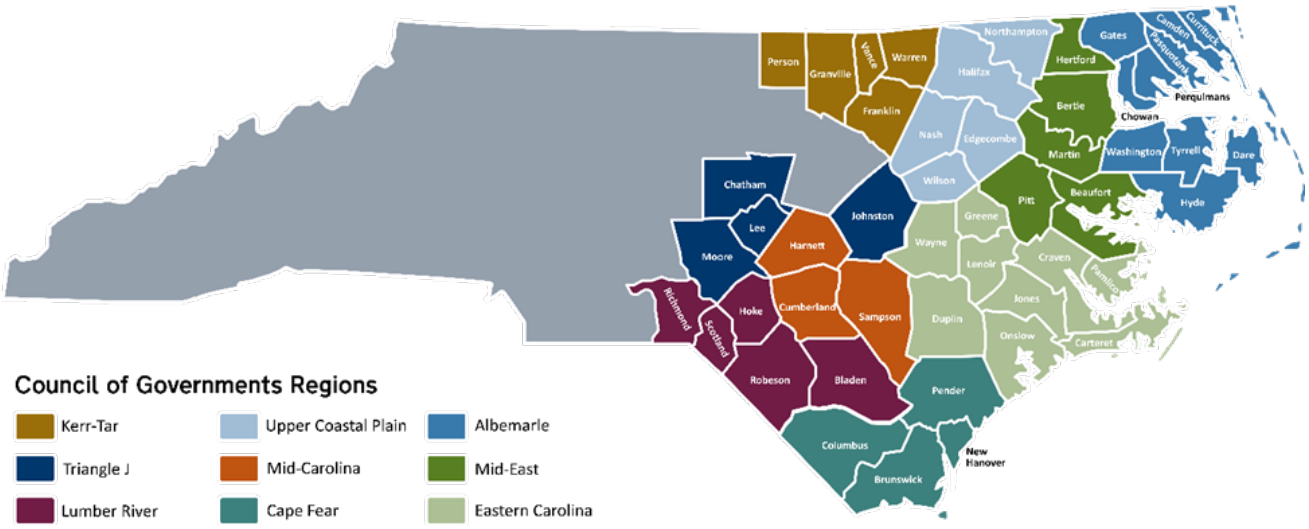
B. RISE Program Overview

Developed in partnership with North Carolina Rural Center, NCORR's Regions Innovating for Strong Economies and Environment (RISE) program supports resilience in North Carolina by:

- Facilitating the Regional Resilience Portfolio Program, which provides coaching and technical assistance to regional partners in the eastern half of the state to build multi-county vulnerability assessments, identify priority actions to reduce risk and enhance resilience in their region, and develop paths to implementation.
- Developing the North Carolina Resilient Communities Guide, a statewide resource that will provide tools, guidance, and opportunities for building community resilience.
- Hosting the Homegrown Leaders program, a NC Rural Center leadership training workshop, which operates in the eastern half of the state, which emphasizes resilience as a tool for community economic development.

This vulnerability assessment, which covers Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, and Wayne Counties, fulfills the first deliverable of the Regional Resilience Portfolio Program for the Eastern Carolina Region. The RISE Regional Resilience Portfolio Program covers nine areas, which align with the North Carolina Council of Government regions (**Figure 1**).

Figure 1. RISE Councils of Government



The second and final deliverable of each region's RISE Regional Resilience Portfolio Program will be a portfolio of 5–10 projects identified through community input and expert consultation. The portfolio document will outline funding opportunities and potential project partners to enable a clear path toward implementation for each project.

RISE is funded by the U.S. Economic Development Administration and the HUD's CDBG-MIT funds, with in-kind support from NCORR and the North Carolina Rural Center. In addition, the Duke Energy Foundation committed $600,000 in grant funding to support the Regional Resilience Portfolio Program.

I. EXECUTIVE SUMMARY

The RISE Eastern Carolina Regional Resilience Portfolio Program is an initiative to support and expand resilience efforts throughout the Eastern Carolina Region. This program addresses community concerns about vulnerabilities by engaging stakeholders and members of the public throughout the program's execution. The regional resilience projects developed in this program will increase safety among residents and visitors, support the regional economy, and protect valuable natural resources. This vulnerability assessment bridges science and local knowledge to identify current and future hazards impacting the region and analyzes the region's strengths and challenges when faced with those hazards.

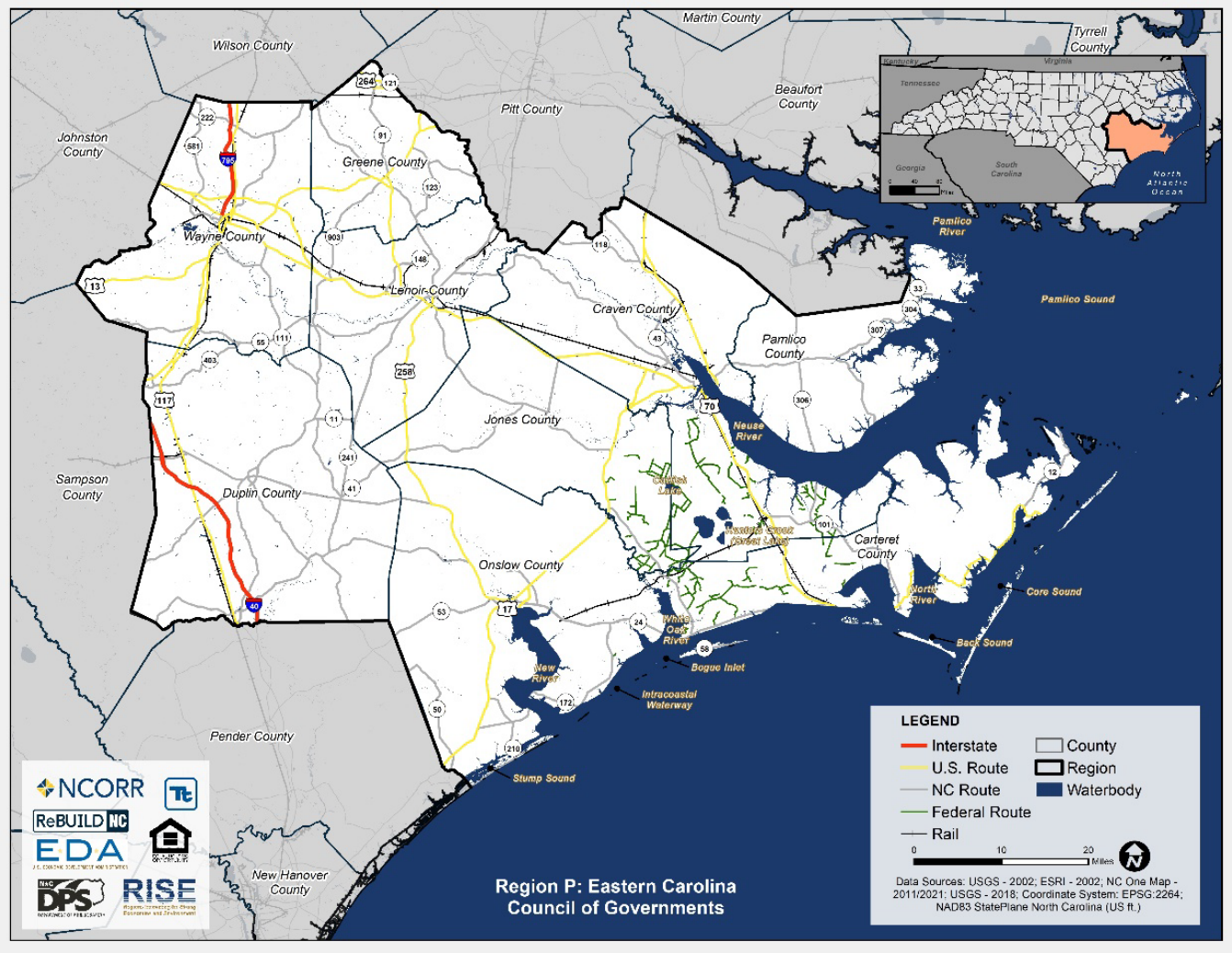
Partner organizations in this project include:

- Eastern Carolina Council of Governments
- North Carolina Office of Recovery and Resiliency
- North Carolina Rural Center
- Tetra Tech, Inc.

A. The Eastern Carolina Region

The Eastern Carolina Region occupies the central portion of North Carolina's coast. The region includes the counties of Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, and Wayne, as shown in **Figure 2.** The Eastern Carolina Region has a total land area of 5,710 square miles. As noted in the 2019 Comprehensive Economic Development Study for the Eastern Carolina Region, the region "consists of nine counties and 62 municipalities. The geography of the region varies significantly from rural agriculture to urbanizing areas and coastal tourist towns." (Eastern Carolina Council of Governments 2019)

Figure 2. The Eastern Carolina Region



Project Team

The planning effort in the Eastern Carolina Region is led by a project team composed of an NCORR representative, the Eastern Carolina Council, Tetra Tech, Inc., and a regional facilitator. The Eastern Carolina Council offered project guidance, and Tetra Tech, Inc. provided technical assistance. The North Carolina Rural Center hired a local leader to provide facilitation support at the many stakeholder and public meetings held during the planning process.

Stakeholder Partnership

The planning effort in the region is informed by a Stakeholder Partnership to ensure the vulnerabilities identified reflect local priorities. The Stakeholder Partnership's responsibilities include the following:

- Steer the implementation of the project by providing local input and perspective
- Review project materials to ensure materials reflect local priorities and address local concerns
- Attend monthly meetings

The Stakeholder Partnership, consisting of 54 local subject matter experts, represents a cross-section of stakeholders from the region, including representatives from all counties and sectors. Development of the Stakeholder Partnership also considered diversity in race, gender, abilities, and age.

Public Workshops

Public workshops were held in the Eastern Carolina Region to gather input on local concerns. Due to the continued impacts of the COVID-19 pandemic and a surge of cases in the spring of 2022, these workshops were held virtually on April 12 and 23, 2022. Despite efforts to encourage attendance through offering multiple workshops on different dates and times, attendance at these workshops was limited. Nonetheless, the public comments collected during these workshops provided valuable information to inform this vulnerability assessment.

B. Summary of Findings

The need for a greater focus on building resilience has been demonstrated by feedback from the Eastern Carolina Region's stakeholders and the public. When surveyed, 93 percent of the Stakeholder Partnership agreed or strongly agreed that natural disasters will impact the region more severely and frequently over the next 30 years. These results indicate the need for long-term solutions that strengthen the capacity of the region's households, communities, businesses, infrastructure, and the natural environment to prevent, withstand, respond to, and recover from natural disasters and climate hazards.

This vulnerability assessment provides detailed insight regarding the susceptibility of the region to the impacts of climate change and its population, assets, and resources. Summary points for each hazard of concern are listed below.

Social Vulnerability and Equity, Health, and Safety

- Roughly 16% of the population of the Eastern Carolina Region live at or below the poverty level. A lack of access to resources and opportunities can make disaster preparedness and recovery more difficult for people experiencing poverty than others in the community.

Housing, Critical Infrastructure, and Community Support Systems

- Limited safe and affordable housing options throughout the region increases recovery time post-disaster and exacerbates pre-existing disparities and social vulnerabilities. Disasters are felt more severely in communities that are already facing challenges with accessing safe and affordable housing.
- Roadway infrastructure throughout the region is vulnerable to multiple hazards. Past flooding and hurricane events have resulted in extended closures and put the population at risk when evacuation routes are inaccessible. High tide events and extreme rainfall events both cause regular road closures preventing travel to and from work, impacting school transportation, and disrupting the flow of goods and services throughout the region.

Economy

- Agriculture accounts for a significant sector of the regional economy. Flooding, extreme heat, erosion, sea level rise, and drought all threaten the farming and livestock operations which are fundamental to the Eastern Carolina Region's economy.

Natural and Historical Resources

- Projected population increases will drive new development, particularly in areas that are currently suburban and rural. This development will reduce the amount of natural lands available to absorb rainwater and will result in increased flooding.

Summary points for each of the hazards of concern are included below.

Drought

- The areas of western Wayne County and western Lenoir County rely on surface water and are at higher risk of severe drought impacts.
- Droughts could pose significant risk to the region's agricultural industry.

Erosion

- Numerous beaches in Onslow County and Carteret County experience erosional rates of more than 6 feet per year, placing oceanfront development at risk.
- Wetland migration due to sea level rise is likely to lead to significant loss of tidal wetlands in the region.

Extreme Temperature

- Due to climate change, extreme heat events are likely to become more frequent and severe in the region, while extreme cold events should become less frequent and less severe.
- Populations that lack proper heating and cooling are most at risk of extreme temperature events.
- Droughts associated with extreme heat events could pose significant risk to the region's agricultural industry.

Flood

- The region is exposed to various types of flooding, with coastal flooding and stormwater flooding being the largest concerns.
- Heavy rainfall is becoming more frequent in the Eastern Carolina Region.
- Stormwater components are not designed to handle larger rainfall and can be damaged or contribute to stormwater flooding.

Hurricane and Severe Storms

- The region experiences a variety of severe weather events, including numerous secondary hazards like wind, lightning, and hail.
- These events have led to significant damages and impacts.
- The frequency and severity of these events are likely to increase in the future due to climate change.

Sea Level Rise

- Sea level rise is likely to increase the frequency and severity of coastal flooding. Flood maps do not account for sea level rise and therefore under-represent future risk. The region's rate of sea level rise (roughly 0.18 inches per year) is higher than the global average and roughly twice the rate of the southern portions of the state (NC Climate Science 2020).

Tornado

- All of the Eastern Carolina Region is exposed to tornadoes and high wind. The Eastern Carolina Region is located in FEMA Wind Zone III, where wind speeds can reach up to 200 mph (NIST 2011).
- Climate change is warming the atmosphere in the Eastern Carolina Region, meaning storms have potential to be more intense and occur more often.

Wildfire

- Increasing frequency and severity of wildfire will lead to increased damage to natural systems and potential damage to structures
- Projected increases in wildfire risks and associated emissions can have harmful impacts on health.

C. Methodology

As illustrated in **Figure 3** below, the project team followed a detailed process for developing this report.

Figure 3. Methodology for Developing the Vulnerability Assessment

Following a review of existing plans, policies, and programs of the Eastern Carolina Region, the project team surveyed Stakeholder Partnership members to identify the hazards that pose the greatest risk to the region. Respondents ranked hurricanes and coastal storms as posing the greatest risk, followed by inland flooding, including king tide events. Throughout the stakeholder and public engagement process, strong concern for the vulnerability of infrastructure across the region was noted. Eighty-nine percent of stakeholders agreed or strongly agreed that critical infrastructure in the region is at risk from natural or human-caused disasters. Stakeholders noted the following concerns:

- "Roadways and sewage systems are vulnerable to damage from flooding. Severe thunderstorms and tornadoes pose a threat to cell phone towers, cutting communication options from residents."
- "We have one of the state's two major commercial ports in Morehead City, several military installations, … two commercial airports are immediately near the Down East Rural Transportation Planning Organization area (New Bern and Jacksonville) along with a general aviation airport in Beaufort. The North Carolina Railroad Company line's eastern end is in Morehead City/Beaufort; it connects the region directly to the Piedmont cities… by rail and to the wider national network. US 70 and 17 are key highways that connect the area to Wilmington and Norfolk (US 17) and Raleigh (US 70). The NC Global Transpark is located in nearby Kinston."

Additionally, the majority of stakeholders indicated that natural disasters are impacting the region more frequently today than they were in the past (66 percent strongly agree or somewhat agree) and that the region is likely to become more vulnerable to natural disasters in the future (77 percent strongly agree or somewhat agree). Specifically, stakeholders noted:

- "Major hurricanes are becoming an annual event. Winter weather is impacting the region on annual basis. Droughts are becoming more common in the summer months. Severe thunderstorms causing tornadoes and power outages are occurring every spring/summer."
- "Every 5 years seems to be the average [for major tropical storm activity]."
- "There is no indication that these annual events will stop, rather they will become increasingly more frequent. Dealing with natural disasters through many parts of the year will cause a strain on first responders and residents living in the county."
- "Sea level rise [is routinely] paired with more frequent and severe hurricanes and other storm events."

- "We anticipate that climate change will increasingly impact our community in terms of the frequency, intensity, and severity of weather events."

D. Geographic Information System Methodology

2022 Resilience Portfolio

- The risk assessment was updated using best available information.
- Hazard data published between 2014 and 2022 was referenced in the risk assessment.
- 2020 Decennial Census population data and 2015–2019 American Community Survey 5-year estimates were utilized.
- The risk assessment used best available building footprint and parcel data from NC OneMap.
- The critical infrastructure inventory was compiled from NC OneMap and supplemented with Homeland Infrastructure Foundation-Level Data (HIFLD).
- An updated version of Hazus (v5.1) was used to estimate potential impacts to the wind hazards.
- Best available hazard data was used as described in this section.

The following summarizes the asset inventories, methodology, and tools used to support the risk assessment process.

Asset Inventories

Eastern Carolina regional assets were identified to assess potential exposure and loss associated with the hazards of concern. Analysts assessed exposure vulnerability of the following types of assets: population, buildings and critical facilities/infrastructure, and the environment. Some assets may be more vulnerable because of their physical characteristics or socioeconomic uses. To protect individual privacy and the security of critical facilities, information on properties assessed is presented in aggregate, without details about specific individual personal or public properties.

Population

Total population statistics from the 2020 Decennial Census Bureau and 2015–2019 American Community Survey 5-year estimates were used to estimate the exposure and potential impacts to the region's population. Population counts from Census tracts in the region were totaled to estimate total population. The North Carolina State 2018 CDC/ATSDR Social Vulnerability Index (CDC/ATSDR SVI) was also used to identify Census tracts within the region with an SVI ranking of 0.5001 to 0.75 and more than 0.75001. These tracts represented areas of moderate to high social vulnerability and were referenced to assess the region's population at greatest risk to impacts. Limitations of these analyses are recognized, and thus the results are used only to provide a general estimate for planning purposes.

As discussed in Section II (Regional Profile), research has shown that some populations are at greater risk from hazard events because of decreased resources or physical abilities. Vulnerable populations in the Eastern Carolina Region included in the risk assessment are children, elderly, population below the poverty level, population with a disability, population with limited English proficiency, population without a vehicle, and population commuting to work.

Buildings

The building stock inventory was updated regionwide. To develop the building inventory, data was compiled from NC OneMap, i.e., 2021/2022 State Parcels, and North Carolina Emergency Management (NCEM), i.e., 2010 State Building Footprints and 2020 State Building Footprints. The 2010 State Building

Footprints with risk assessment attributes were referenced to assign attributes, i.e., year built, general occupancy class, and square footage, to the building footprints using the BLDG_ID field. Once building footprints were assigned attributes, the data was spatially joined to the 2021/2022 parcel data. The parcel data was used to fill in the gaps for building attributes. If a parcel intersected multiple building footprints, square footage was assigned based on parcel data or building footprint geometry. If the building footprint was the largest building that intersected the parcel, it was assigned the square footage from the parcel data. Otherwise, the square footage was assigned based on the area geometry of the building footprint. If a building footprint intersected multiple parcels with different occupancy classes, general occupancy classes were assigned based on the following priority: (1) residential, (2) government, (3) commercial or industrial, and (4) all other general occupancy classes.

Furthermore, a mobile home inventory was updated regionwide. To develop the mobile home inventory, data was taken from the updated building stock inventory and the HIFLD, i.e., 2022 mobile home parks. Using the updated building stock inventory, mobile homes were extracted using general occupancy class attributes referenced from the 2010 state building footprint data with attributes as well as the spatially joined 2021/2022 parcel data, i.e., PARUSECODE, PARUSEDESC, and PARUSEDSC2 fields. To explore the location of critical facilities in the Eastern Carolina Region, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com).

Critical Infrastructure

Critical infrastructure was compiled from NC One Map, HIFLD, and United States Department of Transportation. Critical infrastructure was categorized into eight major sectors: education facilities; facilities with impacts to public health and environmental systems; healthcare facilities; historic and cultural resource facilities; public service facilities; transportation facilities; utilities; and vulnerable population facilities. The critical infrastructure was assigned attributes such as year built, renovated year, capacity of services, and whether backup power is available (if known). To explore the location of critical infrastructure in the Eastern Carolina Region, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com).

Environment

Land use land cover data was referenced in this risk assessment to analyze changes in the environment for Eastern Carolina. The 2021 Multi-Resolution Land Characteristics (MRLC) National Land Cover Database (NLCD) dataset was used to summarize land use exposure aggregated by agricultural land cover types. Additionally, the 2016 National Oceanic and Atmospheric Administration (NOAA) Marsh Migration dataset was used to illustrate the potential distribution of marsh and wetlands inundated under the potential future sea level rise +1-foot scenario. As sea level rises, higher elevations will become more frequently inundated, allowing for marsh migration landward. At the same time, some lower-lying areas will be so often inundated that the marshes will no longer be able to thrive, becoming lost to open water.

Analysis Methodology

To better understand potential vulnerability and losses associated with hazards of concern, Eastern Carolina Region used standardized tools combined with local, state, and federal data and expertise to conduct the risk assessment. Three different levels of analysis were used depending upon the data available for each hazard, as described below. **Table 1** summarizes the type of analysis conducted by hazard of concern.

- Historic Occurrences and Qualitative Analysis – This analysis includes an examination of historic impacts to understand potential impacts of future events of similar size. In addition, potential impacts and losses are discussed qualitatively using best available data and professional judgement.
- Exposure Assessment – This analysis involves overlaying available spatial hazard layers, or hazards with defined extent and locations, with assets in geographic information systems (GIS) to determine which assets are located in the impact area of the hazard. The analysis highlights which assets are located in the hazard area and may incur future impacts.
- Loss estimation – The FEMA Hazus modeling software was used to estimate potential losses for the hurricane wind hazard.

Table 1. Summary of Risk Assessment Analyses

Hazard	Population	General Building Stock	Critical Facilities and Lifelines
Coastal Erosion	Q	Q	Q
Flood	E	E	E
Hurricane	E, H	E, H	E, H
Sea Level Rise and 2050 1-Percent Annual Chance Flood	E	E	E
Storm Surge	E	E	E
Urban Heat Islands	Q	Q	Q

E – Exposure analysis; H – Hazus analysis; Q – Qualitative analysis

Hazards U.S.– Multi-Hazard (Hazus)

In 1997, FEMA developed a standardized model for estimating losses caused by earthquakes, known as Hazards U.S. or Hazus, in response to the need for more effective national-, state, and community-level planning and the need to identify areas that face the highest risk and potential for loss. FEMA expanded Hazus into a multi-hazard methodology, Hazus-MH, with new models for estimating potential losses from wind (hurricanes) and flood (riverine and coastal) hazards. Hazus is a GIS-based software tool that applies engineering and scientific risk calculations, which hazard and information technology experts developed to provide defensible damage and loss estimates. These methodologies are accepted by FEMA and provide a consistent framework for assessing risk across various hazards. The GIS framework also supports the evaluation of hazards and assessment of inventory and loss estimates for these hazards.

Hazus uses GIS technology to produce detailed maps and analytical reports that estimate a community's direct physical damage to building stock, critical facilities, transportation systems, and utility systems. To generate this information, Hazus uses default Hazus-provided data for inventory, vulnerability, and hazards; this default data can be supplemented with local data to provide a more refined analysis. Damage reports can include induced damage (inundation, fire, threats posed by hazardous materials and debris) and direct economic and social losses (casualties, shelter requirements, and economic impact) depending on the hazard and available local data. Hazus' open data architecture can be used to manage community GIS data in a central location. This software also promotes data output consistency now and, in the future, and standardization of data collection and storage. More information on Hazus is available at http://www.fema.gov/hazus.

In general, modeled losses were estimated in the program using user-defined flood depth grids for the flood analysis and probabilistic analyses were performed to develop expected/estimated distribution of losses (mean return period losses) for hurricane wind hazards. The probabilistic model generates estimated damages and losses for specified return periods (e.g., 100-year and 500-year). **Table 2** displays the various levels of analyses that can be conducted using the Hazus software.

Table 2. Summary of Hazus Analysis Levels

Hazus Analysis Levels	
Level 1	Hazus provided hazard and inventory data with minimal outside data collection or mapping.
Level 2	Analysis involves augmenting the Hazus-provided hazard and inventory data with more recent or detailed data for the study region, referred to as "local data".
Level 3	Analysis involves adjusting the built-in loss estimation models used for the hazard loss analyses. This level is typical done in conjunction with the use of local data.

Erosion Rate

A qualitative assessment was conducted for erosion rates along the coastline of the Eastern Carolina Region. Researchers used information from the NC Division of Coastal Management to assess the potential impacts to the region's assets. The information used in this assessment, which was released in 2020, identifies the 2019 average annual long-term erosion rates along North Carolina's oceanfront. The erosion rates are calculated by using the earliest and most current shorelines and shore-perpendicular transects, measuring the distance between the two shorelines at each transect, and dividing the measured distance by number of years between the two shorelines. This identifies whether accretion (i.e., beaches gain sand), erosion (i.e., beaches lose sand), or no change has occurred between the earliest and most current shorelines. The resulting information is used to update North Carolina's Ocean Hazard Construction Setback Factors and the Ocean Erodible Area of Environmental Concern.

Flood

The 1- and 0.2-percent chance flood events were examined to evaluate Eastern Carolina's risk and vulnerability to the riverine and coastal flood hazard areas. These flood events are generally those considered by planners and evaluated under federal programs such as the NFIP.

The NCORR Eastern Carolina Region is composed of multiple counties. As such, the text below outlines the counties within the region and their effective and letter of map revision (LOMR) Region FEMA Digital Flood Insurance Rate Map (DFIRM) dates:

- Carteret County: June 19, 2020. LOMR – August 28, 2017
- Craven County: June 19, 2020
- Duplin County: June 20, 2018; December 6, 2019; and June 19, 2020. LOMR – October 26, 2018, and October 9, 2020
- Greene County: June 20, 2018. LOMR – October 5, 2018
- Jones County: June 19, 2020
- Lenoir County: June 19, 2020. LOMR – June 13, 2014, and October 5, 2018
- Onslow County: June 2, 2021. LOMR – January 14, 2009, and February 11, 2022
- Pamlico County: June 19, 2020. LOMR – March 11, 2021

- Wayne County: June 20, 2018

The effective FEMA DFIRMs were used to evaluate the region's assets risk to flood exposure.

To estimate exposure to the 1-percent and 0.2-percent annual chance flood events, researchers overlaid DFIRM flood boundaries on the region's assets (building stock, critical infrastructure, and population). Building footprints and critical infrastructure that intersected the flood boundaries were totaled to estimate the total number of buildings and infrastructure located in the flood inundation areas, respectively.

To estimate the total population and vulnerable population at risk of the flood hazard, the DFIRM flood boundaries were used to extract the area of each county in the region located in the 1-percent and 0.2-percent annual chance flood events. The population at risk of flood events was calculated by obtaining the percentage of total land area within the flood hazard for each county, multiplied against the county's total population and vulnerable population types. Additionally, the analysis summarized the total number of persons living in moderate to high socially vulnerable tracts within the region located in the 1-percent and 0.2-percent annual chance flood events. The percentage of total land area of Census tracts with CDC/ASTR SVI rankings of 0.5001 to 0.75 and more than 0.75001 located in the 1-percent and 0.2-percent annual chance flood events was multiplied against the total population and vulnerable population types within these moderate to high SVI tracts. These results were summarized for each county within the region.

Hurricane

A Hazus probabilistic analysis was performed for the Eastern Carolina Region to estimate debris generated and displacement of persons caused by the 50-year hurricane wind mean return period event. The probabilistic Hazus hurricane model activates a database of thousands of potential storms that have tracks and intensities reflecting the full spectrum of Atlantic hurricanes observed since 1886 and identifies those with tracks associated with the region. Hazus contains data on historic hurricane events and wind speeds. It also includes surface roughness and vegetation (tree coverage) maps for the area. Surface roughness and vegetation data support the modeling of wind force across various types of land surfaces. Default demographic and building inventories in Hazus were used for the analysis. Although damages are estimated at the Census tract level, results were presented at the county and regionwide level.

Sea Level Rise and 2050 1-Percent Annual Chance Flood

Sea level rise data (in 1-foot increments) available from the NOAA Office of Coastal Management (NOAA Digital Coast 2022) published in 2017 was considered and used for this analysis to understand the assets within the Eastern Carolina Region that are at risk of impacts from the projected 2050 1-percent annual chance flood event (i.e., sea level rise +1 foot and 1-percent annual chance flood event). Sea level rise data does not include additional storm surge due to a hurricane. Furthermore, the current Flood Insurance Rate Maps (FIRMs) also do not include the effects of sea level rise.

Asset data (population, building stock, and critical infrastructure) were used to support an evaluation of assets at risk of future impacts from the projected 2050 1-percent annual chance flood hazard area. To determine the assets at risk, the region's assets were overlaid with the hazard area. Building footprints and critical infrastructure that intersected the projected 2050 1-percent annual chance flood hazard area were totaled to estimate the total number of buildings and infrastructure located in the projected flood hazard area.

To estimate the total population and vulnerable population at risk of the projected 2050 1-percent annual chance flood hazard area, the projected flood hazard area was used to extract the area of each county in the region located in the 2050 flood hazard area. The population at risk of the 2050 1-percent annual chance flood was calculated by obtaining the percentage of total land area within the projected flood hazard area for each county, multiplied against the county's total population and vulnerable population types. Additionally, the analysis summarized the total number of persons living in moderate to high socially vulnerable tracts within the region located in the projected 2050 1-percent annual chance flood event. The percentage of total land area of Census tracts with CDC/ASTR SVI rankings of 0.5001 to 0.75 and more than 0.75001 located in the projected 2050 1-percent annual chance flood event was multiplied against the total population and vulnerable population types within these moderate to high SVI tracts. These results were summarized for each county within the region.

Storm Surge

An exposure analysis was conducted using the 2014 Sea-Lake Overland Surge from Hurricanes (SLOSH) Model, which represents potential flooding from worst-case combinations of hurricane direction, forward speed, landfall point, and high astronomical tide were used to estimate exposure. Please note these inundation zones do not include riverine flooding caused by hurricane surge or inland freshwater flooding. The 2014 model, developed by the NOAA National Hurricane Center to forecast surges that occur from wind and pressure forces of hurricanes, considers only storm surge height and does not consider the effects of waves. The SLOSH spatial data includes boundaries for Category 1 through Category 4 storm surge events.

Asset data (population, building stock, and critical infrastructure) were used to support an evaluation of assets at risk of future impacts from storm surge. To determine the assets at risk, the region's assets were overlaid with each SLOSH Category 1 through 4 storm surge hazard area. Building footprints and critical infrastructure that intersected the SLOSH Category 1 through 4 storm surge hazard areas were totaled to estimate the total number of buildings and infrastructure located in each storm surge hazard area.

To estimate the total population and vulnerable population at risk of storm surge, the SLOSH Category 1 through 4 storm surge hazard areas were used to extract the area of each county in the region located in storm surge hazard areas. The population at risk of storm surge was calculated by obtaining the percentage of total land area within the SLOSH Category 1 through 4 storm surge hazard areas for each county, multiplied against the county's total population and vulnerable population types. Additionally, the analysis summarized the total number of persons living in moderate to high socially vulnerable tracts within the region located in the storm surge hazard areas. The percentage of total land area of Census tracts with CDC/ASTR SVI rankings of 0.5001 to 0.75 and more than 0.75001 located in the SLOSH Category 1 through 4 storm surge hazard areas was multiplied against the total population and vulnerable population types within these moderate to high SVI tracts. These results were summarized for each county within the region.

Urban Heat Islands

A qualitative assessment was conducted for the urban heat island (UHI) hazard. Information from the Trust for Public Land, Descarte Labs, and United States Geological Survey (USGS) was used to assess the potential impacts to the region's assets. The Urban Heat Island Severity for U.S. Cities – 2019 contains the relative heat severity for every city in the United States derived from imagery from the summers of 2018 and 2019. It shows where certain areas of cities are hotter than the average

temperature for that same city. Knowing where areas of high heat are located can help plan for mitigation strategies.

Considerations for Mitigation and Next Steps

The following items are to be discussed for considerations for the next plan update to enhance the vulnerability assessment:

- Inventory Data

Update risk attributes of building footprints using current tax assessor data.
Update critical facilities with local input and locally available data sources.

- Coastal Erosion

Collect data on historic costs incurred to reconstruct buildings, cultural resources, and/or infrastructure due to coastal erosion impacts.

- Flood

Conduct a Hazus loss analysis (e.g., 100-year flood event) using building footprint risk assessment attributes and updated flood data.

- Hurricanes

Estimate storm surge-related losses using the Hazus flood model if the data is available.
Conduct Hazus loss analysis using user-defined facilities and critical facilities in the latest version of Hazus.

- Sea Level Rise and Projected 2050 1-percent Annual Chance Flood Event

Incorporate modeled 2050 1-percent annual chance flood event data that shows modeled extent of future flood hazard area.

- Urban Heat Islands

Implement locally produced data for analysis if available.

Data Source Summary

Table 3 summarizes the data sources used for the risk assessment for this plan.

Table 3. Risk Assessment Data Documentation

Data	Source	Date	Format
Population Data	Census Bureau; American Community Survey 5-Year Estimates	2020; 2019	Digital (GIS) Format
Social Vulnerability Index	CDC/ATSDR SVI	2018	Digital (GIS) Format
Building Footprints	NCEM	2020	Digital (GIS) Format
Parcel Boundaries	NC One Map	2021/2022	Digital (GIS) Format
Critical Facilities	NC OneMap; HIFLD	2011/2016/2018/2019; 2020/2021/2022	Digital (GIS) Format

Data	Source	Date	Format
2019 Land Cover	USGS/NLCD	2021	Digital (GIS) Format
Marsh Migration	NOAA	2016	Digital (GIS) Format
Erosion Rate	NC Division of Coastal Management	2020	Digital (GIS) Format
Urban Heat Island	The Trust for Public Land	2019	Digital (GIS) Format
Digitized Effective FIRM Maps	NCFRIS; FEMA	2022; 2018/2019/2020/2021	Digital (GIS) Format
Sea Level Rise	NOAA	2017	Digital (GIS) Format
Sea-Lake Overland Surge from Hurricanes (SLOSH) Model	NOAA	2014	Digital (GIS) Format

Limitations

Loss estimates, exposure assessments, and hazard-specific vulnerability evaluations rely on the best available data and methodologies. Uncertainties are inherent in any loss estimation methodology and arise in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from the following:

1. Approximations and simplifications necessary to conduct such a study
2. Incomplete or dated inventory, demographic, or economic parameter data
3. The unique nature, geographic extent, and severity of each hazard
4. Mitigation measures already employed by the participating municipalities
5. The amount of advance notice residents has to prepare for a specific hazard event
6. Uncertainty of climate change projections

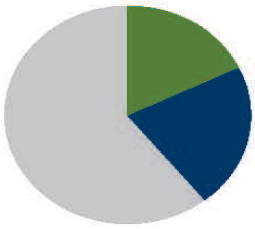
These factors can result in a range of uncertainty in loss estimates, possibly by a factor of two or more. Therefore, potential exposure and loss estimates are approximate. These results do not predict precise results and should be used to understand relative risk. Over the long term, Eastern Carolina communities will collect additional data to collect additional data and update and refine existing inventories to assist in estimating potential losses.

Potential economic loss is based on the present value of the general building stock utilizing best available data. The project team acknowledges significant impacts may occur to critical facilities and infrastructure as a result of these hazard events causing great economic loss. However, monetized damage estimates to critical facilities and infrastructure and economic impacts were not quantified and require more detailed loss analyses. In addition, economic impacts to the industry, such as the tourism and real estate markets, were not analyzed.

Eastern Carolina Regional Profile

POPULATION

Total Population
636,051

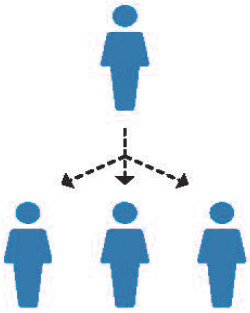


137,571
Number of Persons Under 18

104,014
Number of Persons Over 65

Regional Median Income
$47,145

State Median Income
$56,642



Regional Population Changes

Regional population increased approximately 0.48% from 2010 - 2020.

Regional population is anticipated to increase 6% in the next 30 years.

HOUSING, CRITICAL INFRASTRUCTURE, AND COMMUNITY SUPPORT SERVICES

311,062
Number of Pre-FIRM houses

22.82%
Percentage of residential structures that are mobile homes

1,432
Critical Facilities

628
Number of Utilities

1,658
Roadway Miles

324
Rail Miles

ECONOMY

Educational services, and health care and social assistance

AGRICULTURE

- Number of farms: 2,984
- Acres of farms: 910,981
- Revenue from Agritourism: $2,342,000
- Value of Animal Products: $2,427,492,000

II. REGIONAL PROFILE

A. Physical Setting

The Eastern Carolina Region occupies the central portion of North Carolina's coast. The region includes the counties of Carteret, Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pamlico, and Wayne. The Eastern Carolina Region has a total land area of 5,710 square miles. The region is predominantly rural, with a great deal of wetlands, forests, and agricultural land. Most of the towns in the region are small, with populations of less than 5,000.

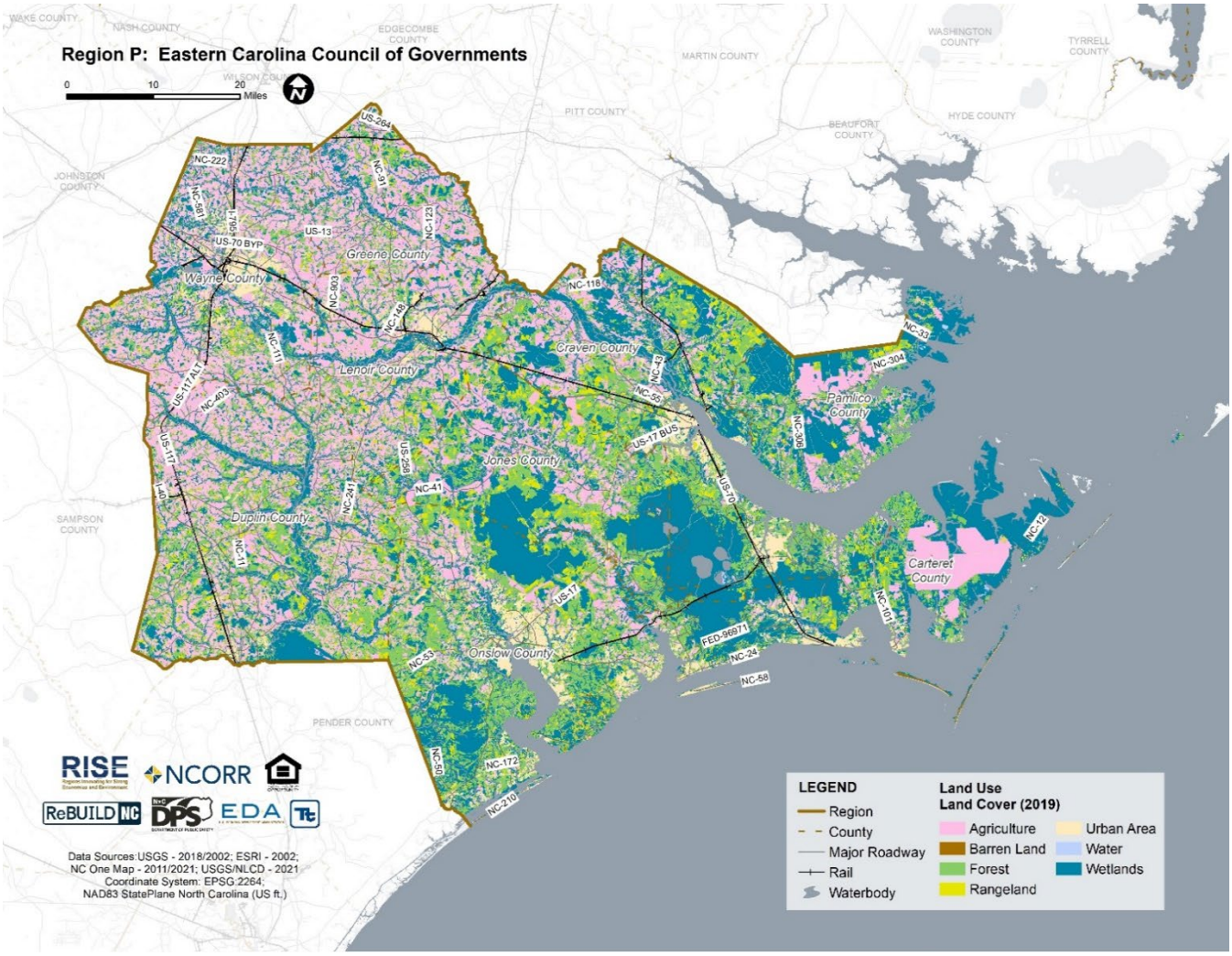
See **Figure 4** for a breakdown of regional land use types. This map illustrates several factors related to regional resilience:

- Extensive agricultural lands, indicating farming as a strong economic driver of region
- Numerous wetlands in the southern and eastern portions of the region, indicating valuable environmental resources and natural habitats which buffer inland communities from coastal hazards
- Strongly defined urban areas such as Goldsboro, Jacksonville, New Bern, and Beaufort

See **Tables 11 - 19 in Appendix A: Additional Data** for a full inventory of regional structures and infrastructure.

Eastern Carolina is home to many rivers and smaller tributaries, contributing to the region's flood-prone nature. Major waterways in the region include the Neuse River, Trent River, New River, and Northeast Cape Fear River.

Figure 4. Land Use Land Cover in the Eastern Carolina Region



B. Population

The total population of the region is 636,051 people, and the most populated cities in the region are Jacksonville (population 70,145) and Goldsboro (population 46,437). Population growth has been slow but steady for the Eastern Carolina Region. The regional population increased by 0.48 percent from 2010 to 2020 (US Census n.d.). Municipal growth has been more rapid in some coastal communities and unincorporated areas (Pamlico Sound RHMP 2020), while other rural communities have experienced negative growth (Neuse River RHMP 2020). According to estimates, the Eastern Carolina Region is expected to grow by roughly 6 percent over the next 30 years, with the highest rates of growth occurring in more urban communities.

Social Vulnerability

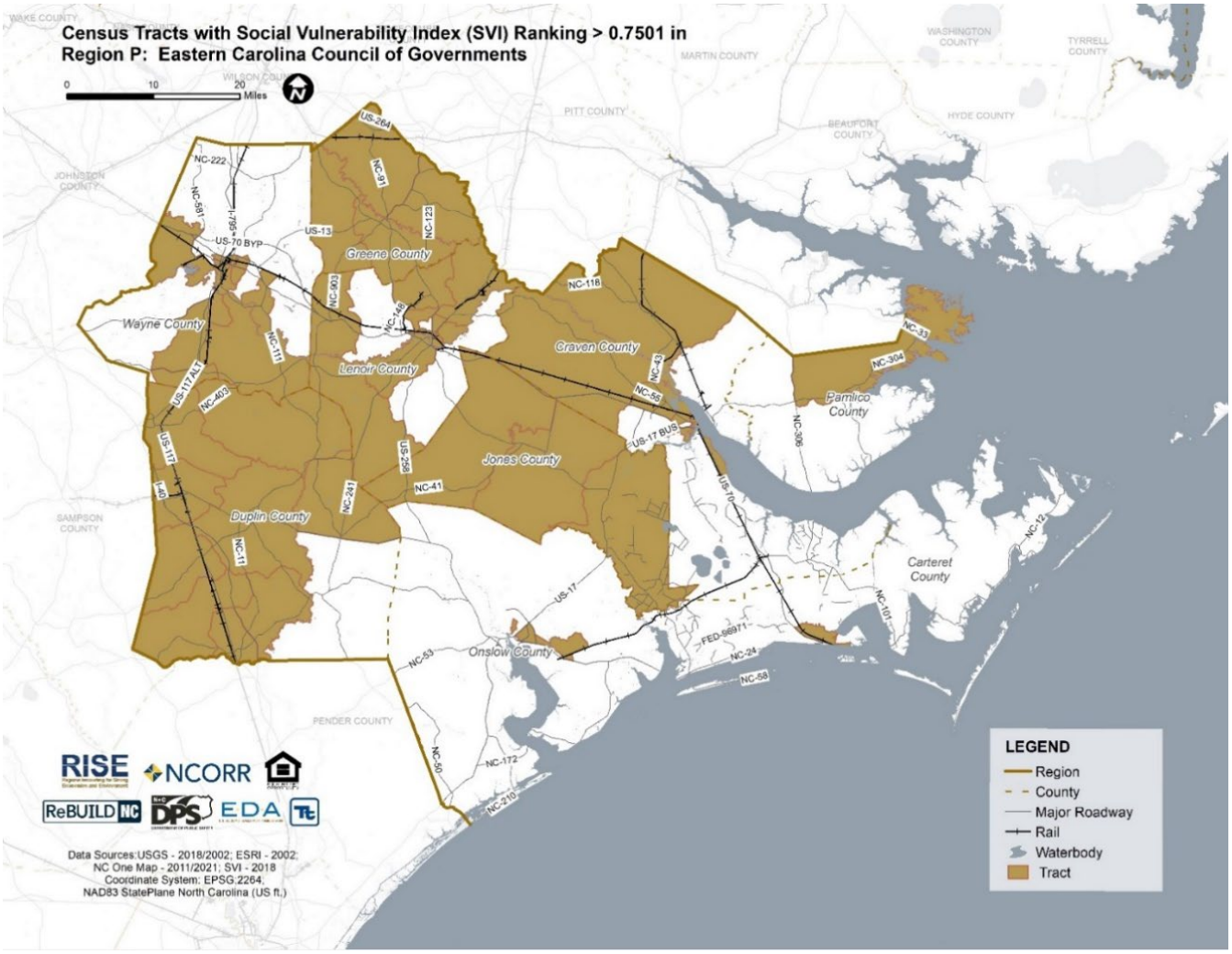
Several populations in the region are particularly vulnerable to disasters. The population over 65 years of age in the Eastern Carolina Region is 104,014 people, and 108,293 individuals in the region have a disability (US Census n.d.). 43,881 are below 5 years of age (US Census n.d.). Mobility issues and

reliance on caregiver assistance make evacuation during events such as tropical storms particularly challenging.

The Eastern Carolina Region also has a high population living in poverty. 102,767 people, roughly 16% of the regional population, live at or below the poverty level (US Census n.d.). A lack of access to resources and opportunities can make disaster preparedness and recovery more difficult for people experiencing poverty than others in the community.

Figure 5 displays the Census tracts in the Eastern Carolina Region with the highest levels of social vulnerability. When these areas are impacted by disasters (such as hurricanes) or climate stressors (such as increased heat), residents are likely to be disproportionally impacted. This creates additional burden on local authorities responsible for responding to emergencies and providing assistance. For information on the region's facilities for vulnerable populations, see **Table 20 in Appendix A.**

Figure 5. Social Vulnerability in the Eastern Carolina Region



Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Figure 6 illustrates several themes of social vulnerability across the region. Shown below are census tracts and their vulnerability related to socioeconomic status, household composition & disability, minority status & language, and housing type & transportation.

Figure 6. Social Vulnerability in the Eastern Carolina Region

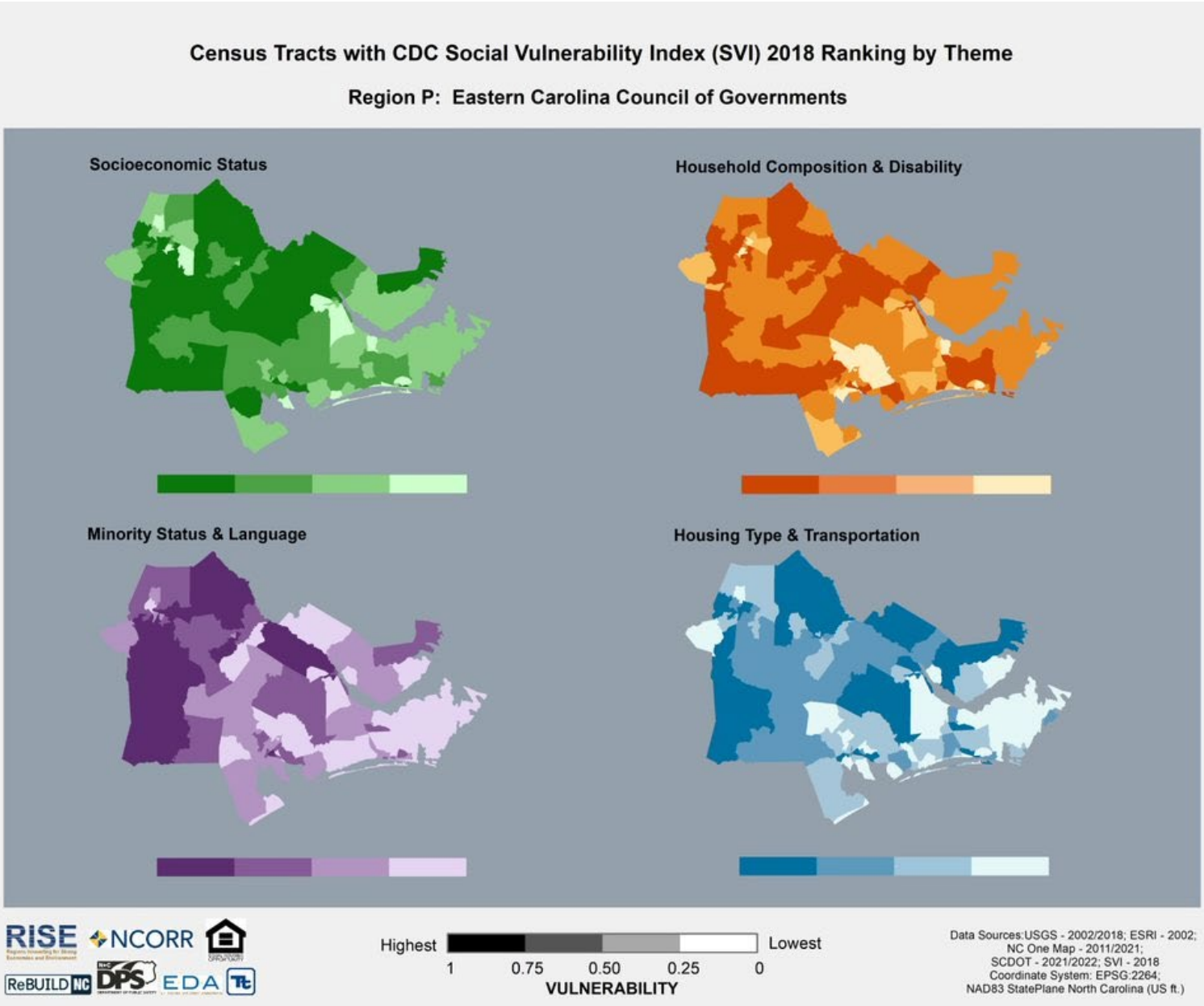


Table 4 below identifies the number of facilities across the region which serve vulnerable populations. Note the high number of both mobile homes and nursing homes.

Table 4. Vulnerable Population Facilities in the Eastern Carolina Region

Vulnerable Population Facility	Total Vulnerable Population Facilities
Emergency Shelter	187
Mobile Homes	96,118
Nursing Homes	66
Eastern Carolina (Total)	**96,371**

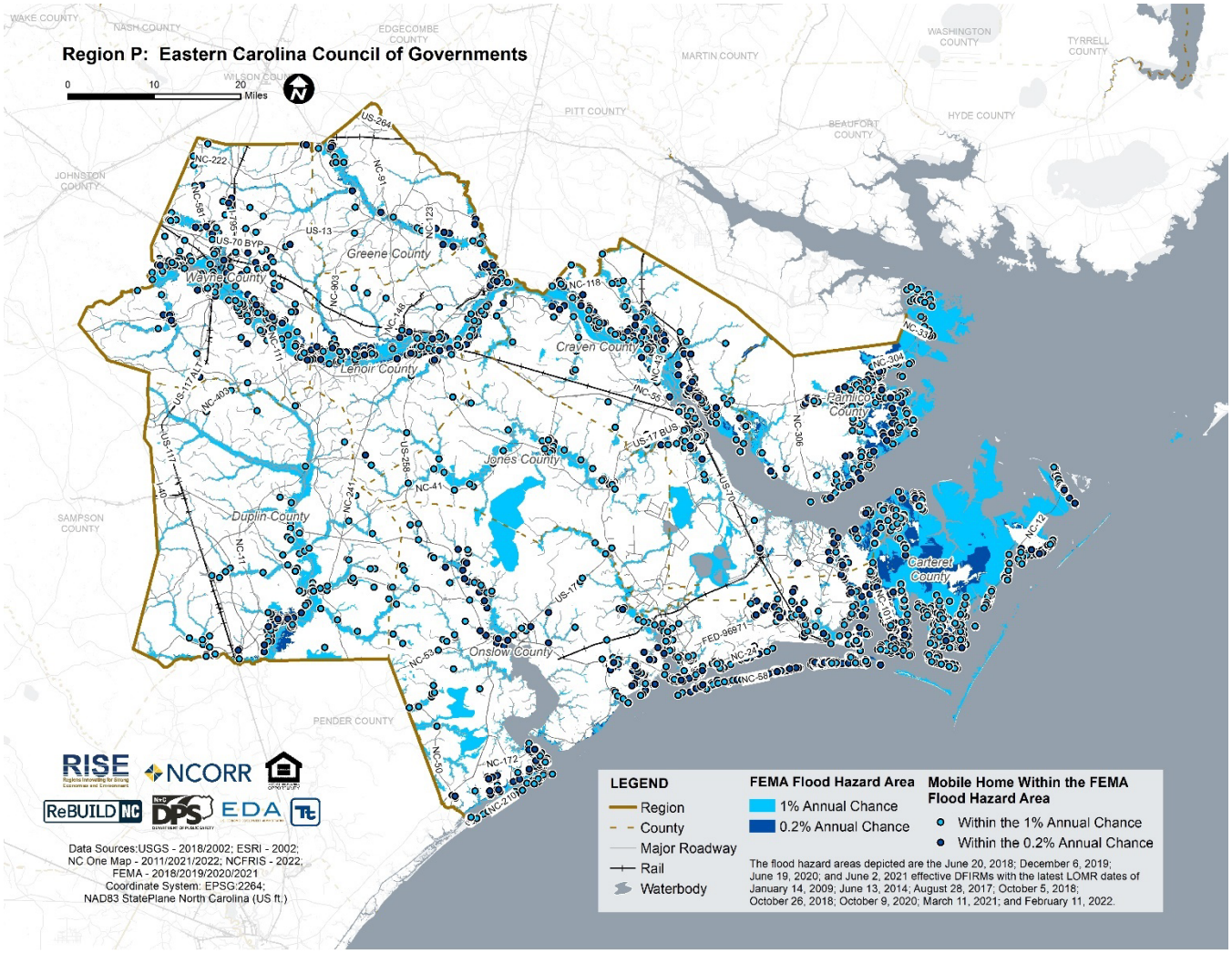
C. Housing, Critical Infrastructure, and Community Support Services

Housing

The Eastern Carolina Region has 243,074 housing units with a median home value of $117,000. 34% of the population rents their home for an average monthly rental rate of $754 (Eastern Carolina Council of Governments 2019). As the region's population grows, home values are expected to increase. Development pressure and a strong tourism economy may also contribute to an increase in the construction of additional housing units.

Given the rural makeup of the region, mobile homes are prominent within the Eastern Carolina Region. 387 mobile home parks and over 95,000 mobile home buildings exist within the region (NC OneMap n.d.). **Figure 7** displays the mobile home park locations in the current Federal Emergency Management Agency (FEMA) Flood Hazard Area. Over 8,400 mobile home buildings are located within the 1-percent annual chance flood hazard area, commonly referred to as the "100-year floodplain." These homes and their residents are exposed to dangerous high flood conditions. If not relocated prior to a severe weather event, mobile homes are more likely to be damaged than traditional residential structures. For information on the number of mobile homes in each county, see **Table 21 in Appendix A.**

Figure 7. Mobile Homes in Eastern Carolina Located in the FEMA Flood Hazard Area



Critical Infrastructure

Critical facilities and infrastructure provide services and functions essential to a community, especially during and after a disaster. Critical facilities include essential facilities, transportation systems, utility systems, high-potential loss facilities (such as nuclear power plants, dams, and military installations), and hazardous material facilities. Transportation systems include roadways, bridges, airways, and waterways. Utility systems include potable water, wastewater, oil, natural gas, electric power facilities, and emergency communication systems. A community lifeline, a type of critical facility, enables the continuous operation of government functions and critical business and is essential to human health and safety or economic security.

More information on the breakdown of the types of essential facilities in the region can be found in **Appendix A.**

Emergency Facilities

Emergency facilities include police, fire, emergency medical services (EMS), and emergency operations centers (EOC). The Eastern Carolina Region has an interconnected network of emergency facilities and services at the county and municipal levels. In total, the region has 444 emergency facilities. These facilities serve as lifelines during and after hazards. In addition to the facilities needing to be protected, access to the facilities is important to maintain their critical services. **Table 5** shows the number of emergency facilities in the Eastern Carolina Region.

Table 5. Emergency Facilities in Eastern Carolina

Emergency Facility	Total Emergency Facilities
EMS	166
EOC	9
Fire Stations	202
Police	67
Eastern Carolina Region (Total)	**444**

Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Hospitals and Medical Facilities

Hospitals and medical facilities provide critical medical support to the Eastern Carolina Region. The region is home to nine major hospitals and many smaller medical facilities. **Table 6** shows the number of health care facilities in the region.

Table 6. Health Care Facilities in the Eastern Carolina Region

Health Care Facility	Total Health Care Facilities
Hospital	9
Medical Facility	524
Pharmacy	170
Public Health Department	9
Eastern Carolina Region (Total)	**710**

Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Shelters

Emergency shelters are a last resort option during and sometimes immediately after a natural disaster. Access to sheltering is vital to prevent loss of life during severe events. In total, the Eastern Carolina Region has 62 emergency shelters, which may need to be used to house citizens before and after an emergency. In addition to these emergency shelters, communities may have unofficial shelters or staging locations for evacuation to official shelters. While not included in traditional sheltering counts, these unofficial sheltering locations are also critical. **Table 7** states the number of emergency shelters in Eastern Carolina by county.

Table 7. Number of Emergency Shelters in Eastern Carolina Region

Total Number of Emergency Shelters in Eastern Carolina Region	
Carteret County	21
Craven County	24
Duplin County	19
Greene County	5
Jones County	7
Lenoir County	24
Onslow County	43
Pamlico County	6
Wayne County	38
Eastern Carolina Region (Total)	**187**

Sources: NC One Map 2019/2020/2021

Government Buildings

Government buildings provide the base for critical government services and exist to maintain continuity of operations. In total, the Eastern Carolina Region has 3,199 government buildings. **Table 8** displays the number of government buildings in the region by county.

Table 8. Number of Government Buildings

County	Government Buildings
Carteret County	581
Craven County	385
Duplin County	208
Greene County	95
Jones County	72
Lenoir County	152
Onslow County	316
Pamlico County	56
Wayne County	1,334
Eastern Carolina Region (Total)	**3,199**

Sources: NC One Map 2021/2022

To explore the location of critical facilities in the Eastern Carolina Region, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com)

Transportation Systems

With the Eastern Carolina Region dominated by sounds and rivers, transportation can be difficult and involve indirect routes and sometimes ferries to move around water. This transportation movement can make evacuation or detours due to damages and hazard impacts slow and increase emergency response times. The region is home to 10,524 miles of roadway and 325 miles of rail. The region classifies 952 miles of roadway as evacuation routes (9 percent of the region's total roadway mileage). Ferries also

serve an important service as critical evacuation infrastructure. **Table 9** shows the total length of critical infrastructure in the region.

Table 9. Total Length of Critical Infrastructure in the Eastern Carolina Region (Miles)

Counties	Roadway	Rail	Evacuation (Road)	Evacuation (Ferry)
Carteret County	1,077	14	96	-
Craven County	1,649	32	137	-
Duplin County	1,640	33	206	-
Greene County	546	-	37	-
Jones County	487	-	55	-
Lenoir County	1,137	9	62	-
Onslow County	1,770	-	175	-
Pamlico County	443	-	-	2
Wayne County	1,775	237	183	-
Eastern Carolina Region (Total)	**10,524**	**325**	**951**	**2**

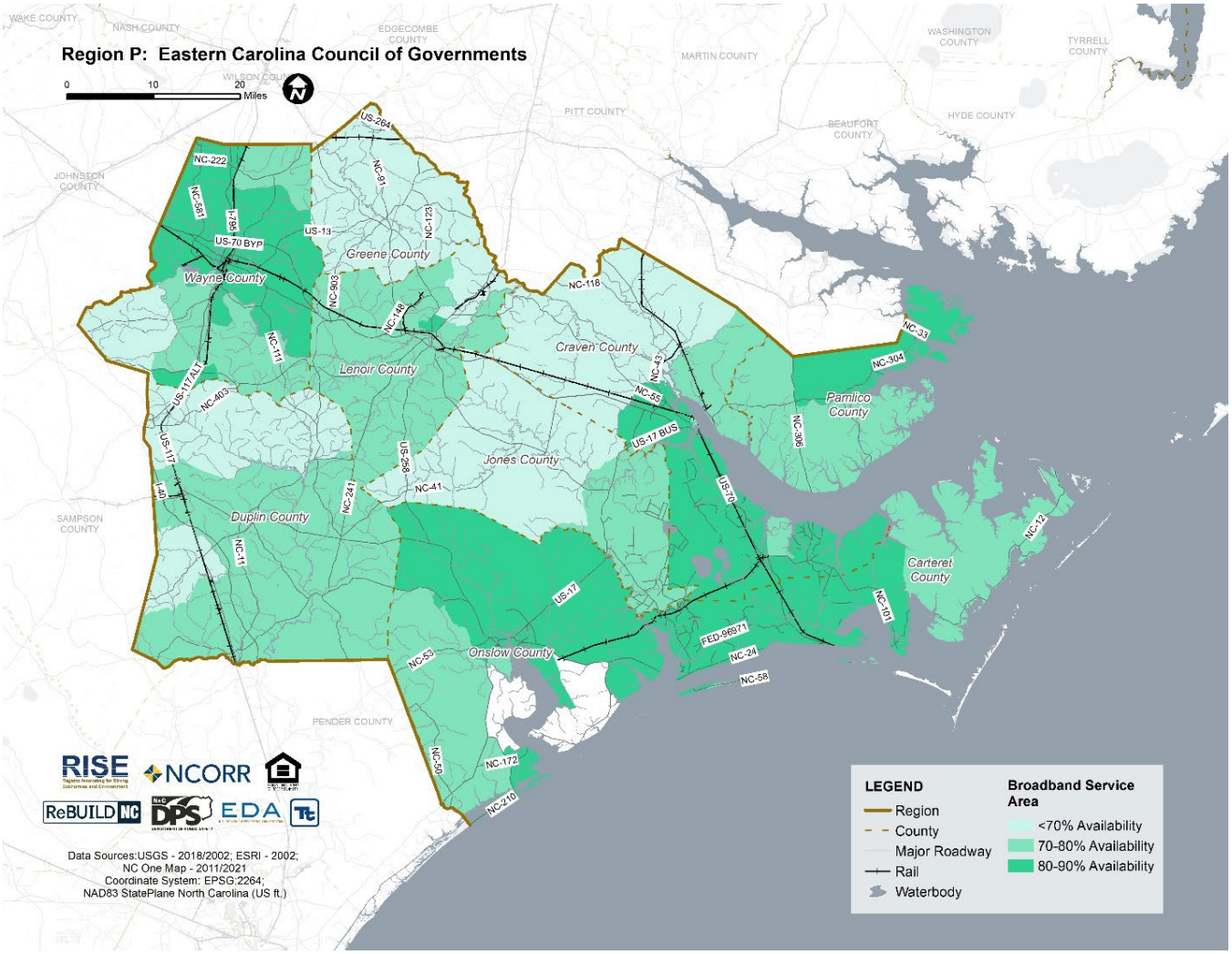
Sources: NCDOT 2015/2020/2021

High-Speed Internet Access

Infrastructure deficiencies include a lack of affordable high-speed internet access. This limits the ability to work remotely and is a concern with the move to electronic textbooks for school-age children. At least 1.1 million North Carolina households lack access to high-speed internet, cannot afford it, or do not have the skills needed to take advantage of the digital economy. North Carolina plans to invest nearly $1 billion in federal American Rescue Plan funds to establish digital equity (NC Department of Information Technology n.d.).

Consistent, reliable access to broadband capabilities is also a challenge for many areas in Eastern Carolina. **Figure 8** shows the prevalence of broadband access within the region. Within Craven, Duplin, Greene, and Jones Counties, there are several large areas where less than 70 percent of communities have access to consistent broadband service. This poses a challenge in keeping the people within these areas adequately informed about impending disasters and available emergency services.

Figure 8. Access to Broadband in the Eastern Carolina Region



D. Economy

One of the dominant industries in Eastern Carolina is agriculture. Regionally, there are nearly 3,000 farms bringing $3,296,000 to the region in direct-to-consumer agriculture sales of produce and animal products (Eastern Carolina Council of Governments 2019). As seen in **Figure 4**, agriculture takes up a sizable amount of land in Greene, Lenoir, and Duplin County as well as in the coastal areas of Carteret County and Pamlico County. In total, the region dedicates over 910,000 acres to agriculture (Eastern Carolina Council of Governments 2019) and has 27,729 buildings devoted to agricultural purposes, with over 9,000 in Duplin County alone.

The largest industries in Eastern Carolina by percentage of the regional economy include the following:

- Retail Trade (15.37%)
- Health Care and Social Assistance (15.26%)
- Accommodation and Food Service (10.53%)
- Manufacturing (9.23%)

- Public Administration (7.17%)

Several economic factors are notable indicators of challenges that Eastern Carolina faces in establishing regional resilience. These factors are listed below and compared to national average rates. **Table 10** shows the resilience-related economic factors for those in the Eastern Carolina Region compared to the U.S. as a whole.

Table 10. Resilience-Related Economic Factors in the Eastern Carolina Region

Economic Factor	Eastern Carolina Rate (2019)	National Rate (2019)
Families Below Poverty Level	14%	11.4%[1]
Labor Force Participation	59%	63.1%[2]
Unemployment Rate	9%	4.0%[3]
Food Insecurity Rate	18%	13.6%[4]

These factors, all of which are higher than national averages, address the socioeconomic status of the region. They are notable here because they represent challenges that individuals and families face as they build their preparedness in the face of regional hazards. Resilience is fundamentally tied to well-being, and factors such as food insecurity and unemployment may limit residents from contributing to regional resilience in the future.

[1] (US Census n.d.)
[2] (U.S. Bureau of Labor and Statistics 2022)
[3] (U.S. Bureau of Labor and Statistics 2022)
[4] (USDA 2022)

III. REGION'S STRENGTHS AND CHALLENGES RELATED TO RESILIENCE

The Eastern Carolina Region is impacted by a wide variety of natural and human-caused hazards. For this planning effort, the Stakeholder Partnership worked to identify hazards of regional concern and provide input on each. Hazards were assessed to determine the following:

- Impact on Social Vulnerability and Equity, Health, and Safety
- Impact on Housing, Critical Infrastructure, and Community Support Systems
- Impact on Economy
- Impact on Natural Environmental Systems
- Impact on Historical and Cultural Resources
- Cascading Impacts on Other Hazards

A. Regional Climate Hazard Overview

Based on a literature review and conversations with stakeholders and the public, the members of the Eastern Carolina project team identified the hazards below to assess for regional vulnerabilities. Each hazard impacts the region in specific ways, and climate change will make many hazard impacts worse for the region. See the hazard-specific sections later in this report for additional details and 30-year climate projections. Below are key takeaways for each hazard.

- Drought

Periods of drought and abnormally dry conditions are occurring more frequently in the Eastern Carolina Region, and severe droughts will likely become more intense.
Loss of surface water and groundwater sources will be devastating for people and the economy, especially the agriculture industry.

- Extreme Temperature

Extreme heat will increase in frequency and duration due to climate change.
Vulnerable populations are especially subject to negative health impacts from extreme temperatures.
Longer periods of more intense heat have negative effects on roadways.

- Flood

The Eastern Carolina Region is extremely vulnerable to several types of flood hazards, including coastal, stormwater, riverine, and more.
Heavier precipitation, stronger storms, and sea level rise will expose the region to flood events of increased frequency and duration.
Vulnerable populations, particularly those who live in mobile homes, are likely to suffer impacts of flooding at a disproportionally high rate.

- Hurricanes and Severe Storms

The Eastern Carolina Region's coastal areas are vulnerable to damage from hurricane winds.
Hurricane intensity is likely to increase due to climate change.
Older buildings and infrastructure (pre-1953) are highly susceptible to damage from hurricane winds.

- Sea Level Rise

Sea level is very certain to continue rising.
Sea level rise is leading to marsh migration and loss of shoreline in the Eastern Carolina Region.
As greater development occurs in coastal communities, more people and infrastructure will be vulnerable to the effects of sea level rise.

- Tornado

Tornado and high wind events are becoming more likely due to climate change.
Agricultural workers are the population group most vulnerable to the immediate effects of tornadoes.
Global climate models project an increase in the frequency of tornadoes across the United States over the middle to late 21st century (Kunkel 2020).

- Wildfire

The Eastern Carolina Region is vulnerable to wildfire events.
Periods of prolonged drought increase the region's risk of wildfire.
As more trees and plants die off due to saltwater exposure from flooding and sea level rise, the risk of wildfire is raised exponentially.

B. Significant Non-Climate Stressors

As detailed above in the Regional Profile, the Eastern Carolina Region faces significant challenges from development and population growth as well as the age of much of its regional infrastructure. These factors will become exacerbated with the impacts of climate change, making investments in regional resilience increasingly important.

Eastern Carolina is likely to see development pressure increase in its urban areas, such as Goldsboro, Jacksonville, New Bern, and Beaufort. The coastal nature of these communities will result in increasing numbers of residents, visitors, structures, and infrastructure at risk from flooding hazards. Costs of additional development coupled with an ongoing need to replace existing infrastructure such as roadways and bridges at the end of their useful life results in the potential for significant costs to the Eastern Carolina Region following a disaster.

Additionally, Eastern Carolina is home to a large socially vulnerable population. 14 percent of families in the Eastern Carolina Region live below the poverty line. Residents with social vulnerabilities are at high risk for impacts during hazard events. These populations may also have limited ability to make changes to their normal behavior when threatened by a hazard and are likely to have lower capability to invest in improvements to their businesses or property to protect from hazard damages.

C. Regional Strengths and Advantages in Relation to Climate Resilience

As noted by members of the Stakeholder Partnership and the public in surveys and workshops, communities throughout the region are adept at preparing for and responding to the natural hazards that most regularly impact the region, notably flooding and tropical storms. These skills will provide an advantage to residents, officials, and support agencies across the Eastern Carolina as preparedness today serves as a foundation for individual and community resilience in the future.

Regional strengths noted in the 2019 Eastern Carolina Council Comprehensive Economic Development Strategy include:

- Access to healthcare
- Agriculture
- Cost of living
- Growing cultural diversity
- Higher education
- Highway and non-highway transportation infrastructure (Airport, rail, port)
- History, heritage, and culture
- Inexpensive land
- Location (middle of the east coast, water access)
- Manufacturing base with an international component
- Military facilities
- Natural environment
- Tourism

Various state and local laws exist to help reduce the impacts of current and future hazards. As an example, Carteret, Craven, Onslow, and Pamlico Counties are subject to the rules and policies of the Coastal Resources Commission, which administers the Coastal Area Management Act (CAMA). The purpose of CAMA is to protect the unique natural resources of the North Carolina coastal areas. Areas of Environmental Concern (AECs) are the foundation of the CAMA regulations. An AEC is an area of natural importance; it may be easily destroyed by erosion or flooding, or it may have environmental, social, economic or aesthetic value. Generally, property is within an AEC if it is:

- In or on navigable waters;
- On marsh or coastal wetlands;
- Within 75 feet of the mean high water line along an estuarine shoreline;
- Near the ocean beach;
- Near an inlet;
- Within 30 feet of the north high water level of areas designated as inland fishing waters by the North Carolina Marine Fisheries Commission; or
- Within 575 feet of the mean high water line along an Outstanding Resource Waters (ORW) shoreline.

Construction activities on properties within an AEC require CAMA permits prior to the application for flood development and building permits. This helps to restrict development in areas prone to erosion and flooding (North Carolina Department of Environmental Quality n.d.).

D. Known Investment or Planning Efforts Underway

The counties of the Eastern Carolina Region all maintain hazard mitigation plans which address the natural and human-caused disasters to which a county is vulnerable. Each plan contains mitigation actions which serve as an ideal way to begin building regional resilience. Many of these mitigation actions address flood risk reduction, increased public awareness of hazards, and other activities which are foundational to building resilience. Portions of the Eastern Carolina Region are covered by:

- Neuse River Regional Hazard Mitigation Plan
- Pamlico Sound Regional Hazard Mitigation Plan
- Sampson-Duplin Regional Hazard Mitigation Plan
- Southeastern Regional Hazard Mitigation Plan

The project team also reviewed and identified potential regional resilience solutions within:

- State of North Carolina Hazard Mitigation Plan
- 2020 North Carolina Climate Risk Assessment and Resilience Plan
- Hurricane Matthew Resilient Redevelopment Plan – Southeast Region
- Hurricane Matthew Resilient Redevelopment Plan – each county within the Eastern Carolina Region

All nine Eastern Carolina counties are well-positioned to seek funding from federal grant sources such as FEMA's Building Resilient Infrastructure and Communities Program, NOAA's National Coastal Resilience Fund, and EPA's Clean Water State Revolving Fund to accelerate local resilience planning and implementation efforts. The State of North Carolina also offers grants to fund resilience actions, including the North Carolina Land and Water Fund – Flood Risk Reduction Program and the North Carolina Department of Environmental Quality's Local Assistance for Stormwater Infrastructure Investments Fund.

E. Recovery Processes and Challenges

The Eastern Carolina Region has been impacted by numerous natural disasters. Each event has had unique recovery challenges. The ordeals of experiencing an event and then attempting to regroup, rebuild, and return to pre-event conditions can result in substantial mental stress (North Carolina Department of Health and Human Services 2015). As climate change increases the frequency of damaging events, mental health struggles are likely to climb in the Eastern Carolina Region.

Hurricane Matthew was among the most impactful hazards the Eastern Carolina Region has faced in recent years. As a result of widespread impacts, the Disaster Recovery Act of 2016 tasked North Carolina Emergency Management with facilitating the creation of resilient redevelopment plans for the 50 counties included in federal disaster declarations for Hurricane Matthew. Hurricane Matthew Resilient Redevelopment Plans were developed for each county in the region. These plans discussed impacts to housing, economic development, infrastructure, agriculture, and the local environments and identified strategies for resilient redevelopment.

Challenges identified in stakeholder and public meetings for the region included:

- Age of regional infrastructure, particularly roads and stormwater systems
- Cost to repair septic and well systems
- Lack of broadband connectivity
- Local codes and policies which encourage redevelopment in hazard-prone areas
- Poor condition of regional infrastructure, particularly roads and stormwater systems
- Slow recovery process following a hazard event

Investments in electrical systems, transportation systems, and stormwater systems will both increase the Eastern Carolina Region's capacity to recover from disasters and also enhance its resilience in the face of a changing climate and growing impacts of natural hazards.

F. Key Gaps in Data and Understanding

Additional data and information on areas targeted for growth would contribute to a comprehensive understanding of where the population may increase throughout the region. This data will provide an

opportunity to identify opportunities for planning and regulatory decisions to reduce risk as the population increases and more individuals are exposed to hazards.

Additionally, an increased understanding of the competing priorities of local elected officials would help frame discussions of regional resilience. While investments in regional resilience may be seen as a lesser concern than investments in education, public safety, and local government services, findings from this report and from engagement with stakeholders and the public throughout this project indicate that prioritizing regional resilience will also provide benefit to the concerns of elected officials in each Eastern Carolina community.

Gaps in data and understanding that were identified during public and stakeholder meetings included:

- Lack of stormwater modeling to determine future stormwater management needs
- Limited mapping of local watersheds at an appropriate level
- Mapping of anticipated development areas
- Limited mapping of individual residential wells and septic systems

IV. DROUGHT

A. Hazard Description

Drought is a normal phase in the climactic cycle of most geographical regions. According to the National Drought Mitigation Center, drought "originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector." Drought is the result of a significant decrease in water supply relative to what is "normal" in a given location.

The severity of a drought depends on the degree of moisture deficiency, the duration, and the size and location of the affected area. The longer the duration of the drought and the larger the area impacted, the more severe the potential impacts (NOAA 2021). According to the Palmer Drought Severity Index, Eastern North Carolina has a relatively high risk for drought hazard as compared to the rest of the State (SENC RHMP, 2021). The year 2007 was recorded as the driest year in more than 100 years in North Carolina by the National Weather Service and set many records for number of days with temperatures above 90°F (Southeastern NC RHMP 2021).

The Eastern Carolina Region regularly experiences periods of drought. Due to the size of the region, the severity of drought has varied across the region.

A recent example of extreme drought impacting the region occurred in June and July, 2011. The region received less than normal amounts of precipitation the previous winter, leading to streamflows and groundwater levels lower than normal. As of June 1st, 2011, local Climatological Data Sites New Bern and Cape Hatteras observed fifty-one and seventy-seven percent of normal precipitation, respectively. As a result of these conditions, the North Carolina Department of Environment and Natural Resources banned open burning in Eastern North Carolina. Hot and dry conditions also helped maintain wildfires in Onslow and mainland Dare Counties (NOAA NCEI 2022).

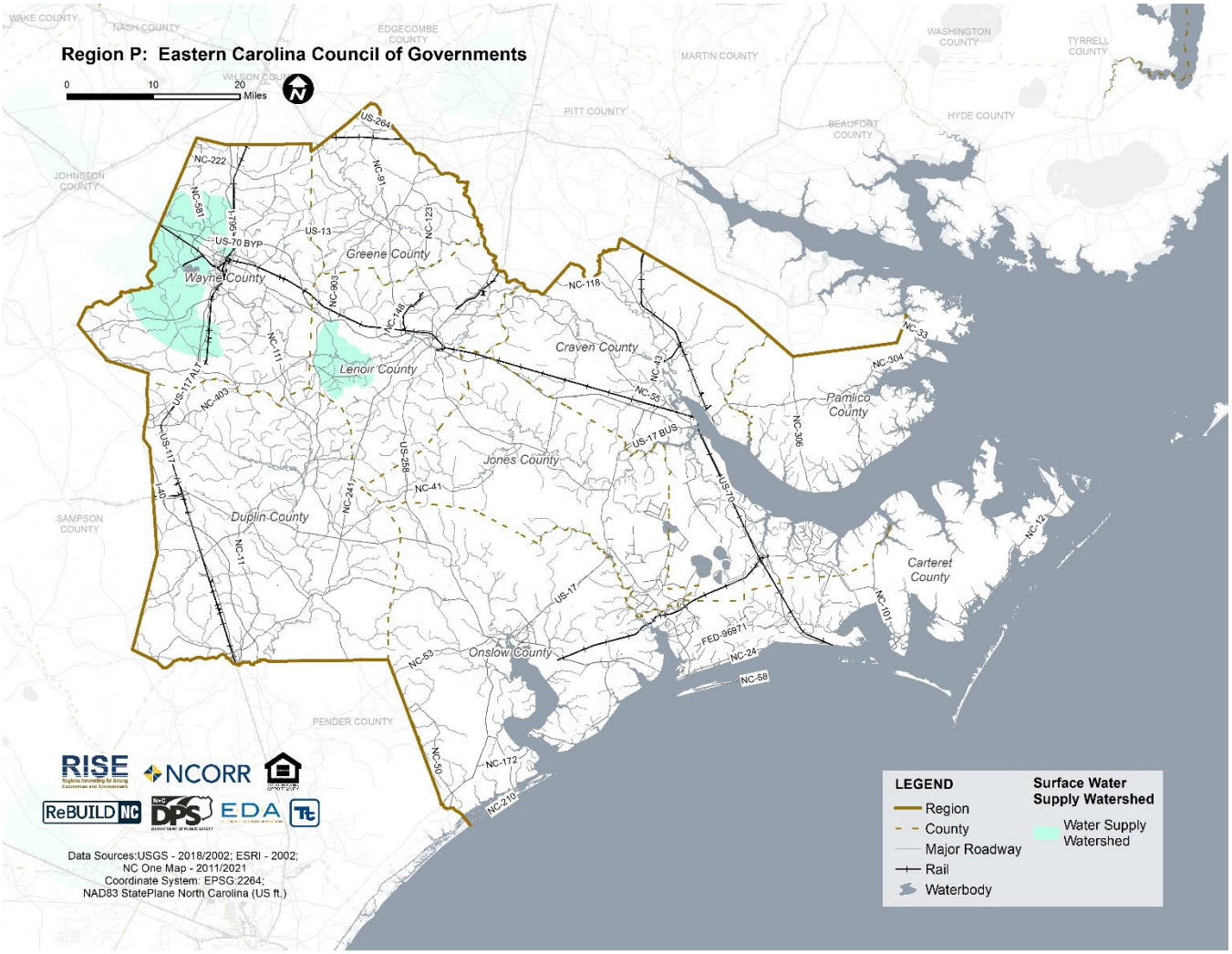
B. Location and Extent

The entire population of the Eastern Carolina Region is exposed to drought. Droughts can impact portions or the entirety of the region based upon precipitation patterns.

The Eastern Carolina Region is home to a large agricultural industry, which is heavily reliant on existing water resources. Drought can cause a lessened crop yield, wildlife and livestock may become undernourished, land values could decrease, and ultimately, there could be a financial loss for the farmer (International Panel on Climate Change [IPCC] 2016).

Locations that rely on surface water supply are at higher risk to the impacts of drought than those areas that rely primarily on groundwater supply. **Figure 9** shows Eastern Carolina's surface water supply watersheds which are critical for watering crops and providing drinking water to residents and to livestock. Impacts to these watersheds would result in a decrease of available clean water for the region.

Figure 9. Surface Water Supply Watersheds in the Eastern Carolina Region



C. Climate Change Impacts

Climate change will likely increase the frequency and severity of droughts in the region (Kunkel 2020). Droughts can cause deficits in surface and groundwater used for drinking water. If the region experiences an increased draw on freshwater aquifers due to drought conditions and limited supply of surface water, saltwater infusion may become exacerbated, further contaminating groundwater supplies. Warmer temperatures may lead to longer dry seasons and multi-year droughts (James M. Vose 2012).

D. Impact on Social Vulnerability and Equity, Health, and Safety

Public health impacts may include an increase in heat-related illnesses, waterborne illnesses, recreational risks, and limited food availability. Vulnerable populations could be particularly susceptible to impacts from droughts due to age, health conditions, and limited ability to mobilize to shelter, cooling, and medical resources. Other possible impacts to health due to drought include increased recreational risks; effects of air quality; diminished living conditions related to energy limitations (lack of power for HVAC systems, etc.), sanitation, and hygiene; compromised food and nutrition; and increased incidence

of illness and disease. Health implications of drought are numerous. Some drought-related health effects are short-term, while others can be long-term (CDC 2021).

Agricultural workers are most likely to be negatively impacted financially by drought, increasing social vulnerability. 2,984 farms are in operation across the Eastern Carolina Region. According to the USDA, 96 percent of all farms in North Carolina are family-run (United States Department of Agriculture 2017).

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

While associated drought events do not cause impacts on buildings or critical infrastructure, limited water supply can stress critical services such as drinking water supply and water supply for firefighting.

Eastern Carolina is expected to grow at a steady rate, with much of the growth occurring in coastal locations. This growth will require additional housing to accommodate individuals and families. It will also expose more people to future droughts and may exacerbate issues related to limited drinking water. Additionally, increased development will add further challenges to already-stressed freshwater aquifers, which in turn will exacerbate the process of saltwater intrusion across the region.

F. Impact on Economy

A prolonged drought can have a serious economic impact on a community. One impact of drought is its impact on water supply. When drought conditions persist with little to no relief, water restrictions may be put into place by local or state governments. These restrictions may include placing limitations on when or how frequently lawns can be watered, car washing services, or any other recreational/commercial outdoor use of water supplies. In exceptional drought conditions, watering of lawns and crops may not be an option, putting crops at risk of failure. This can lead to crop shortages, which in turn increases the price of food (NC State University 2013).

Increased demand for drinking water can also result in shortages and higher costs for this resource. Industries that rely on water for business are impacted (e.g., landscaping businesses). Although most businesses will still be operational, some may be impacted aesthetically. These aesthetic impacts are most significant within the recreation and tourism industry. Moreover, droughts within another area could impact the food supply and price of food for residents within the region.

Direct impacts of drought include reduced crop yield, increased fire hazard, reduced water levels, and damage to wildlife and fish habitat. When a drought occurs, the agricultural industry is most at risk in terms of economic impact and damage. For example, crops may not mature, leading to a lessened crop yield; wildlife and livestock may become undernourished; land values could decrease; and ultimately there could be a financial loss for the farmer (IPCC 2016). The Eastern Carolina Region has over 820,000 acres of agricultural land, which puts the region at great economic risk in the event of a drought.

G. Impact on Natural Environmental Systems

Droughts can trigger wildfires, increase insect infestations, and exacerbate the spread of disease (IPCC 2016). Droughts also impact water resources that are relied upon by aquatic and terrestrial species. Ecologically sensitive areas, such as wetlands, can be particularly vulnerable to drought because they depend on steady water levels and soil moisture availability to sustain growth. As a result, these types of habitats can be negatively impacted after long periods of dryness (NJDEP 2017).

Droughts also have the potential to increase water pollution. Without rainfall, chemicals that make their way into water sources are not diluted. Contaminated water supplies may be harmful to plants and animals as well as humans. If water is not getting into the soil, the ground will dry up and become unstable. Unstable soil increases the risk of erosion and loss of topsoil (NC State University 2013).

H. Cascading Impacts on Other Hazards

Droughts can cause deficits in surface and groundwater used for drinking water. Drought also has the potential to lead to water pollution due to the lack of rainwater to dilute any chemicals in water sources. Contaminated water supplies may be harmful to plants and animals. While non-point source pollution regularly moves into waterways through runoff, extended periods of dry weather can result in a buildup of non-point source pollutants that wash into waterways at a high volume after the first rainfall, causing more detrimental impacts than normal. If water is not getting into the soils, the ground will dry up and become unstable. Unstable soils increase the risk of erosion and loss of topsoil (NC State University 2013).

Drought also increases the risk of wildfire. For example, drought worsened the 2008–2009 Pocosin Lakes National Wildlife Refuge wildfire. Dry conditions allowed peat soil to burn, increasing the fire's severity and allowing the fire to spread underground (North Carolina Department of Public Safety [NCDPS] 2018).

I. Additional Data Needs

Key gaps in data and understanding that were identified during review of available scientific information and public and stakeholder meetings included:

- Drought's impact on agriculture is assessed based on drought having impacts on all sectors of the agriculture industry in the region. Better understanding of the ability of current and future agricultural practices to withstand drought conditions is needed to determine vulnerability more accurately.
- Analysis of anticipated future development/land use would allow for better understanding of future water needs in the region and where drought impacts are likely to be felt strongest (agriculture, landscaping, etc.).

V. EROSION

A. Hazard Description

Erosion is one of the primary hazards leading to property and infrastructure damage in coastal areas. Many natural factors affect shoreline erosion of the shoreline, including:

- Shoreline orientation
- Decreased sediment supplies
- Impacts from hurricanes and other coastal storms
- Storm-induced high water
- Wave action on inland waters
- Response of these factors to storm frequency and sea level rise

Beach composition influences erosion rates as well. For example, a beach composed of a finer sand and silt, such as many of the beaches found in Onslow and Carteret Counties, is easily eroded compared to beaches primarily consisting of course sand, boulders, gravel, or large rocks, which are more resistant to erosion.

Coastal erosion can result in significant economic loss through the destruction of buildings, roads, infrastructure, natural resources, and wildlife habitats. Damage often results from an episodic event such as a hurricane or other coastal storm, with the combination of severe storm waves and dune or bluff erosion.

Erosion results in the transfer of sediment from one location to another. The addition of sediment to a location is referred to as accretion. Accretion can be beneficial if it strengthens a shoreline, leading to wider beaches and more material for dune building. However, accretion can also result in the narrowing of channels and inlets, which can ultimately lead to a potential increase of coastal flooding risk or lack of safe water access for emergency response boats.

Wetlands Retreat

Wetlands are areas where water covers the soil for at least part of the year. Wetlands include a variety of natural systems, such as marshes, swamps, bottomland hardwoods, pocosins, and wet flats. While each wetland type looks and functions differently, the prolonged presence of water causes the growth of specially adapted plants and the development of wetland (hydric) soils (NCDEQ n.d.).

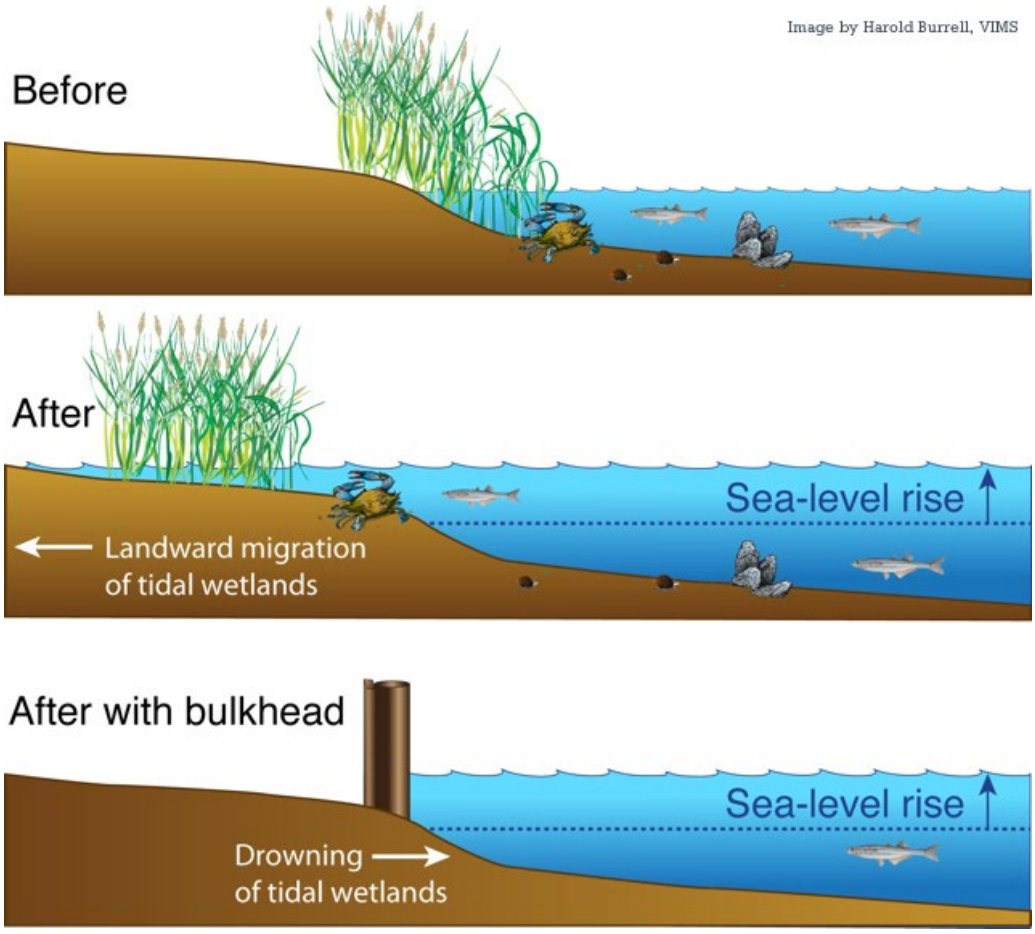
Wetlands provide a variety of important services, including:

- Water quality protection
- Flood protection
- Shoreline erosion protection
- Fish and wildlife habitat

Figure 10 displays wetlands retreat and its impact on shoreline protection. Wetland retreat is the process of these habitats migrating inland due to changes in the environment. Wetlands migrate inland due to the increased salinity of surrounding waters, often due to ocean waters rising higher and moving further inland. As erosion impacts coastal areas of the Eastern Carolina Region, wetlands are impacted and shift

accordingly. This shift affects agricultural lands and developed areas, putting people, infrastructure, farms, and livestock at further risk.

Figure 10. Wetlands Retreat and the Impact of Shoreline Protection



(Burrell 2009)

B. Location and Extent

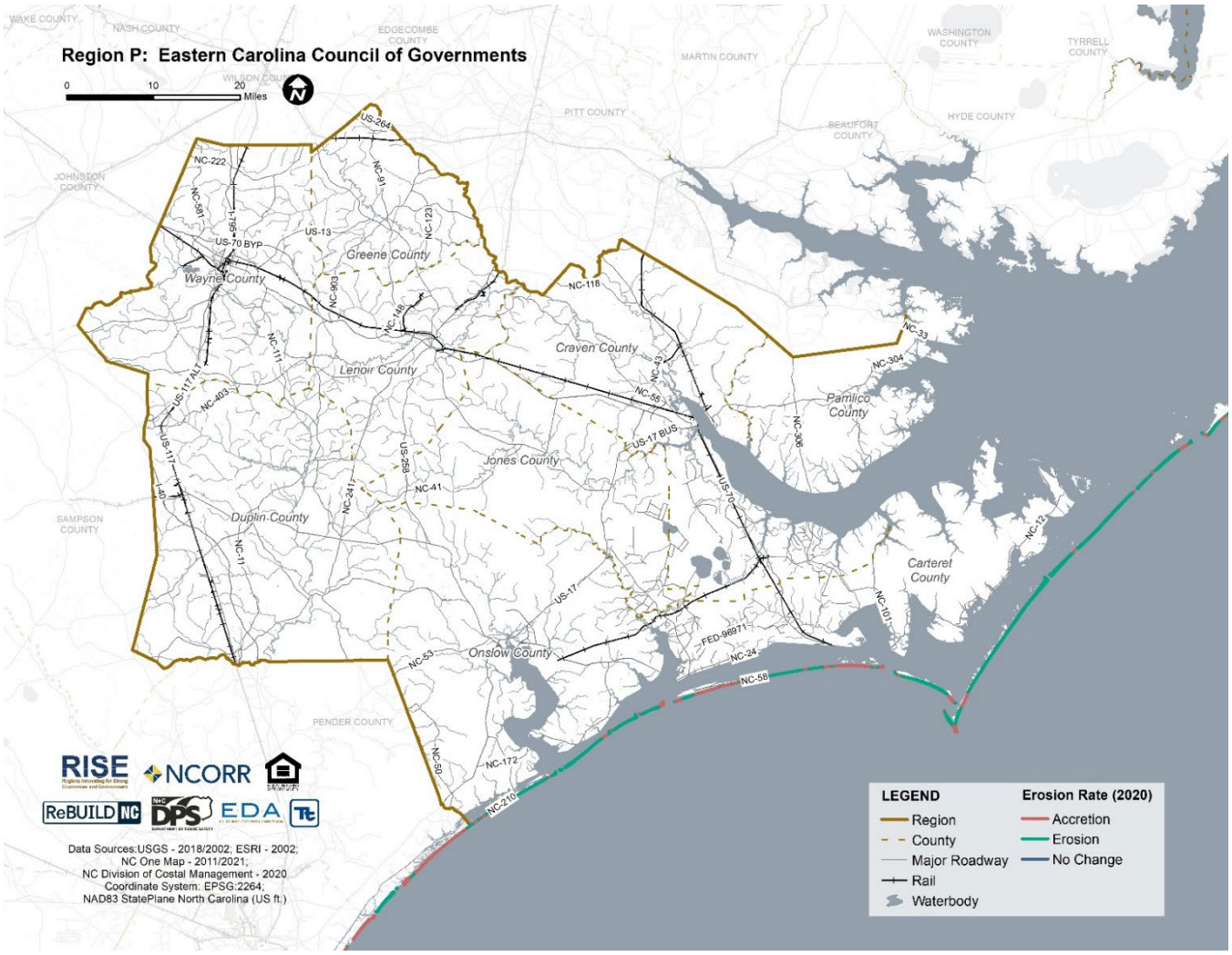
Long-term erosion rates throughout the Eastern Carolina Region vary significantly because of geology and the physical nature of different locations along the shoreline. Although structural and other measures can be taken to reduce the impact or frequency of this hazard, all shorelines in the Eastern Carolina Region are vulnerable to erosion. The properties most at risk of coastal erosion will be those located within 200 feet of the erodible shoreline and beaches.

Barrier islands are notably prone to large impacts from erosion. Erosion is responsible for the position and shape of most barrier islands, outside of human influence. When eroded sediment is carried a long distance away, barrier islands can shift their entire location or break into multiple segments, typically with one end of the island lengthening due to accretion.

Locations that have historically experienced erosion and accretion in the Eastern Carolina Region's Atlantic Ocean shorelines are shown in **Figure 11**. Areas of particular concern are located near North

Topsail Beach and Camp LeJeune. These areas experience rates upwards of 9 feet per year, with some localized erosion occurring at a rate of 12 feet per year, placing structures and habitats at risk.

Figure 11. Erosion and Accretion on Atlantic Ocean Shorelines in the Eastern Carolina Region



Although oceanfront erosion provides the most dramatic displays of coastal erosion in the Eastern Carolina Region, coastal erosion can take place on natural shorelines bordering any coastal waterbodies. Areas along the inland sounds and tributaries in the Eastern Carolina Region are dominated by coastal wetlands. Wetlands can experience episodic erosion when strong storms create enough wave energy on inland waterways to result in scouring of the wetlands edge.

A long-term concern for erosion in the Eastern Carolina Region is the gradual retreat or loss of wetlands due to marsh migration caused by sea level rise. Wetlands act as natural barriers to storm effects. As vegetation is lost to the open ocean, the effects of erosion can occur at a greater frequency. **Figure 12** displays the extensive coverage of wetlands in the Eastern Carolina Region. **Figure 13** shows likely changes in wetlands distribution in 2050 with 1 foot of sea level rise.

Figure 12. Wetlands in the Eastern Carolina Region, Present Day

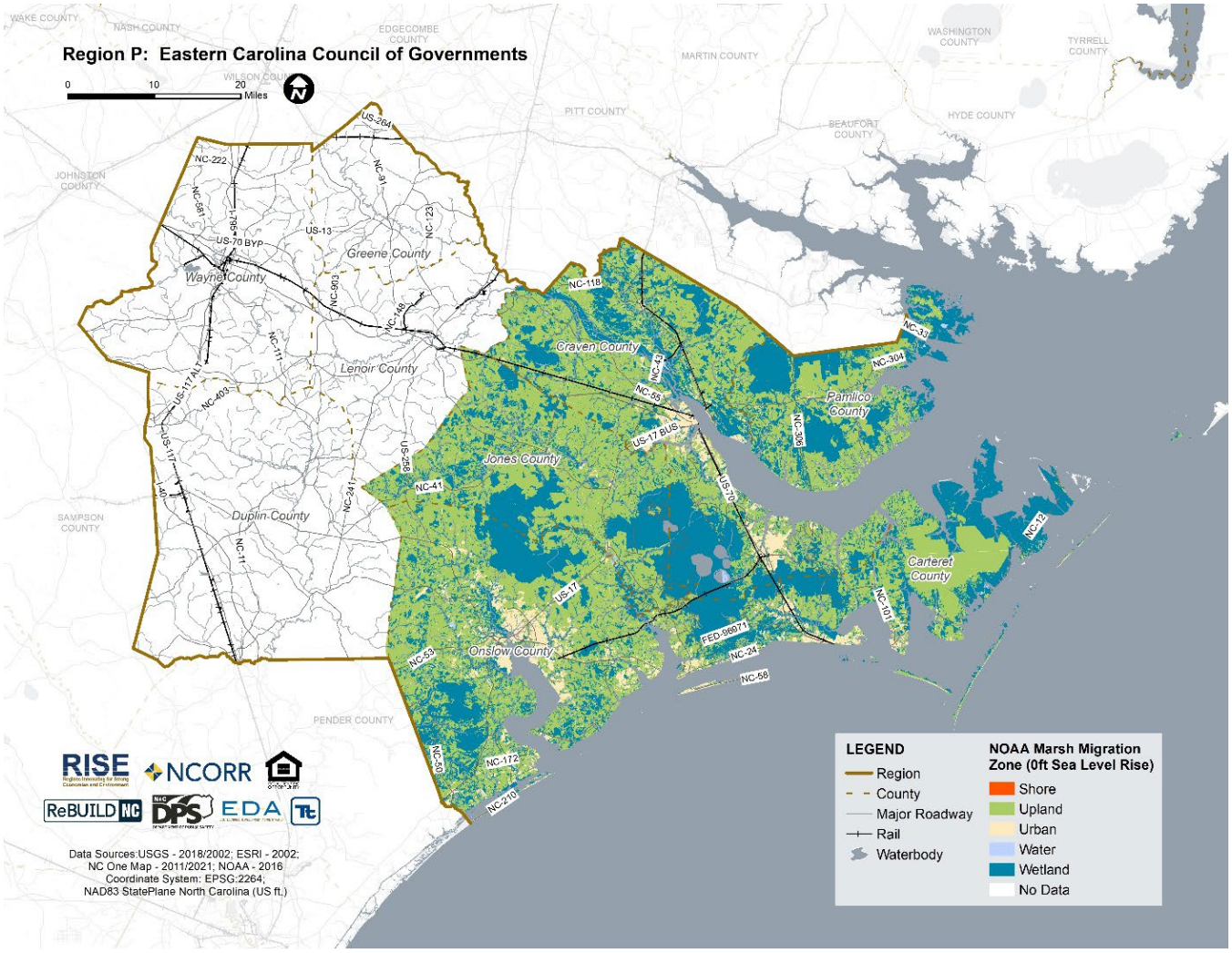
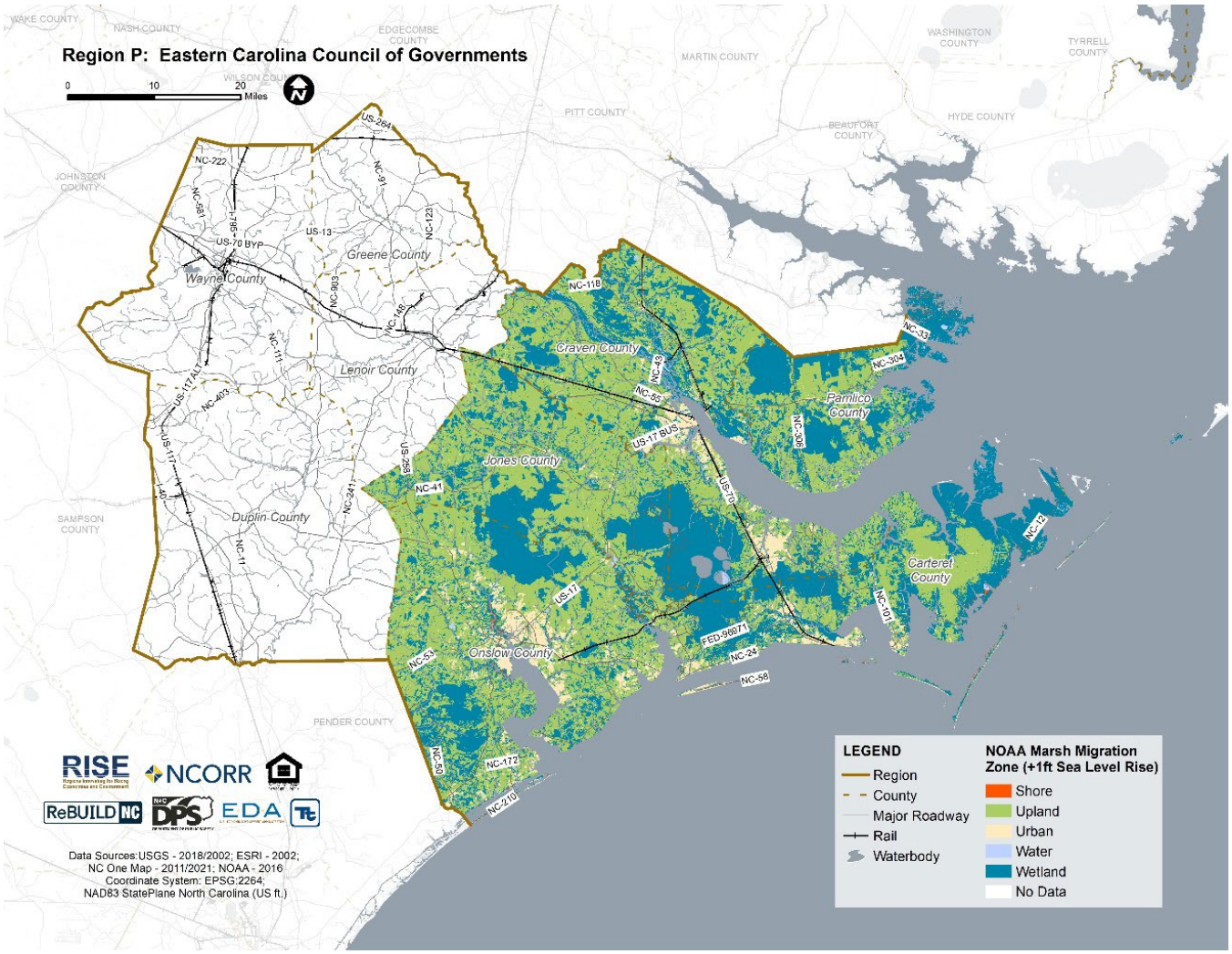


Figure 13. Anticipated Wetland Areas in the Eastern Carolina Region in 2050 Due to 1-Foot of Sea Level Rise



To explore the Eastern Carolina Region's specific exposure to erosion, visit [Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com)].

C. Climate Change Impacts

Impacts of climate change can lead to shoreline erosion, coastal flooding, and water pollution, affecting man-made coastal infrastructures and coastal ecosystems. Coastal areas may be impacted by climate change in different ways. These areas are sensitive to sea level rise, changes in the frequency and intensity of storms, increase in precipitation, and warmer ocean temperatures (US EPA 2017). Temperatures are predicted to increase in the Eastern Carolina Region, which could lead to an increase in intensity and frequency of severe storm events. This may increase shoreline erosion rates due to increased frequency and severity of coastal flooding and coastal storms. The most vulnerable coastal landscapes anticipated to experience exacerbated impacts of erosion due to climate change include coastal wetlands and barrier islands.

D. Impact on Social Vulnerability and Equity, Health, and Safety

Coastal erosion is unlikely to have a direct impact on life, health, and safety. However, the loss of natural systems that provide protection or the weakening of protective structures by coastal erosion increases the likelihood of direct impacts by flooding.

Socially vulnerable populations (e.g., low-income populations, persons with disabilities, and the elderly) in the Eastern Carolina Region may be at the greatest risk to coastal erosion. The cost of interventions to protect properties from coastal erosion risk may financially stress lower- or middle-income residents. Relocating may be difficult because of the expenses and the availability of accessible housing or the time needed to make housing accessible.

The population over the age of 65 may have more difficulty evacuating than younger populations. They may require extra time or outside assistance during evacuations and are more likely to seek or need medical attention, which may not be available due to isolation during a storm event. As climate change intensifies, additional resources will be required to assist older and vulnerable populations in times of emergency.

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

Any buildings or critical facilities located near shorelines could be impacted by coastal erosion. Erosion can result in scouring of foundations and eventual collapse if corrective measures or additional protections are not put in place. Assets located near the oceanfront shoreline have a greater risk of sudden damage and loss from coastal erosion during severe coastal storms with large waves and storm surge. Assets located near wetlands or shorelines are more likely to experience erosion on an incremental basis, potentially providing more time for mitigation measures to be employed.

Coastal erosion can degrade infrastructure and utility lines, depending on their location. Critical services may be interrupted due to direct damage or if transportation corridors that connect these facilities to the community are damaged. Roads that are damaged, particularly evacuation routes, may even isolate residents and can prevent access throughout the region to many service providers needing to reach vulnerable populations. Bridges, ferries, and terminals, which may be considered major corridors for essential services and economic activity in the region, are also vulnerable to coastal erosion due to being located along shorelines.

Results of such coastal erosion have been seen as recently as the spring of 2022. On May 10, the Cape Hatteras National Seashore confirmed reports of an unoccupied house in Rodanthe collapsing into the ocean due to significant erosion. This follows a similar erosion-caused house collapse in Rodanthe on February 9, 2022. “Unfortunately, there may be more houses that collapse onto Seashore beaches in the near future,” said David Hallac, superintendent, National Parks of Eastern North Carolina (National Parks Service 2022). Although these recent examples occurred outside of Eastern Carolina, the threat to the region is the same.

The primary growth areas in Eastern Carolina are coastal communities, which will likely put more people and property at risk of impact by coastal erosion. Development in wetlands in North Carolina requires a permit from either the U.S. Army Corps of Engineers or the N.C. Division of Coastal Management. This reduces the likelihood of wetland services being lost due to development (NC DEQ n.d.) However, development that borders wetlands areas reduces available land for wetlands retreat and increases the likelihood of wetlands loss as sea level rises.

F. Impact on Economy

Rapid coastal erosion, in association with harsh coastal storms, has the potential for financial loss in the local and regional economy. Gradual coastal erosion may also pose a financial risk. These financial risks include but are not limited to general building stock damages and associated tax loss, impacts to utilities and infrastructure, business interruption, and impacts on tourism. Destruction caused by coastal erosion in parks, beaches, and coastal communities that rely on tourism may experience negative economic consequences should the hazard breach these sites. In areas that are directly experiencing coastal erosion, renovations of commercial and industrial buildings may be necessary, disrupting associated services.

G. Impact on Natural Environmental Systems

The loss of natural resources is difficult to quantify; however, their loss would deeply cost the Eastern Carolina Region's counties and communities. The loss of beaches, dunes, wetlands, and other shoreline features would greatly reduce important ecosystems. Wetland areas and coastal habitats are important ecosystems for many species and provide other environmental benefits, such as flood mitigation, that may be altered through chronic coastal flood conditions, erosion, and sea level rise.

H. Impact on Historical and Cultural Resources

Erosion can result in the need to abandon historical buildings and cultural assets such as the Cape Lookout Lighthouse. Older structures that were built at a safe distance from the shoreline may be exposed to flooding and wave damage due to steady or sudden erosion. An example of this impact is the recent demolition of six historic structures in the Cape Lookout National Seashore. Cape Lookout officials noted that unrecoverable damage occurred, and while these structures were representative of important parts of the area's history, they posed a serious threat to visitors and needed to be demolished (Charlotte Observer 2020).

I. Cascading Impacts on Other Hazards

Because altering beach shape and coastal erosion along the Eastern Carolina Region's shorelines could cause changes in land elevation, the impacts of sea level rise may become enhanced. Additionally, receding shorelines make coastal properties more susceptible to flooding (FEMA 2018). For example, flood map projects for coastal communities are evaluated based on erosion assessments. Estimated flood extents may change based upon the level of erosion that has occurred. Loss of wetlands increases the likelihood of water quality issues without the natural filtration provided by wetland plants. While wetland migration inland can help to preserve wetland acreage, it comes at the expense of the habitats that wetlands will replace. To learn more about the relationship between erosion and flooding in coastal communities, see FEMA's 2018 Coastal Erosion Guidance Document (FEMA 2018).

J. Additional Data Needs

Key gaps in data and understanding that were identified during review of available scientific information and public and stakeholder meetings included:

- A review of the cost-effectiveness of implemented erosion mitigation techniques, including hard shoreline stabilization and beach nourishment, is needed to determine the likelihood of future protections being implemented within the Eastern Carolina Region.

- Modeling that uses sea level rise projections and future storm occurrence to project future erosional hotspots and likely location of washover and inlet breaches would allow for a more accurate vulnerability assessment and the informing of land use and development decision making.
- Riverine erosion, which involves the scouring of riverbanks by rivers, streams, and creeks, may also be a localized problem in the Eastern Carolina Region in some locations. Riverine erosion is typically found in rivers that have a high rate of flow over changes in elevation. While the majority of the region's river systems have small changes in elevation as they empty into sounds, some inland stretches of rivers could experience riverine erosion. Information on the locations of any riverine erosion and riverine shorelines prone to erosion would benefit future planning efforts.
- Mapping of areas of anticipated future development in coastal areas would allow for better understanding of where future development may be at risk of erosion and prevent wetlands migration into upland areas.

VI. EXTREME TEMPERATURE

A. Hazard Description

Extreme temperature includes both heat and cold events, which can significantly impact human health, commercial/agricultural businesses, and primary and secondary effects on infrastructure (e.g., burst pipes and power failure). What constitutes *extreme cold* or *extreme heat* can vary across different areas of the country based upon what the population is accustomed to. The potential issues identified with extreme temperature events include:

The Eastern Carolina Region has a long history of extreme temperature events. Four extreme heat events took place in the Eastern Carolina Region in 2019 and 2020. Events on July 13 and 21, 2019, and September 2 and 3, 2020, all saw extreme heat index values between 105°F and 115°F (NOAA NCEI 2022) which pose danger to individuals with prolonged exposure to outdoor temperatures.

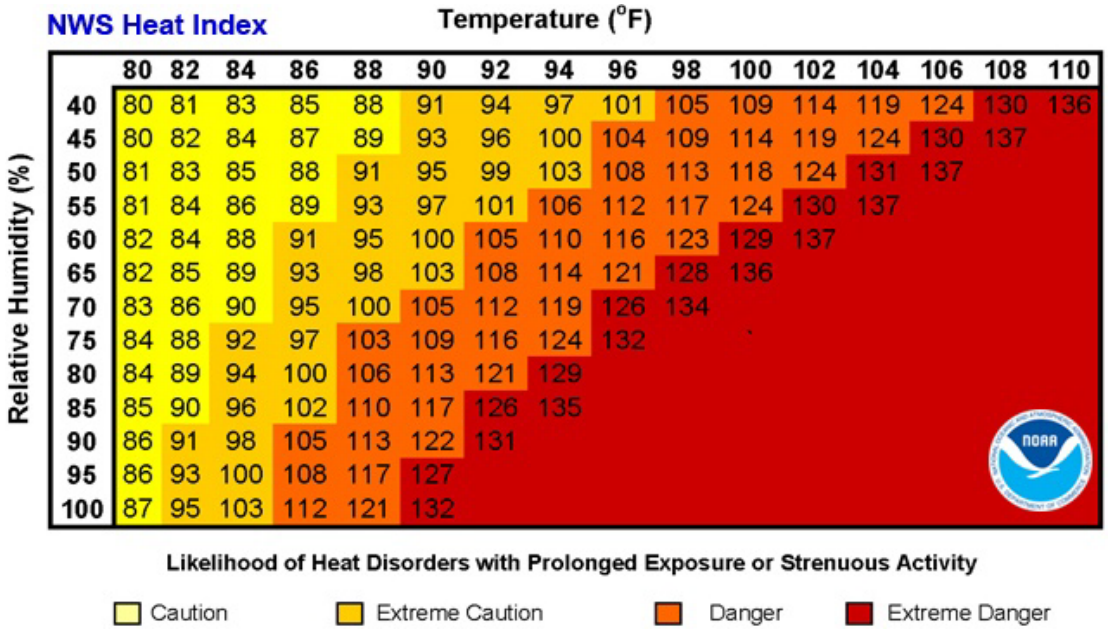
- Prolonged extreme heat events can lead to drought conditions, impacting the drinking water supply for residents and increasing the likelihood of wildfires.
- Vulnerable populations, such as the aging, youth, homeless, BIPOC communities, and individuals with existing conditions, are less able to withstand extreme temperatures.
- Extreme temperature events can damage aging infrastructure and buildings. Highways, roads, and roofs are damaged by excessive heat as the asphalt softens and breaks down. Other construction materials can be damaged from freeze and thaw cycles, which lead to potholes.
- Homeless individuals experience an acute vulnerability to extreme temperatures owing to the lack of sheltering and exposure to the elements.
- Extreme temperatures, both hot and cold, can cause power outages, leading to cascading impacts.

This report focuses predominantly on extreme heat, as incidents of extreme cold pose a significantly smaller risk to the Eastern Carolina Region.

Extreme Heat

Extreme heat is defined as summertime temperatures that are much hotter and/or humid than average (CDC 2017). The extent of extreme heat temperatures is measured through the Heat Index, identified in **Figure 14**. The Heat Index was created by the National Weather Service (NWS) to accurately measure apparent temperature of the air as it increases with the relative humidity. Temperature and relative humidity are needed to determine the Heat Index (NC State Climate Office 2022).

Figure 14. Heat Index Chart



(NWS n.d.)

B. Location and Extent

Extreme heat can occur anywhere within the Eastern Carolina Region. Excessive heat incidents are widespread, even if there are localized cooler areas. Extreme heat temperatures occur throughout the region for most of the summer season. High-pressure systems can move off the Atlantic coast and become stagnant for several days.

Areas of dense urban development are especially vulnerable to the UHI effect that can further raise temperatures. UHIs occur when communities replace natural land cover with impervious surfaces (buildings, pavement, etc.) that absorb and retain heat. This effect increases energy costs, air pollution levels, and heat-related mortality and illness (US EPA 2022).

Figure 15 below shows areas of the Eastern Carolina Region affected by heat islands.

Figure 15. Urban Heat Island and Socially Vulnerable Census Tracts

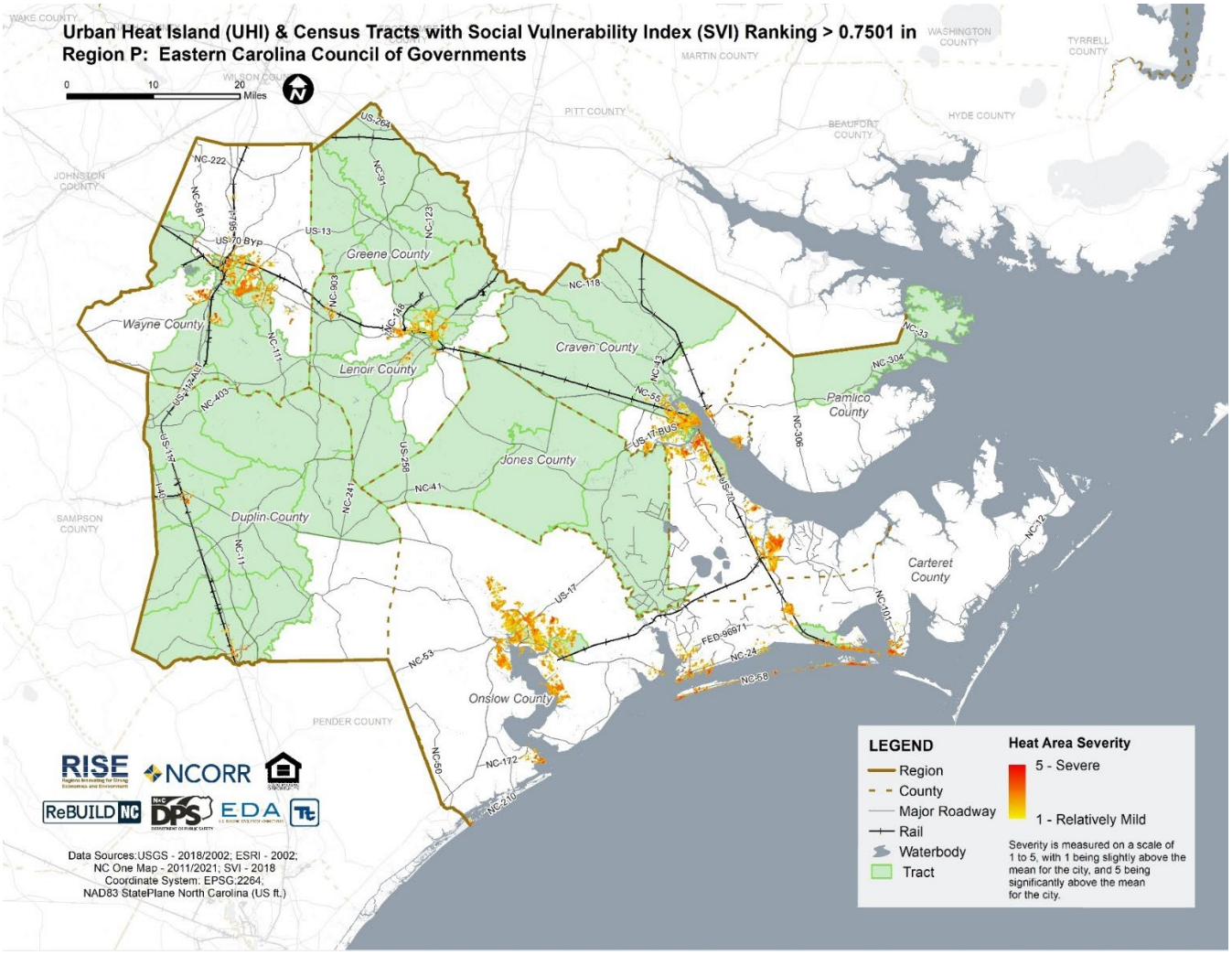
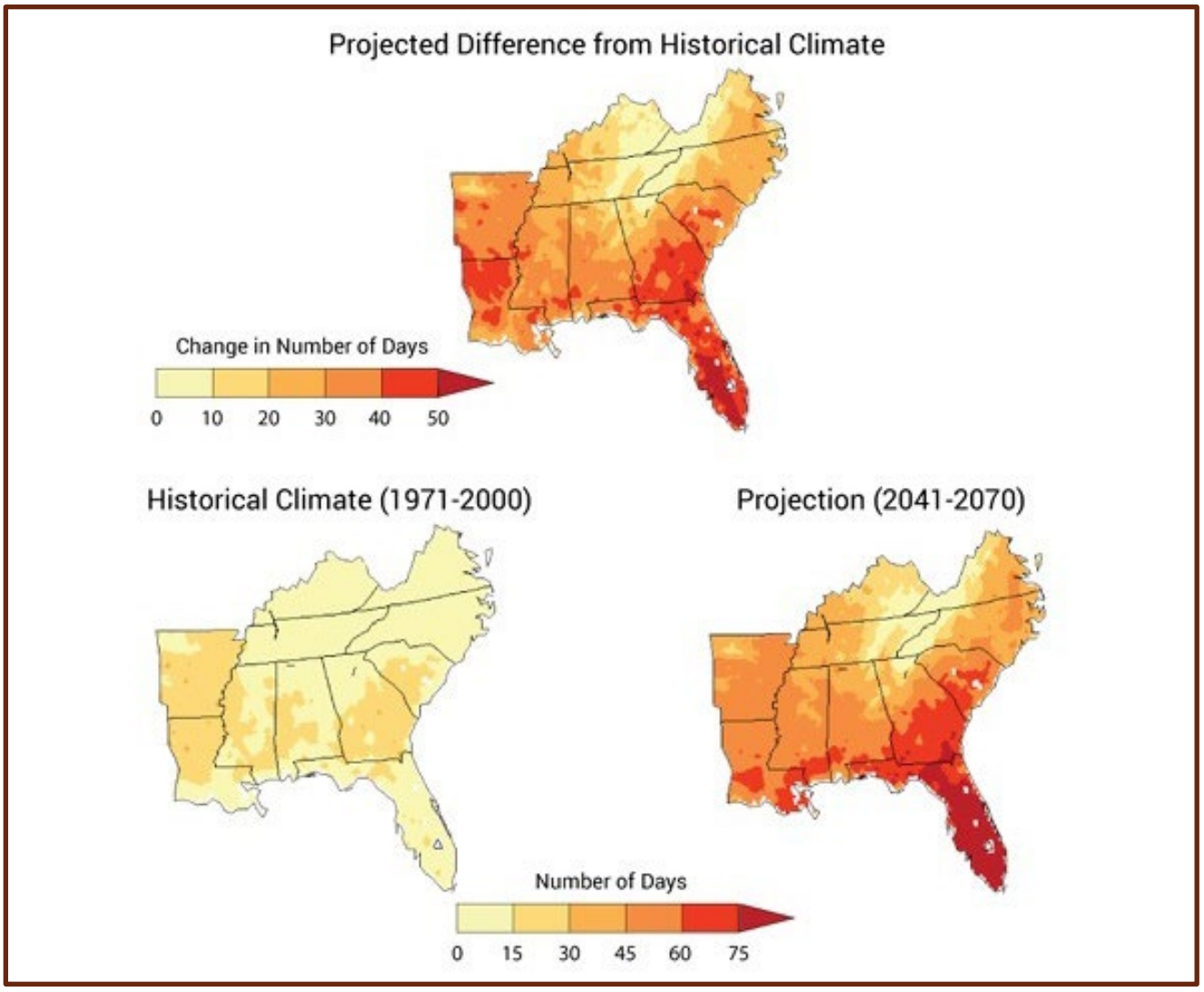


Figure 16 below shows the projected change in number of days that will experience extreme heat impacts (Neuse River RHMP 2020).

Figure 16. Projected Change in Number of Days Over 95°



According to the North Carolina Climate Science Report, "The number of very hot days is projected to increase by 10 to 20 days per year as compared to the 1996–2015 average." Additionally, the number of very warm nights in the Eastern Carolina Region "is projected to increase by 3 to 15 [nights] per year … with some areas projected to increase by 18 or more [nights] per year."

To explore the Eastern Carolina Region's specific exposure to extreme temperature, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com).

C. Climate Change Impacts

A gradual change in temperatures will alter the growing environment of many tree species throughout the Eastern Carolina Region, reducing the growth of some trees and increasing the growth of others. Tree growth and regeneration may be affected more by extreme weather events and climatic conditions than by gradual changes in temperature or precipitation (James M. Vose 2012). As temperatures warm and tolerant plant species shift, Eastern Carolina farmers may be required to modify their growing

practices, planting new crops more tolerant to warmer climates or shifting their growing seasons to better align with regional temperatures.

D. Impact on Social Vulnerability and Equity, Health, and Safety

The entire population of the Eastern Carolina Region is exposed to extreme temperature events. According to the Centers for Disease Control and Prevention (CDC), populations most at risk of extreme cold and heat events include the elderly; infants and children up to 4 years of age; individuals with chronic medical conditions (e.g., heart disease, high blood pressure); low-income persons who cannot afford proper heating and cooling; and the general public who may overexert during work or exercise during extreme heat events or experience hypothermia during extreme cold events (CDC 2017).

The population over 65 years of age in the Eastern Carolina Region is 104,014 people, and there are 108,293 individuals in the region who have a disability (US Census n.d.). 43,881 are below 5 years of age (US Census n.d.). Eastern Carolina also has a high population living in poverty. 102,767 people live at the poverty level in the Eastern Carolina Region, and 11,559 people commute to work by walking (US Census n.d.).

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

All buildings in the Eastern Carolina Region are exposed to the extreme temperature hazard. Elevated summer temperatures increase the energy demand for cooling and decrease the lifespan of some building materials, such as roofing materials. Losses can be associated with the overheating of HVAC systems. Extreme cold temperatures can freeze and burst pipes and increase vulnerability to home fires. Additionally, manufactured homes (mobile homes) and antiquated or poorly constructed facilities can have inadequate capabilities to withstand extreme temperatures.

Additionally, all critical facilities in the Eastern Carolina Region are exposed to the extreme temperature hazard. It is essential that critical facilities remain operational during natural hazard events. Extreme heat events can sometimes cause periods of utility failures, commonly referred to as brown-outs or black-outs, due to increased usage from air conditioners and other energy-intensive appliances. Similarly, heavy snowfall and ice storms, associated with extreme cold temperature events, can cause power interruption.

Increasing development will create more impervious surfaces, exacerbating the UHI effect in Eastern Carolina communities. Communities of particular concern include Goldsboro, Jacksonville, Kinston, Havelock, and New Bern. More development will also require greater power needs, straining systems in the event of extreme temperatures. This is likely to create greater strain on water resources throughout the region. To mitigate localized impacts of extreme heat, communities should consider methods of heat island reduction, such as increasing the number of trees planted in urban areas and creating green roofs.

F. Impact on the Economy

Extreme temperature events also impact the economy, including loss of business function and damage to and/or loss of business inventory. Business owners can be faced with increased financial burdens due to unexpected repairs caused to the building (e.g., pipes bursting), higher than normal utility bills, or business interruption due to power failure (i.e., loss of electricity or telecommunications). Disruptions in public transportation service will also impact the economy for commuters, customers, and truck drivers.

Extreme heat can also damage crops, especially when combined with the impacts of drought. A changing climate is likely to change the growing season and could potentially change the types of appropriate crops as temperatures rise. From 1990 to 2006, North Carolina's plant hardiness zone shifted from a majority Zone 7 statewide to a majority Zone 8 statewide (North Carolina Department of Health and Human Services 2015).

G. Impact on Natural Environmental Systems

Extreme temperature events have a major impact on the environment. Freezing and warming weather patterns create changes in natural processes. An excess amount of snowfall and earlier warming periods may affect natural processes such as flow within water resources (USGS 2019). Likewise, rain-on-snow events also exacerbate runoff rates with warming winter weather. Extreme heat events can have particularly negative impacts on aquatic systems, contributing to fish kills, aquatic plant die offs, and increased likelihood of harmful algal blooms.

H. Cascading Impacts on Other Hazards

Extreme temperature events can exacerbate the drought hazard, increase the potential risk of wildfires, and escalate severe storm and severe winter weather events for the region. For example, extreme heat accelerates evaporation rates, drying out the air and soils. Extreme heat can also dry out terrestrial species, making them more susceptible to catching fire. Extreme variation in temperatures could create ideal atmospheric conditions for severe storms or worsen the outcome of severe winter weather during freezing and thawing periods.

Extreme heat, exacerbated by drought, can increase the withdrawal of fresh water and increase the likelihood of saltwater intrusion in coastal aquifers. Saltwater intrusion is a natural process, but it becomes an environmental problem when excessive pumping of fresh water from an aquifer changes the water pressure and intensifies the effect, drawing saltwater into new areas. When freshwater levels drop, the intrusion can proceed further inland until reaching a pumped well.

Extreme heat often contributes to poor air quality conditions. The North Carolina State Climate Office and the North Carolina Division of Air Quality have developed an Air Quality Portal for North Carolina to monitor and display air quality conditions in the state.

I. Additional Data Needs

Key gaps in data and understanding that were identified during review of available scientific information and public and stakeholder meetings included:

- Use of projections for the Coastal Plain or Northern Coastal Plain were used as the best available data. Region-specific climate change data would allow for a more specific assessment of the impacts of extreme temperature on the region.
- Recent years have seen an increase in occurrence of extreme cold. While extreme cold is likely to become less frequent and severe globally in a warming climate, there is still some scientific debate on whether changes in weather patterns in the arctic regions due to climate change could result in more frequent releases of cold air into lower latitudes (otherwise known as polar vortex events). Continued research on this subject would allow the Eastern Carolina Region to be better informed on the likelihood of these events occurring in the future.

- UHI impacts have been noted on smaller scales in more rural or suburban areas. Identification of localized UHI locations that are not located in urban areas would allow for better assessment of this phenomenon.
- Mapping of areas of anticipated for future development would allow for better understanding of changes in exposure to extreme temperature.
- Understanding of the likely density of future development and the increase in hard surfaces and decrease in vegetation may help to identify potential sources of the UHI effect.

VII. FLOOD

A. Hazard Description

Floods are one of the most common natural hazards, both in the U.S. and in the Eastern Carolina Region. They can develop slowly over a period of days or develop quickly with disastrous effects that can be local (impacting a neighborhood or community) or regional (affecting entire river basins, coastlines, and multiple counties or states) (FEMA 2007).

The main flood types of concern for the Eastern Carolina Region include:

- Riverine Flooding

Most common type of flood
Occurs along a channel and includes overbank and flash flooding

- Flash Flooding

Caused by heavy or excessive rainfall in a short period of time
Characterized by raging torrents after heavy rains that rip through riverbeds, drainage ditches, and urban streets

- Stormwater/Urban Flooding

Generally due to local drainage issues and high groundwater levels
Urban flooding is increasing due to the growing number of extreme precipitation events (University of Maryland 2018)
Urban flooding is not mapped by FEMA

- Coastal Flooding

Occurs along the coasts of oceans, bays, estuaries, coastal rivers, and large lakes
May cause beach erosion; loss or submergence of wetlands and other coastal ecosystems; saltwater intrusion; high water tables; loss of coastal recreation areas, beaches, protective sand dunes, parks, and open space; and loss of coastal structures (FEMA 2011)

- Storm Surge

Abnormal rise in seawater level during a storm, measured as the height of the water above the normal predicted astronomical tide (NOAA 2022)
Primarily caused by winds pushing water ashore

Floodplains

A floodplain is land that has been or may be covered by floodwater during a storm. The land does not need to be designated by FEMA to function as a floodplain. The State of North Carolina regulates the floodplain in order to protect people and property, ensure federal flood insurance and disaster assistance are available, save tax dollars, and reduce future flood losses to NC communities (NCDPS 2017).

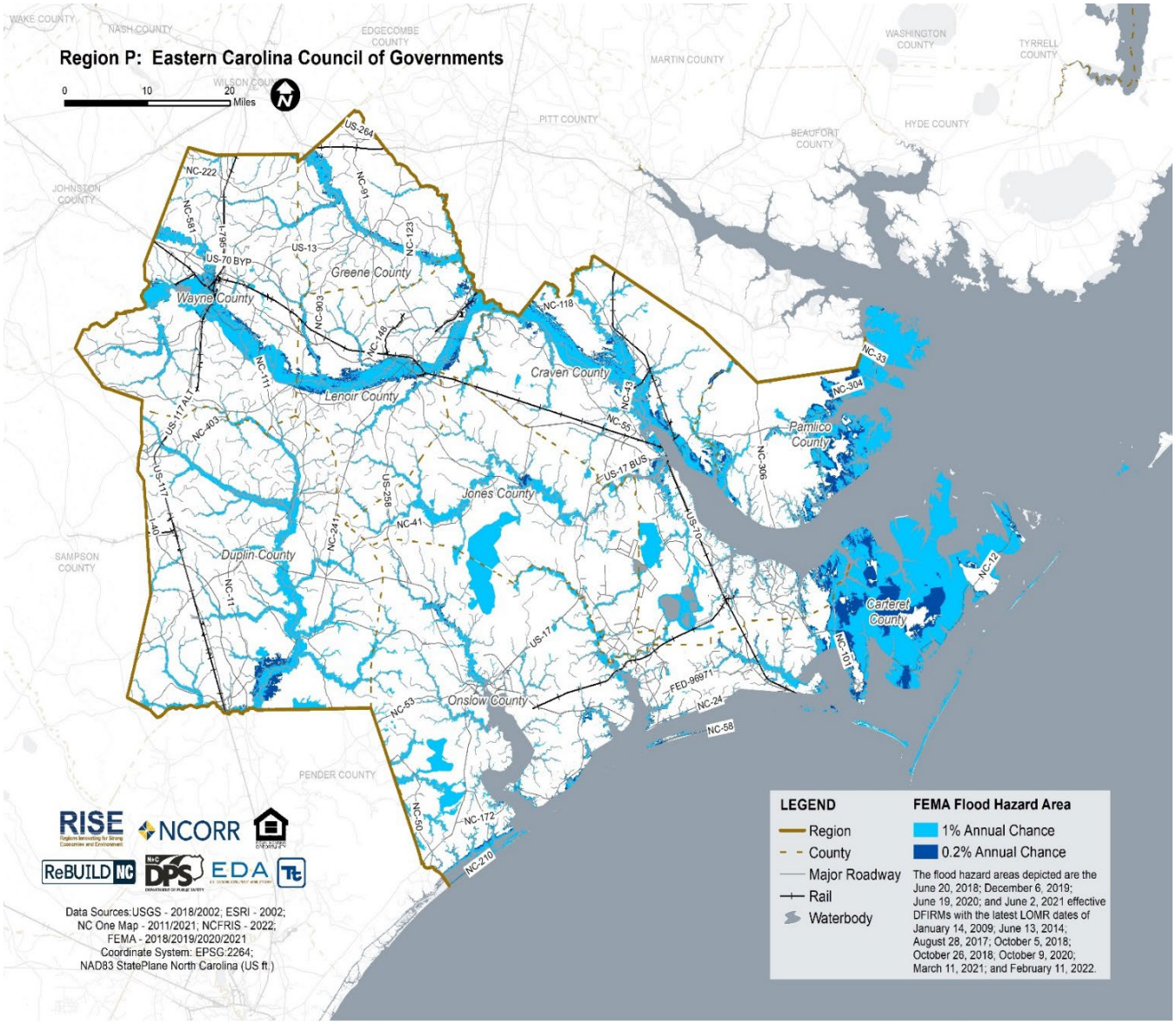
Floodplain mapping is based on riverine and coastal flooding conditions. FEMA's floodplain mapping does not include future flooding conditions from factors such as sea level rise and changes in rainfall or

urban/stormwater flooding conditions. As such, floodplain maps are more likely to underestimate flooding risk in many areas in the region. Maps that underestimate flood risk can have many potentially harmful results for the public, including:

- Misunderstanding of flood risk
- Limitations in building requirements (as many are tied to floodplain zone)
- Flood insurance requirements (as requirements are tied to the SFHA)
- Available mitigation funding (as many federal flood mitigation funding sources are restricted to locations within the 1% annual chance floodplain) (Carolina Public Press 2022)

Figure 17 shows floodplains within the Eastern Carolina Region. Areas most susceptible to flooding are riverine and coastal areas, with much of Carteret County being susceptible to both 1% and 0.2% annual chance flooding.

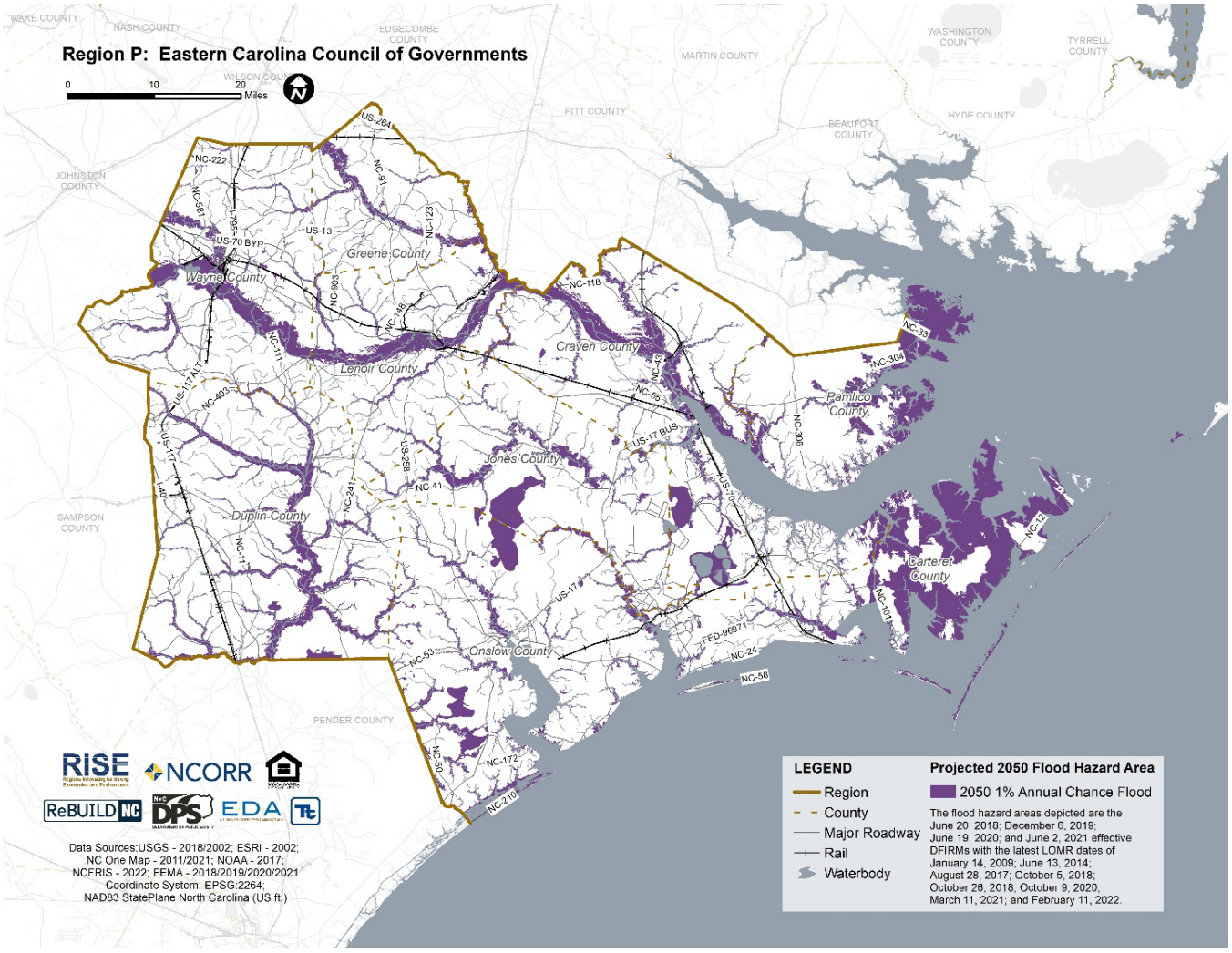
Figure 17. Floodplains in the Eastern Carolina Region



Sea Level Rise

As sea level rises, the starting elevation of coastal flooding events will also rise. This means that coastal floods are likely to reach a higher elevation and push farther inland. As a result, it is likely that the mapped 1% annual chance floodplain will expand. **Figure 18** displays the potential expansion of the 1% annual chance floodplain with 1 foot of sea level rise, a threshold likely to be reached by 2050. See ***Section VIII*** for further information on sea level rise vulnerability.

Figure 18. Projected Expanded SFHA in 2050 (1 Foot of Sea Level Rise) in the Eastern Carolina Region



To explore The Eastern Carolina Region's specific exposure to flooding, visit [Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com)].

B. Impact on Social Vulnerability and Equity, Health, and Safety

The impact of flooding on life, health, and safety is dependent upon several factors, including the severity of the event and the provision of adequate warning time to residents. Exposure represents the population living in or near floodplain areas that could be impacted should a flood event occur. Additionally, exposure should not be limited to only those who reside in a defined hazard zone but everyone who may be affected by the effects of a hazard event (e.g., people are at risk while traveling in flooded areas or their access to emergency services is compromised during an event). The degree of that impact will vary and is not strictly measurable.

As the population of the region increases, so may the number of people impacted by flooding. To limit the number of residents impacted by flooding in the future, Eastern Carolina communities can consider

planning and zoning solutions such as expanded regulatory floodplains, increased freeboard requirements, buyouts of vulnerable residential areas, and establishment of stormwater utilities.

C. Riverine and Coastal Flooding

To estimate population exposure to the 1-percent and 0.2-percent annual chance flood events, the DFIRM flood boundaries were used. Based on the spatial analysis, there are an estimated 136,074 residents living in the 1-percent annual chance floodplain, or 21.4 percent of the total population of the Eastern Carolina Region. There are an estimated 154,995 residents living in the 0.2-percent annual chance floodplain, or 24.4 percent of the region's total population. For a detailed assessment of regional populations living in the floodplain, please see **Tables 22 - 27 in Appendix A: Additional Data.**

Research has shown that some populations may experience exacerbated impacts and prolonged recovery if/when impacted. This is due to many factors, including their physical and financial ability to react or respond during a hazard. Of the population exposed, the most vulnerable include individuals who are economically disadvantaged and individuals over the age of 65. Other socially vulnerable populations include persons below age 5, persons with a disability, persons with limited English proficiency, and persons without a vehicle. Special consideration should be given to these vulnerable groups when planning for disaster preparation, response, and recovery. For a detailed assessment of vulnerable populations living in the floodplain, please see **Tables 22 – 27 in Appendix A: Additional Data.**

D. Climate Change Impacts

The Eastern Carolina Region will see an increase in average annual temperatures and precipitation due to factors of a changing global climate. Annual precipitation amounts in the region will increase, primarily in the form of heavy rainfalls, which have the potential to increase the risk to flash flooding and riverine flooding, and flood critical transportation corridors and infrastructure. Increases in precipitation may alter and expand the floodplain boundaries and runoff patterns, resulting in the exposure of populations, buildings, and critical facilities and infrastructure that were previously outside the floodplain. This increase in exposure will result in an increased risk to life and health, an increase in structural losses, a diversion of additional resources to response and recovery efforts, and an increase in business closures affected by future flooding events due to loss of service or access.

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

The impact of flooding on health and safety is dependent on several factors, including the severity of the event and whether adequate warning time is provided to residents. Exposure represents the population living in or near floodplain areas that could be impacted should a flood occur. Additionally, exposure should not be limited to only those who reside in a defined hazard zone but to everyone who may be affected by the effects of a hazard (e.g., people are at risk while traveling in flooded areas or their access to emergency services is compromised during an event).

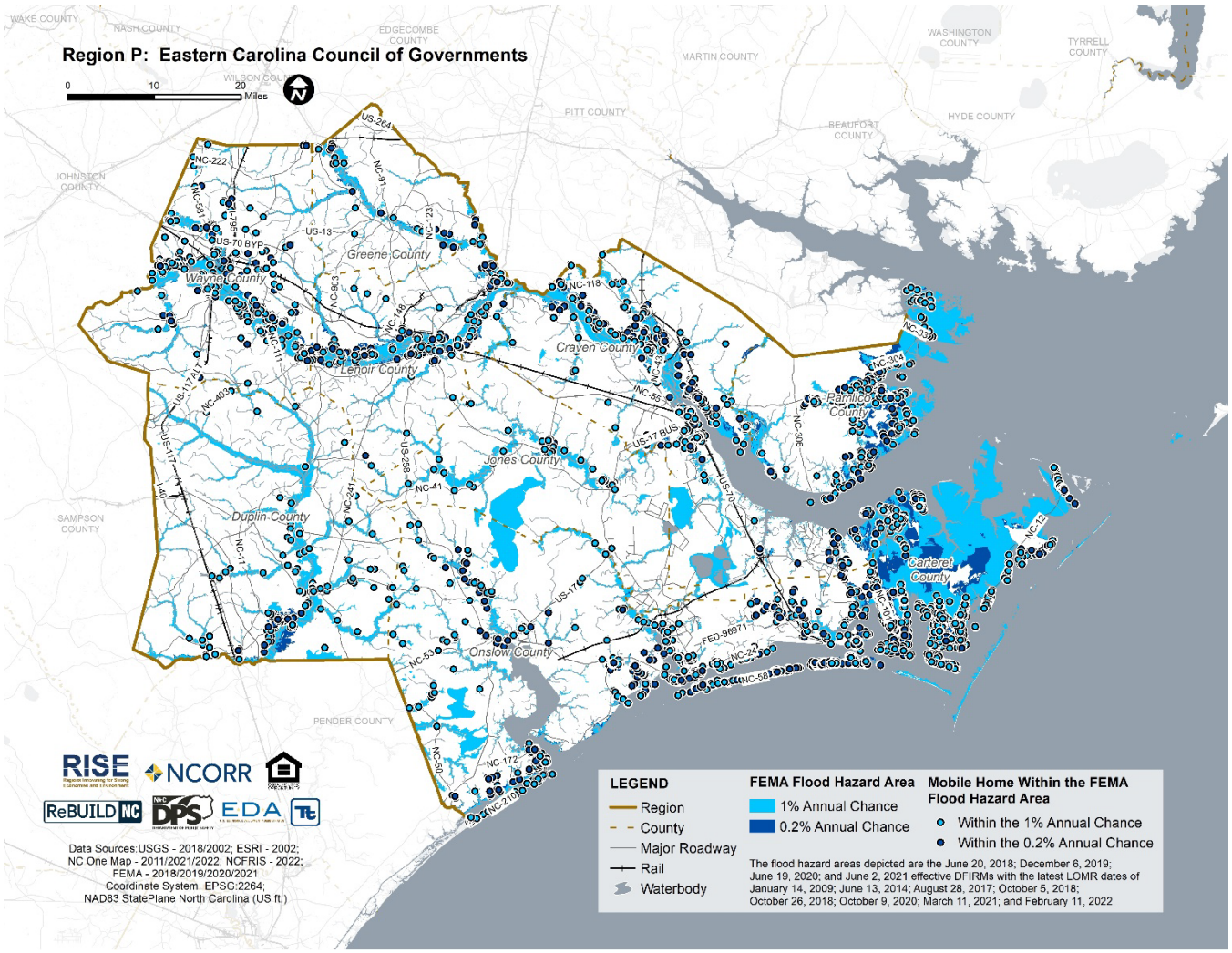
In the Eastern Carolina Region, there are:

- 42,306 buildings located in the 1-percent annual chance flood boundary (8.6 percent of total)
- 60,341 buildings located in the 0.2-percent annual chance flood boundary (12.2 percent of total)

For a detailed assessment of buildings by general occupancy located in the floodplain, please see **Tables 28 and 29 in Appendix A: Additional Data.**

While some mobile homes can be relocated, lack of transportation or degradation of mobile components may prevent evacuation of mobile homes before a flood event. Sudden flood events also eliminate the likelihood of evacuation of mobile homes. As indicated below in **Figure 19**, the majority of mobile homes across Eastern Carolina are located in some of the region's most flood-prone areas.

Figure 19. Mobile Homes Located in the 1-Percent and 0.2-Percent Annual Chance Flood Hazard Areas in the Eastern Carolina Region



For a detailed assessment of mobile homes and mobile home parks located in the floodplain, please see **Tables 30 and 31 in Appendix A: Additional Data.**

Critical services during and after a flood event may not be available if critical facilities are directly damaged or transportation routes to access these critical facilities are impacted. Roads that are blocked or damaged can isolate residents and can prevent access throughout the planning area to many service providers needing to reach vulnerable populations or to make repairs.

Critical facility exposure to the flood hazard was examined. The Eastern Carolina Region contains:

- 323 critical facilities located in the 1-percent annual chance flood event boundary

- 579 critical facilities located in the 0.2-percent annual chance flood event boundary

Of particular concern are the 14 EMS stations located in the 1-percent annual chance flood zone, the 8 police stations located in the 1-percent annual chance flood zone, and the 1 hospital located in the 0.2-percent annual chance flood zone. For a detailed assessment of critical facilities located in the floodplain, please see **Tables 32 and 33 in Appendix A: Additional Data.** Additionally, **Tables 34–50 in Appendix A: Additional Data** list the number of facilities regionwide by critical facility type, including roadways, located in the 1-percent and 0.2-percent annual chance flood zones.

An increase in development, particularly in low-lying and coastal areas, will worsen already-existing flooding issues. Paved surfaces such as roads and parking lots contribute significantly to urban and stormwater flooding. When this urban flooding occurs in areas where the water table is high, water has nowhere to go but up, creating numerous incidents of localized flooding across the region. To address stormwater management related to new development while also mitigating the impacts of flooding and sea level rise, Eastern Carolina communities can consider nature-based and environmentally sound solutions such as rain gardens, bioswales, and permeable paving.

F. Impact on the Economy

Flood events can significantly impact the local and regional economy. This includes but is not limited to general building stock damages and associated tax loss, impacts to utilities and infrastructure, business interruption, impacts on tourism, and impacts on the tax base for municipalities and counties in the Eastern Carolina Region. In areas that are directly flooded, renovations of commercial and industrial buildings may be necessary, disrupting associated services. Other economic components such as loss of facility use, functional downtime, and socioeconomic factors are less measurable with a high degree of certainty.

The Eastern Carolina Region contains 19 major economic development assets located in the 1-percent annual chance flood hazard area and 105 assets in the 0.2-percent annual chance flood hazard area. For a detailed assessment of critical facilities located in the floodplain, please see **Tables 34-50** in **Appendix A: Additional Data.**

G. Impact on Natural Environmental Systems

Flood extents for the 1- and 0.2-percent annual flood events will continue to change alongside natural occurrences such as sea level rise, climate change, and/or severity of storms. Further, residents living in and around areas of wildfire may be at increased risk of flooding in the future due to changes in the natural landscape. Flood events will inevitably impact the Eastern Carolina Region's natural and local environment. Severe flooding influences the habitat of these natural land areas and disrupts species that reside in these natural habitats.

H. Impact on Historical and Cultural Resources

Flood events can significantly damage or completely destroy invaluable historical and cultural resources within the region. The Eastern Carolina Region has 25 facilities of cultural significance in the 1 percent flood hazard area and 54 facilities in the .2 percent flood hazard area (see **Table 37 in Appendix A: Additional Data)**. As sea level rise drives shorelines further inland and flooding is exacerbated, impacts to cultural and historical resources will be further impacted.

I. Cascading Impacts on Other Hazards

Flooding can exacerbate the impacts of disease outbreak and landslides. After a flood, runoff can pick up and transport pollutants from wildlife and soils. Such organisms can then appear in drinking water and transmit diseases to residents (CDC 2021). Flooding can also put additional strain on dams, which may lead to dam failure.

Sea level rise will amplify factors that currently contribute to coastal flooding, such as high tides, storm surge, high waves, and high runoff from rivers and creeks. All of these factors change during extreme weather and climate events (NOAA 2012).

In addition, coastal erosion is considered a cascading hazard in the coastal areas. For more on erosion, see ***Section VII - Hurricanes and Severe Storms.***

J. Additional Data Needs

Key gaps in data and understanding that were identified during review of available scientific information and public and stakeholder meetings included:

- Better stormwater modeling tied to anticipated development is needed to determine future stormwater management needs.
- Mapping of stormwater/urban flooding locations is needed to identify problem areas within the region. This type of flooding is not included in FIRMs and is constantly changing due to clogging, failure, and repair of stormwater systems.
- Modeling is needed to better understand the potential extent and severity of a combined riverine and coastal flooding.
- Better climate projections for the future occurrence of coastal storms and hurricanes in the Eastern Carolina Region is needed to inform the future frequency and severity of storm surge.
- Mapping of areas of anticipated future development would allow for better understanding of changes in exposure to flooding, especially for location-specific flood risk like coastal and riverine flooding.

VIII. HURRICANES AND SEVERE STORMS

A. Hazard Description

A hurricane is a tropical storm that attains hurricane status when its wind speed reaches 74 mph or higher. A tropical storm system is characterized by a low-pressure center and numerous thunderstorms that produce strong winds of 39 to 73 mph and heavy rain. Tropical systems can develop in the Atlantic between the Lesser Antilles and the African coast or in the warm tropical waters of the Caribbean Sea and the Gulf of Mexico. These storms move up the Atlantic coast of the United States, impacting the eastern seaboard, or move into the United States through the states along the Gulf Coast, bringing wind and rain as far north as New England before moving eastward offshore (NWS, Tropical Definitions 2021).

Hurricanes and tropical storms impact the Eastern Carolina Region whenever coastal waters are warm enough to support their development. June through November is the official eastern U.S. hurricane season; however, late July to early October, when coastal waters are warmest, is the most likely period for hurricanes and tropical storms to impact the Eastern Carolina Region.

Hurricanes are one of the most impactful hazards facing the Eastern Carolina Region. Climate change is making conditions in North Carolina more favorable for strong and damaging storms (Kunkel 2020).

In a three-year period from 2018 to 2020, the Eastern Carolina Region experienced four separate federal disaster declarations for Hurricanes Florence, Dorian, Isaias, and Tropical Storm Eta (NOAA NCEI 2022). These four declarations brought more than $265,000,000 to the region for repair of homes, offices, roads, and other critical infrastructure.

B. Location and Extent

All of the Eastern Carolina Region is exposed to hurricane and severe storm events. The Eastern Carolina Region is in Wind Zone III, where wind speeds can reach up to 200 mph (NIST 2011).

The extent of a hurricane or tropical storm is commonly categorized in accordance with the Saffir-Simpson Hurricane Wind Scale, which assigns a designation of tropical storm for storms with sustained wind speeds below 74 mph and a hurricane category rating of 1–5 based on a hurricane's increasing sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered *major hurricanes* because of their potential for significant loss of life and damage (NOAA 2020).

The probability that weather will occur is often discussed through mean return period. Mean return period is the interval between events of similar size or intensity. **Figure 20** presents wind speeds for the 50-year mean return period hurricane wind event. Coastal counties like Pamlico, Carteret, and Onslow are consistently exposed to stronger hurricane winds, which can result in greater property damage during a hurricane event.

Figure 20. Wind Speeds for the 50-Year Mean Return Period Hurricane Wind Event

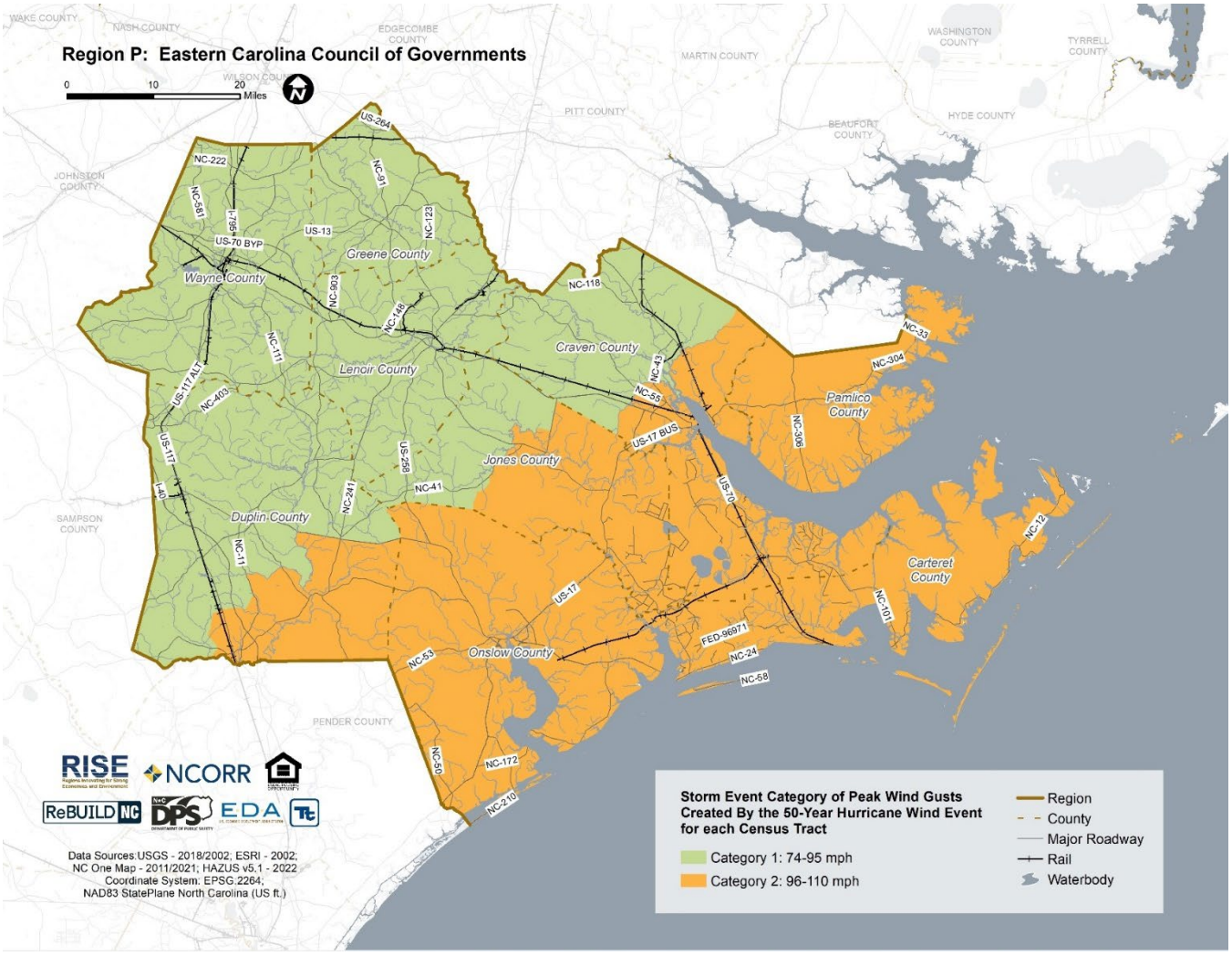
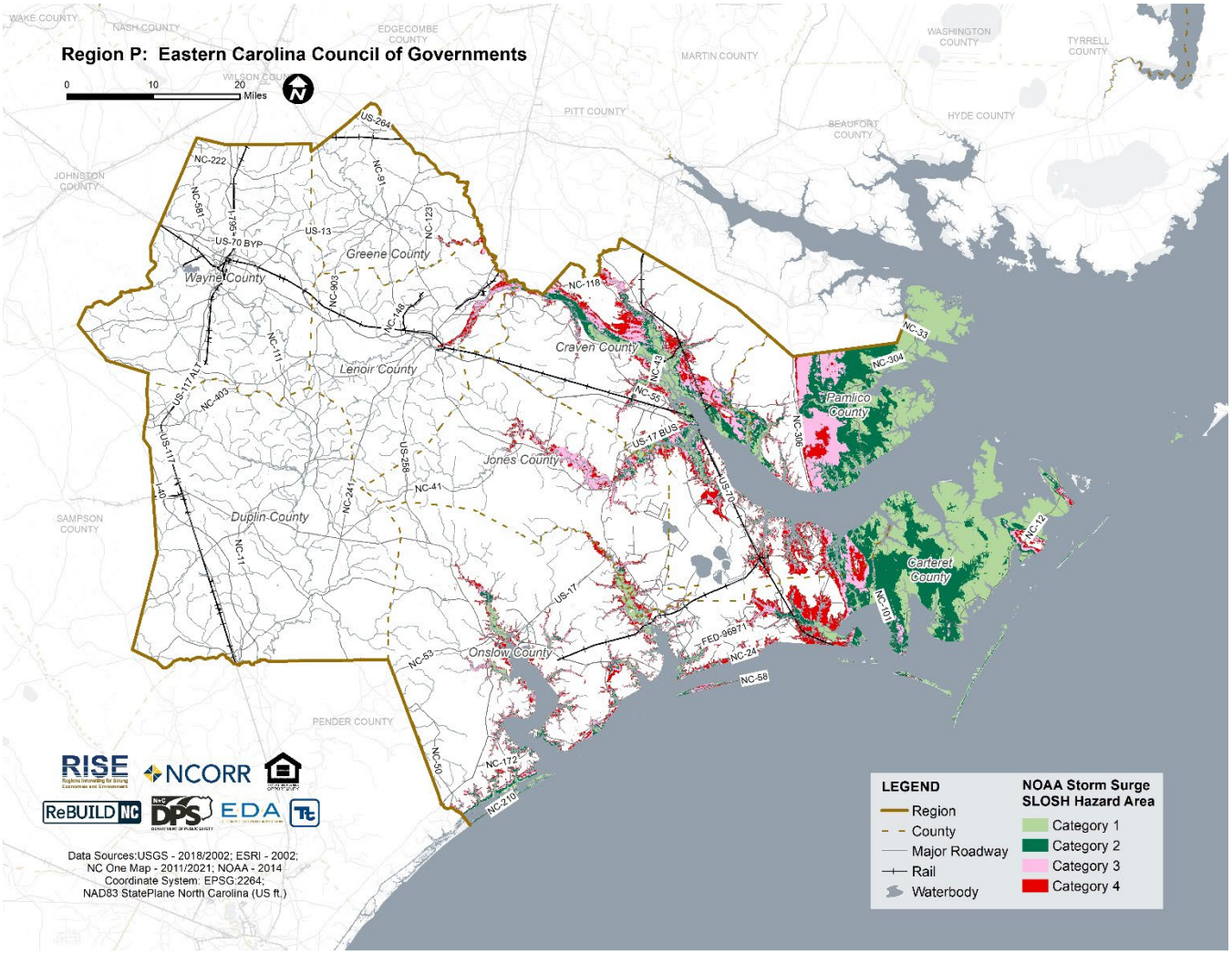


Figure 21 presents the areas of the region in the Sea, Lake, and Overland Surges from Hurricanes (SLOSH) hazard zone, which represents potential flooding from worst-case combinations of hurricane direction, forward speed, landfall point, and high astronomical tide were used to estimate exposure. Please note these inundation zones do not include riverine flooding caused by hurricane surge or inland freshwater flooding. The greatest areas of hazard are concentrated in the counties of Pamlico, Carteret, Craven, and Jones due to their location directly on the Atlantic Coast.

Figure 21. NOAA Storm Surge SLOSH Hazard Areas in the Eastern Carolina Region



To explore the Eastern Carolina Region's specific exposure to hurricanes and severe storms, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com).

C. Climate Change Impacts

In the Eastern Carolina Region, severe storms typically include coastal nor'easters, snowstorms, spring and summer thunderstorms, tornadoes, tropical storms, and hurricanes. As oceans warm, the length of hurricane season may expand. The 2010s had the most such storms, and there has been a steady increase since the 1990s. The National Hurricane Center is currently considering expanding the official hurricane season to begin in May rather than June as a result of the frequency of pre-season events (Cappucci 2021). Temperatures are predicted to increase in the Eastern Carolina Region, and ocean temperatures are forecast to continue to increase, which will lead to an increase in intensity and frequency of hurricanes. As temperatures increase, so will the energy in a storm system, increasing the potential for more intense storms impacting the Eastern Carolina Region (Melillo 2014).

D. Impact on Social Vulnerability and Equity, Health, and Safety

The entire population of the Eastern Carolina Region is exposed to hurricane and severe storm events. Residents may be displaced or require temporary to long-term sheltering. In addition, downed trees, damaged buildings, and debris carried by high winds can lead to injury or loss of life. Socially vulnerable populations and people located outdoors (i.e., recreational activities and farming) are considered most susceptible to hurricane winds. See **Tables 51 – 62 in Appendix A: Additional Data** for more information on vulnerable populations in the region's different SLOSH areas.

The impact of a hurricane or tropical storm on life, health, and safety is dependent upon several factors, including the severity of the event and whether adequate warning time is provided to residents. All residents of the Eastern Carolina Region are at risk of the impacts caused by hurricane and nor'easter wind, with the strongest wind potential in coastal areas.

Research has shown that some populations, while they may not have more hazard exposure, may experience exacerbated impacts and prolonged recovery if/when impacted. Socially vulnerable populations are most susceptible based on several factors, including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. Vulnerable populations include homeless persons, the elderly (over 65 years old), low-income or linguistically isolated populations, people with life-threatening illnesses, and residents living in areas that are isolated from major roads. The elderly are considered vulnerable because they require extra time or outside assistance during evacuations and are more likely to seek or need medical attention, which may not be available due to isolation during a storm. Emergency personnel, such as police, fire, and EMS, may not be able to effectively respond and maintain the safety of its residents. Residents who have limited English proficiency may be difficult to reach with typical emergency messaging. Residents who lack transportation may have difficulty evacuating ahead of severe storms. Vulnerable populations may be more vulnerable if power loss results in heating and cooling service interruption, stagnated hospital operations, and potable water supply shortages.

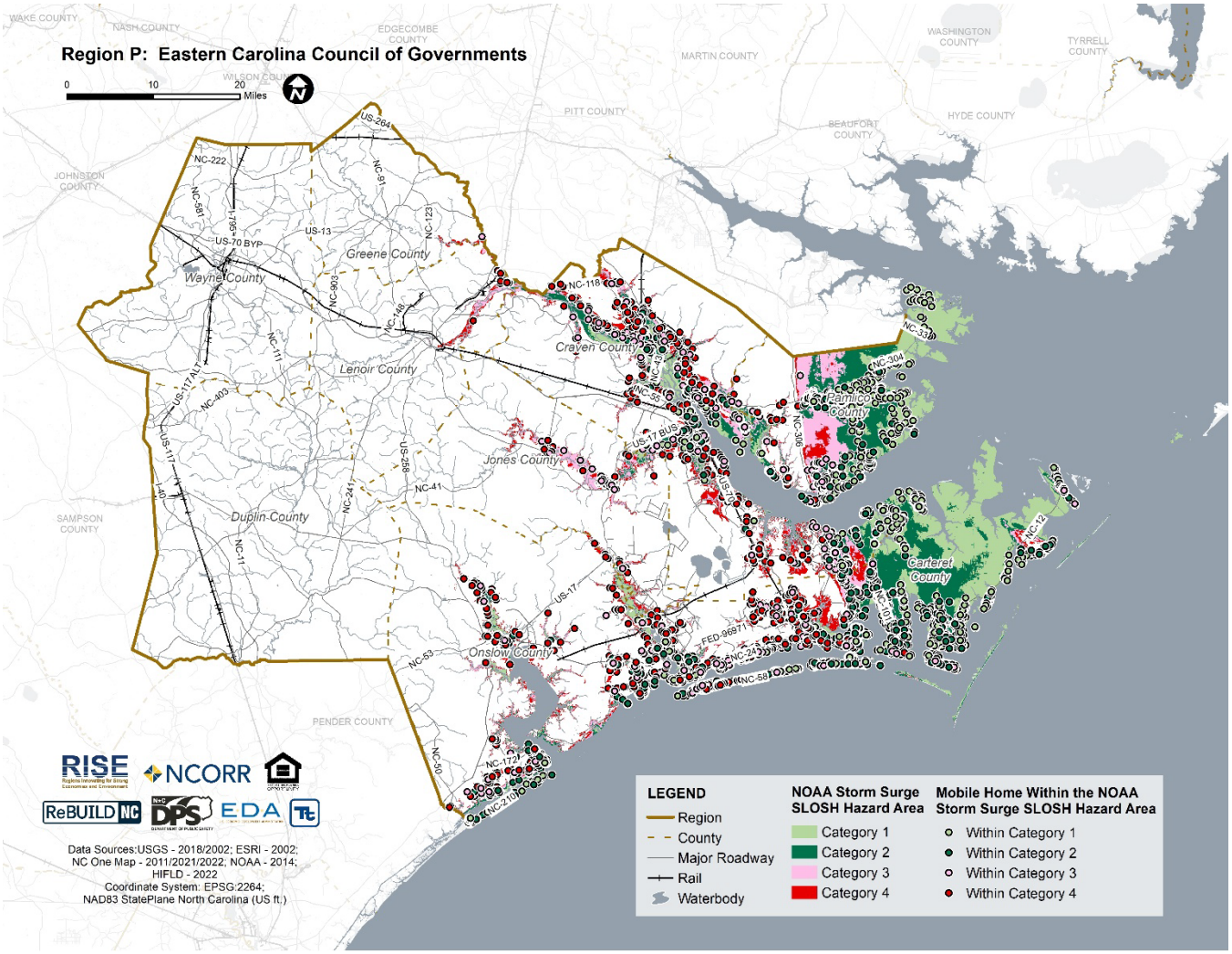
Additionally, people located outdoors for extended periods of time (i.e., recreational activities and farming) are considered vulnerable to hailstorms, thunderstorms, and tornadoes as there may be little to no warning, and shelter may not be available. Moving to a lower-risk location will decrease a person's vulnerability.

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

Damage to buildings and critical infrastructure is dependent upon several factors, including wind speed, storm duration, and path of the storm track. The following vulnerabilities may emerge in a hurricane or severe storm scenario:

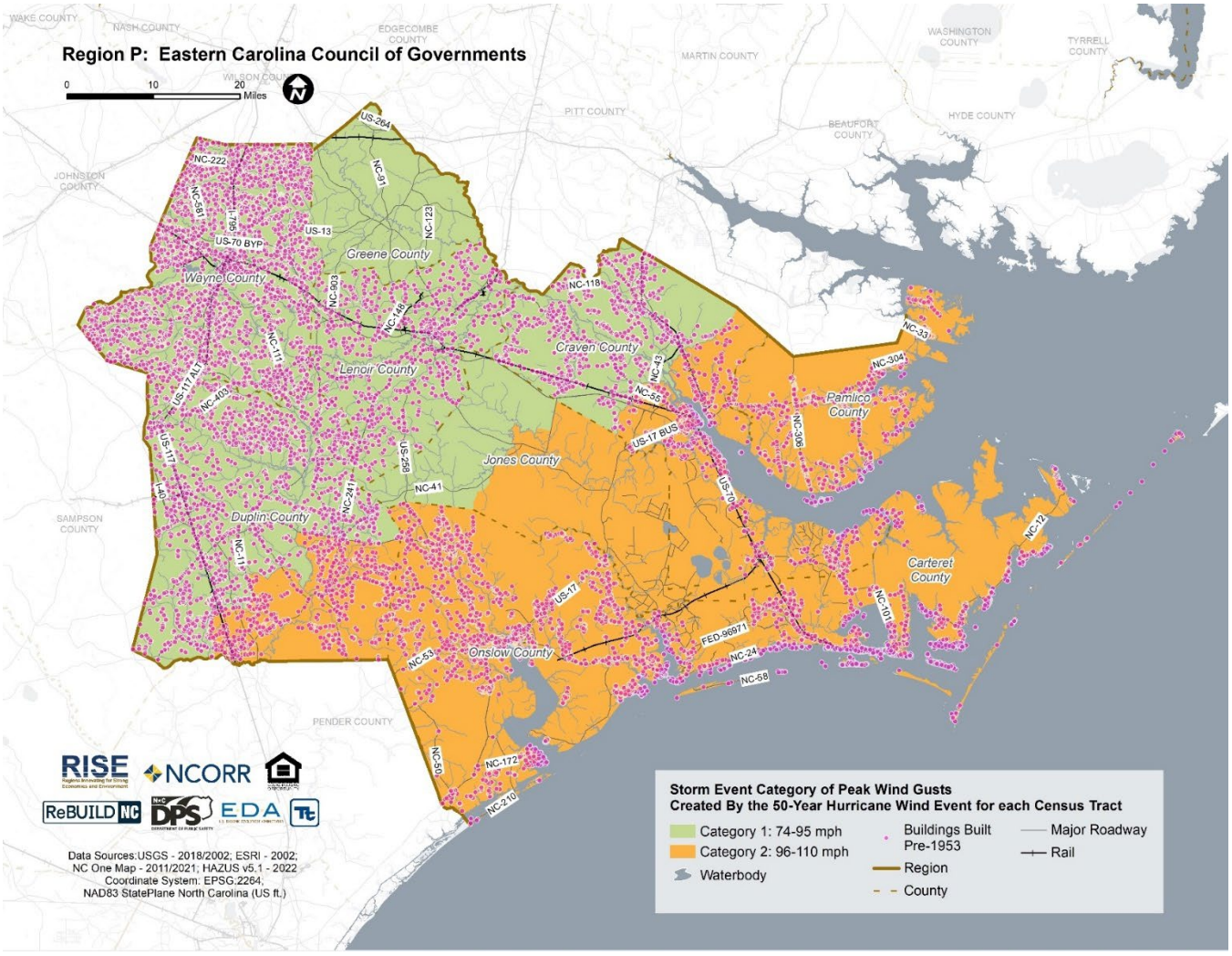
- Mobile/manufactured homes, as well as wood and masonry buildings, may tend to experience more hurricane and severe storm damage than concrete or steel structures. See **Figure 22** for mobile homes located in SLOSH hazard areas.

Figure 22. Mobile Homes Within the NOAA Storm Surge SLOSH Hazard Areas



- Housing units across the region as well as critical infrastructure may experience structural damage directly from high winds or falling tree limbs/flying debris, which can also result in the loss of power. Power loss can greatly impact households, business operations, public utilities, and emergency personnel.
- Individuals with medical needs are more vulnerable if power loss results in interruption of heating and cooling services, stagnated hospital operations, and potable water supplies.
- Emergency personnel such as police, fire, and EMS may not be able to effectively respond and maintain the safety of its residents.
- Buildings constructed prior to 1953 are less likely to have used construction techniques that adequately protect from wind damage. Roughly 11 percent (or 54,511) of buildings in Eastern Carolina were constructed pre-1953 and have a higher likelihood of experiencing wind damage. See **Figure 23** for the locations of buildings built pre-1953.

Figure 23. Buildings Built Pre-1953 in the Eastern Carolina Region



For more information on structures and infrastructure within the different SLOSH hazard areas, see **Tables 63 – 104 in Appendix A: Additional Data.**

Eastern Carolina is expected to increase in population and development in its coastal regions, putting more individuals and structures at risk of the effects of hurricanes and severe storms. As the frequency and severity of severe storms increase, the region can expect to see more residents and visitors in the path of hazardous storms, evacuating in times of emergency, and requiring shelter and recovery assistance during and after disasters.

F. Impact on Economy

Hurricane and severe storm events can have short- and long-lasting impacts on the economy. When a business is closed during storm recovery, there is lost revenue and wages to employees. Overall, economic impacts include:

- Loss of business function (e.g., tourism, recreation)
- Damage to inventory (utility outages)

- Relocation costs, wage loss, and rental loss due to building damage
- Impacts to community's economy and tax base due to building damage
- Impacts to transportation that affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) needs
- Damage to utility infrastructure (power lines, gas lines, electrical systems) resulting in loss of power or heat, potentially impacting business operations and heating or cooling provision to the population
- Costly debris management operations for downed vegetation and removal of damaged construction materials

G. Impact on Natural Environment Systems

Hurricanes and severe storms can be destructive to the natural and local environment. Any severe weather that creates longer periods of rainfall can erode natural banks along waterways and degrade soil stability for terrestrial species. Hurricane winds can tear apart habitats, causing fragmentation across ecosystems. Researchers also believe that a greater number of diseases will spread across ecosystems because of impacts that severe weather and climate change will have on water supplies (USGS n.d.). Overall, as the physical environment becomes more altered, species will begin to contract or migrate in response, which may cause additional stressors to the ecosystems within the Eastern Carolina Region.

H. Impact on Historical and Cultural Resources

Hurricanes and severe storms can be destructive to structures, including those of historical and cultural significance. Eastern Carolina has over 200 historical and cultural resource facilities located in the SLOSH Storm Surge Hazard Areas, with 85 of them located in Category 4 areas. For more information on these structures and historical districts in the different SLOSH areas, see **Table 55, 76, 81, 86, and 91 in Appendix A: Additional Data.**

I. Cascading Impacts on Other Hazards

Hurricane winds often come with heavy precipitation that can cause flooding. Lightning can ignite wildfires. Strong winds can contribute to the rapid spread of a wildfire once ignited. Coastal storms can impact various natural land resources that can be easily uprooted by major wind events and storm surge, increasing potential for erosion (USGS n.d.).

IX. SEA LEVEL RISE

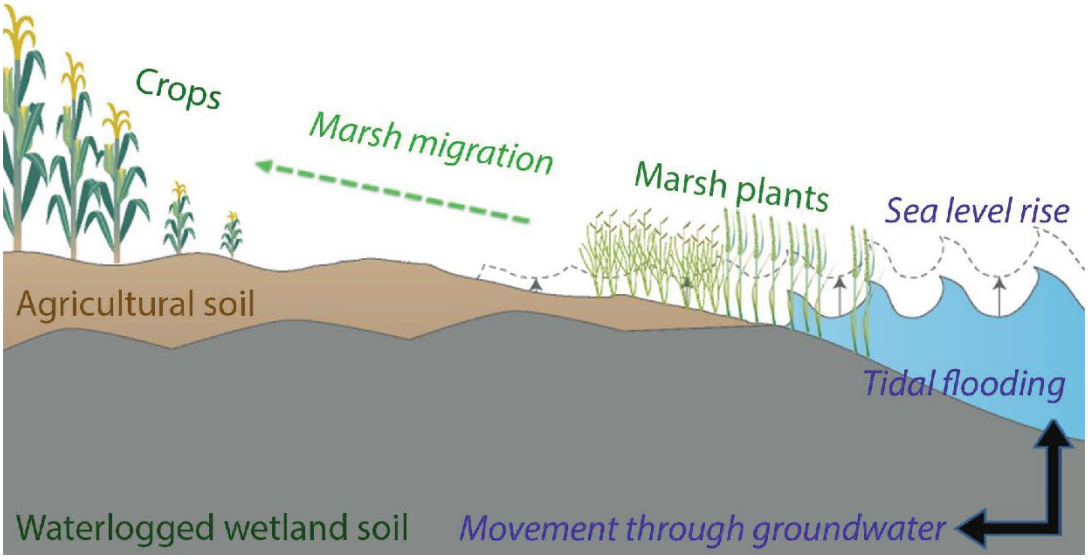
A. Hazard Description

The sea level off North Carolina's coast is up to 11 inches higher than it was in 1950. This increase is mostly due to ice melt. Solutions are not simple in Eastern Carolina because of the area's low elevation, extensive barrier islands, and vulnerability to coastal storms. In addition to the many people who live and work in the coastal region and vacationers who visit throughout the year, North Carolina has vast natural resources and habitats at risk, including the largest estuarine system on the U.S. Atlantic Coast. There are already nearly 60,000 properties at risk from frequent tidal flooding in North Carolina. The State is planning over $2 billion in sea level rise solutions, which include beach renourishment and improvements to reduce flooding on highways (Kunkel 2020).

Rising sea level will cause saltwater to enter coastal aquifers, a phenomenon known as saltwater intrusion. Aquifers, which are like large underground lakes, are important sources of drinking water. With saltwater intrusion, the water in the aquifer becomes contaminated with salt and becomes undrinkable. Saltwater intrusion is a very serious problem because it threatens the availability of drinking water and can make soils too salty for native plants to grow, creating problems for coastal forests and agriculture. Saltwater intrusion is one of the first impacts that the coast is expected to face with an increase in sea level (NCDEQ n.d.).

As sea levels rise, saltwater moves inland through saltwater intrusion (Elliott White Jr. 2017). Freshwater wetlands, and marshes in particular, will be the first to experience saltwater intrusion. In general, three scenarios are possible: 1) marsh plants adapted to low salinities may not be able to survive and are replaced by saltmarsh plants, 2) salt stress causes low salinity marsh plants to be outcompeted by an invasive species like common reed (Phragmites australis), and 3) the rate of sea level rise and saltwater intrusion is such that the low salinity marsh dies off and the area becomes open water (Audobon NC 2021). **Figure 24** displays the impacts from saltwater intrusion.

Figure 24. Saltwater Intrusion Impacts



Source: (USDA n.d.)

Sea Level Rise

During the past 100 years, the rate of global mean sea level rise was approximately 1.7 millimeters per year (0.7 inches per decade), and observations show that the rate of global sea level rise is accelerating. According to the North Carolina Climate Science Report, areas of the Eastern Carolina Region "will be impacted by high tide flooding on a near daily basis by 2100. Studies of storm-driven water levels show substantial changes in the future probability of these events as well." (Kunkel 2020)

As sea level rises, the starting elevation of coastal flooding events will also rise. This means that coastal floods are likely to reach a higher elevation and push farther inland. As a result, it is likely that the mapped 1-percent annual chance flood zone, or Special Flood Hazard Area (SFHA), will expand. **Figure 25** displays the potential expansion of the SFHA with 1 foot of sea level rise, a threshold likely to be reached by 2050.

Figure 25. Projected Expanded SFHA in 2050 (1 Foot of Sea Level Rise) in the Eastern Carolina Region

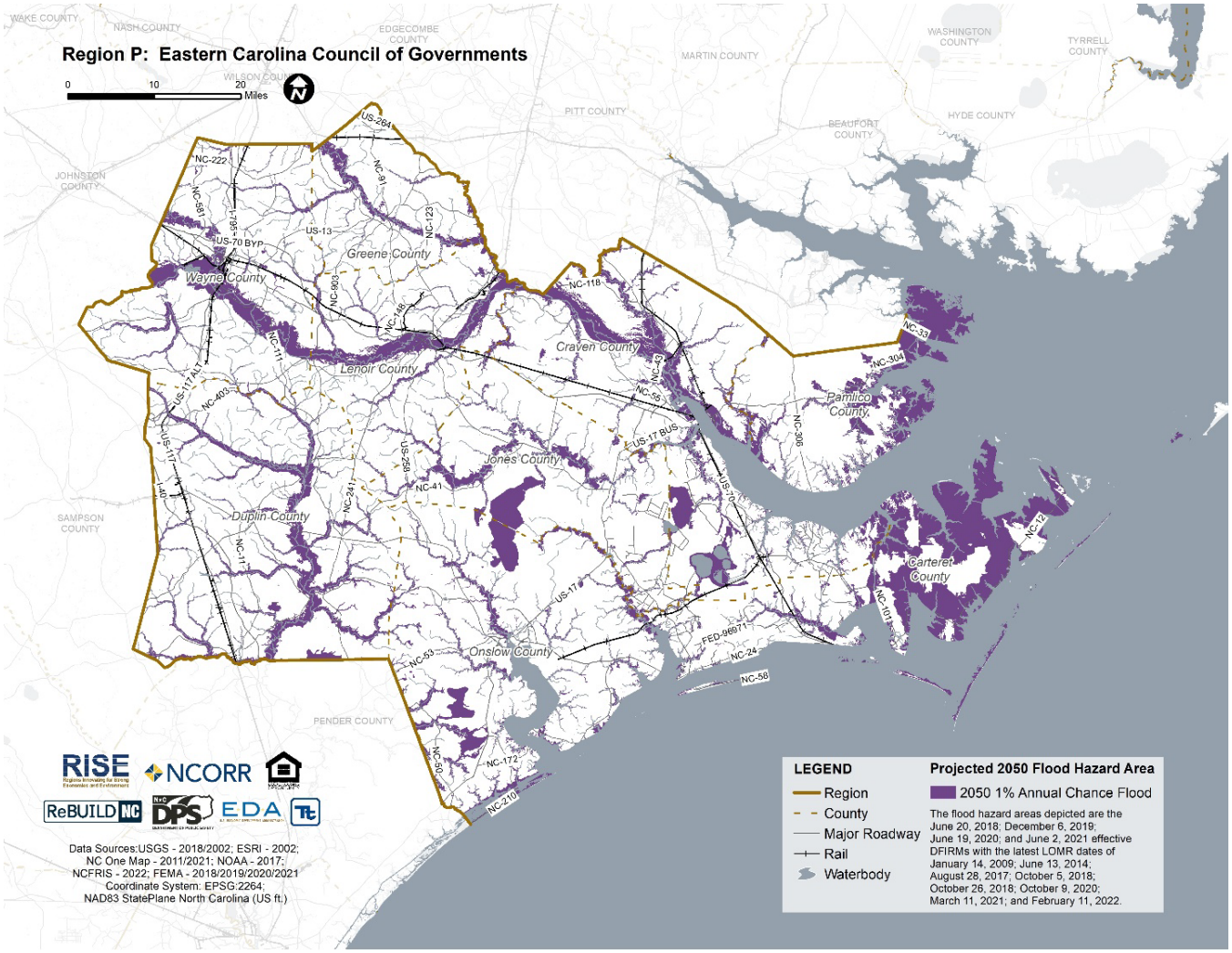
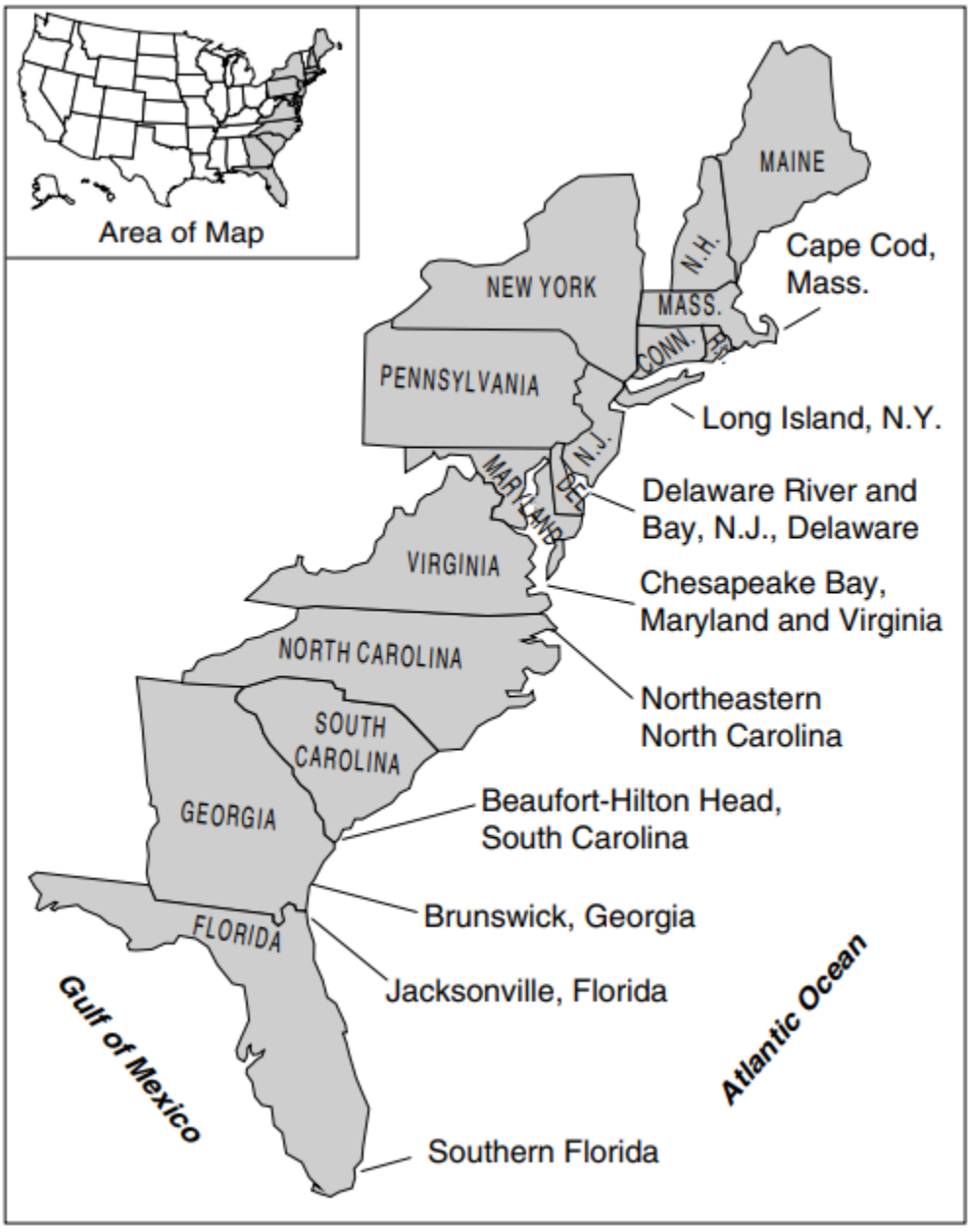


Figure 26 displays areas along the Atlantic coast where saltwater has intruded into freshwater aquifers. The Eastern Carolina Region has been identified as one of these areas.

Figure 26. Selected Areas Along the Atlantic Coast Where Saltwater Has Intruded into Freshwater Aquifers

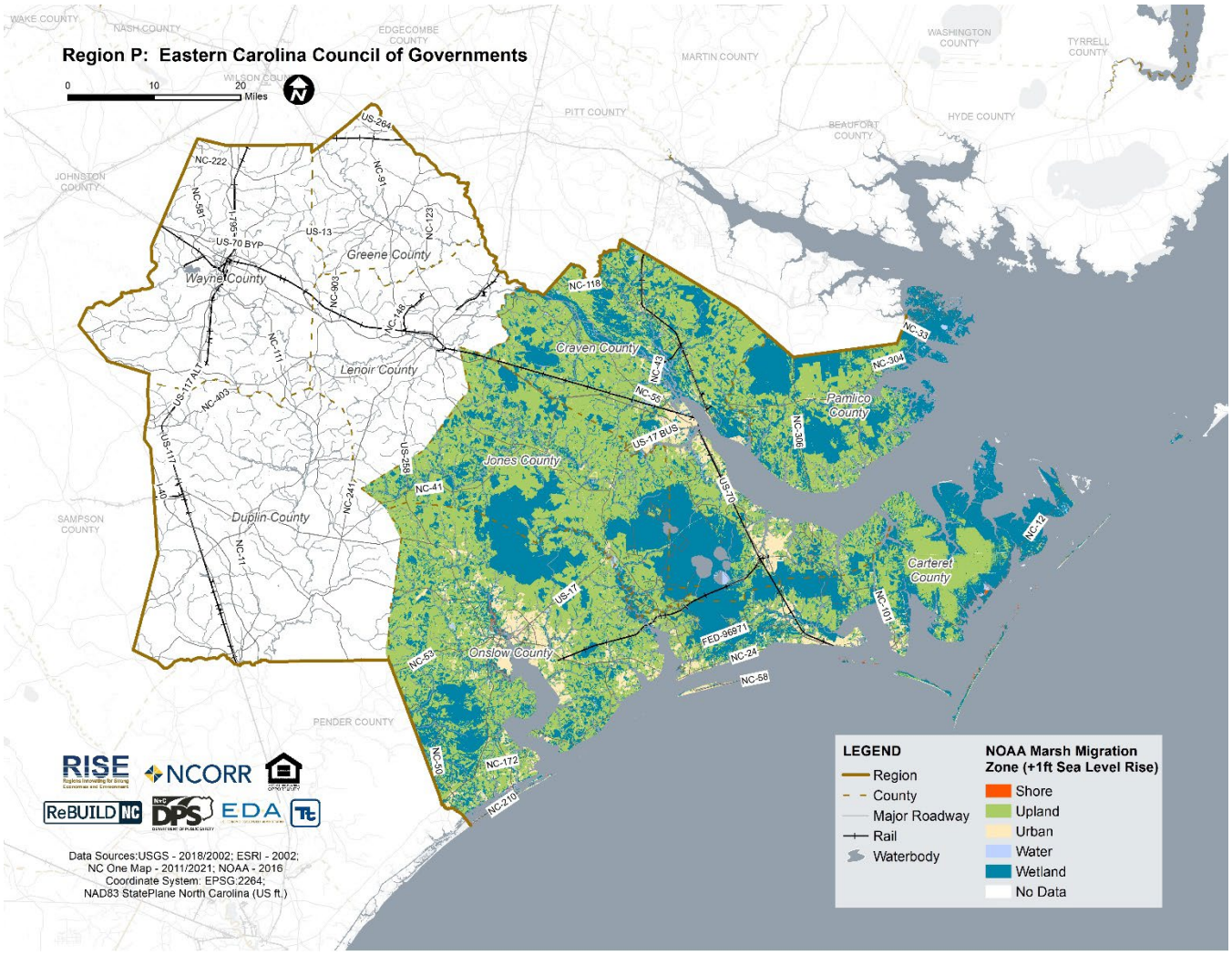


Source: Barlow and Wild 2002

Saltwater intrusion has also been identified as an issue in shallow coastal aquifers by stakeholders and members of the public during this planning process. Farms along the coast have experienced saltwater intrusion, which has resulted in the abandonment of sections of fields that have become too salty to support crops.

Figure 27 shows the rate of marsh migration, already a commonly occurring issue in the Eastern Carolina Region, made worse by 1 foot of sea level rise.

Figure 27. Marsh Migration in Eastern Carolina Region



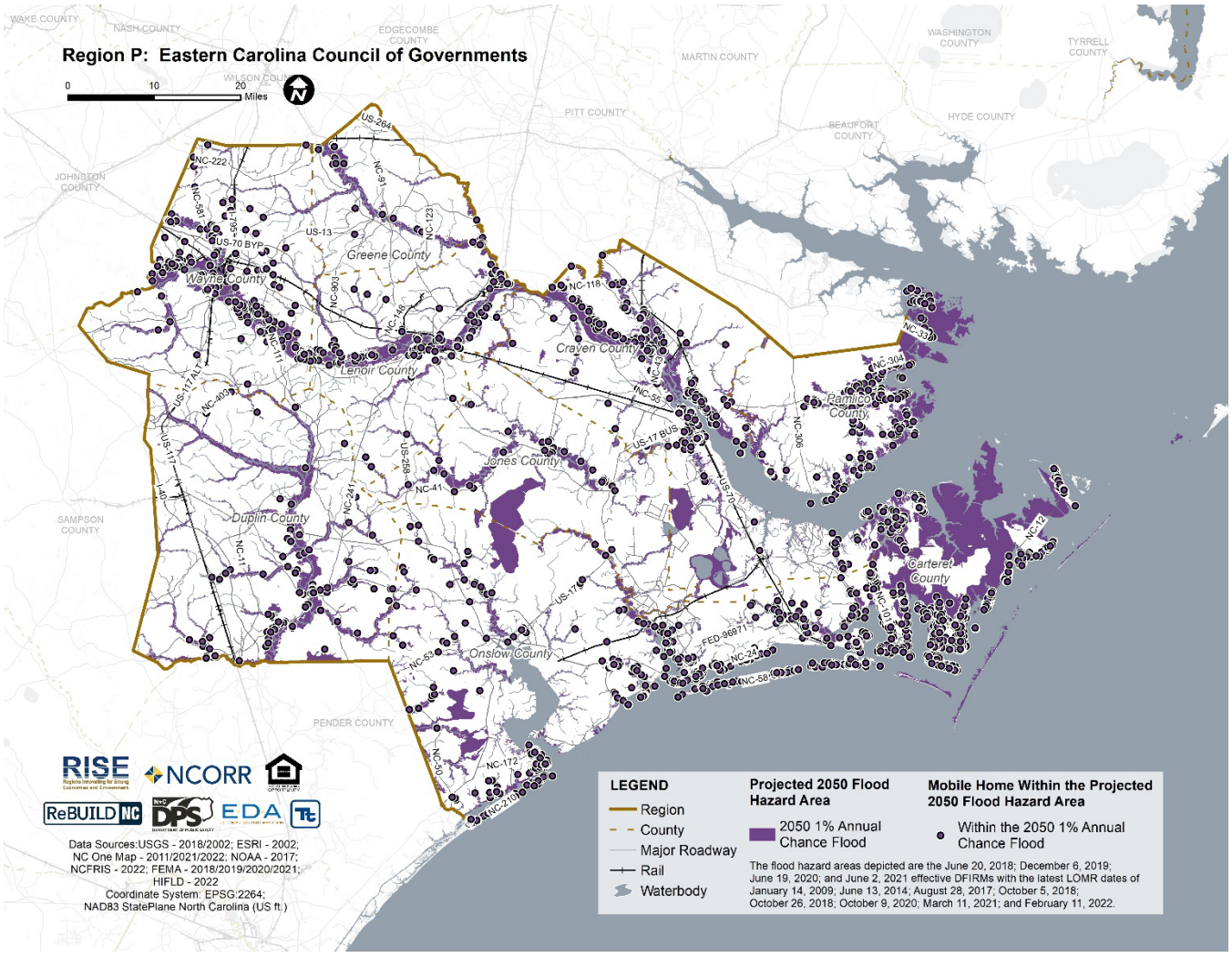
To explore the Eastern Carolina Region's specific exposure to sea level rise, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com).

C. Impact on Social Vulnerability and Equity, Health, and Safety

By 2050, an estimated 136,137 people (21% of the population) in the region will live in the 1 percent SFHA. See **Figure 28** for more information on mobile homes in the projected 2050 SFHA.

Sea level rise can lead to increased saltwater intrusion. Saltwater intrusion may result in elimination of safe drinking water if the aquifers accessed by potable wells are rendered too salty to drink. This is usually addressed by using a different aquifer, installing desalinization plants, or shipping water in from outside sources. However, these measures are often costly and can cause significant financial stress on socially vulnerable populations. See **Tables 105 - 107 in Appendix A: Additional Data** for more information on vulnerable populations in the projected 2050 SFHA.

Figure 28. Mobile Homes in the Projected 2050 SFHA



D. Impact on Housing, Critical Infrastructure, and Community Support Systems

Sea level rise in the long-term will impact the region's buildings and critical infrastructure. While no structures are anticipated to be directly affected by saltwater intrusion, saltwater intrusion can lead to the failure of services provided by potable water wells and aquifers or result in the need to build costly desalinization plants. Coastal erosion caused by sea level rise can impact the structural integrity of coastal buildings and infrastructure. This may result in the relocation or demolishing of prominent structures in the Eastern Carolina Region. See **Tables 108 – 121 in Appendix A: Additional Data** for Critical Infrastructure in the Projected 2050 SFHA.

E. Impact on Economy

Sea level rise will likely have large-scale impacts on local economies. These may include:

- Cost of relocating or demolishing coastal structures

- Lost commercial and tourism opportunities
- Need to build costly desalinization plants
- Cost of construction of new wells or treatment facilities

F. Impact on Natural Environmental Systems

Sea level rise will result in the loss of the Eastern Carolina Region's low-lying coastal ecosystems like wetlands and the conversion of uplands to wetlands. In addition, sea level rise will result in saltwater intrusion, which can damage or kill salt intolerant plant life. Saltwater intrusion will result in the conversion of freshwater wetlands to saltwater wetlands where the impacted aquifer is shallow. Coastal forests that cannot tolerate saltwater will die off and become "ghost forests" if saltwater intrusion reaches their root system.

G. Cascading Impacts on Other Hazards

According to NOAA, sea level rise can amplify factors that currently contribute to coastal flooding: high tides, storm surge, high waves, and high runoff from rivers and creeks. All of these factors change during extreme weather events (NOAA 2012). Other secondary hazards that could occur along the coast in response to sea level rise:

- Coastal erosion
- Flooding of wetland territories
- Saltwater intrusion in potable water sources
- Agricultural soil contamination from salt exposure
- Exacerbates habitat loss

X. TORNADO

A. Hazard Description

Tornadoes and high wind events are a common occurrence in the Eastern Carolina Region. These hazards have damaged property and infrastructure, downed trees and power lines, and caused injuries and fatalities.

Tornadoes

A tornado is a violently rotating column of air that extends from a thunderstorm to the ground with an average forward speed of 30 mph. Tornadoes typically develop from either a severe thunderstorm or a hurricane as cool air rapidly overrides a layer of warm air. Tornadoes can occur at any time of the year, with peak seasons at different times for different states (NWS, Thunderstorms, Tornadoes, Lightning...Nature's Most Violent Storms 2010).

High Winds

Wind occurs at all scales, from local breezes lasting a few minutes to global winds resulting from solar heating of the earth. High winds are often associated with other severe weather events such as thunderstorms, tornadoes, hurricanes, and tropical storms (NWS, Air Pressure and Wind 2012).

B. Location and Extent

All of the Eastern Carolina Region is exposed to tornadoes and high wind. The Eastern Carolina Region is located in FEMA Wind Zone III, where wind speeds can reach up to 200 mph (NIST 2011).

Thunderstorms are common occurrences during North Carolina's summer afternoons and evenings. During the warmer months of the year, weather is driven by more local-scale convective processes as the jet stream retreats north. The popup showers experienced during this time of year are generally small (1 mile to a few miles across) and produce very intense, very local rainfall. During the spring and summer, thunderstorms are often associated with the passage of warm and cold fronts as storms developing along the frontal line and can impact all parts of the state. Thunderstorms in North Carolina bring strong winds and intense rain that can lead to localized flash flooding. Sometimes these storms also produce hail and tornadoes or damaging straight-line winds (NCSU n.d.).

The current average lead time for tornado warnings is 13 minutes. Occasionally, tornadoes develop so rapidly that little, if any, advance warning is possible (NOAA SPC n.d.).

C. Climate Change Impacts

A warmer atmosphere means storms have the potential to be more intense and occur more often (Kathie Dello 2020). In the Eastern Carolina Region, severe storms typically include coastal nor'easters, snowstorms, spring and summer thunderstorms, tornadoes, tropical storms, and hurricanes. Most of these events occur in the warmer months between April and October, with nor'easters occurring between September and April.

D. Impact on Social Vulnerability and Equity, Health, and Safety

Examples of impacts may include:

- Residents may be displaced or require temporary to long-term sheltering due to severe weather events.
- Downed trees, damaged buildings, and debris carried by high winds can lead to injury or loss of life.
- People located outdoors (i.e., recreational activities and farming) are especially vulnerable to tornadoes and high wind events due to lack of shelter.
- Power loss can greatly impact households, business operations, public utilities, and emergency personnel.
- Vulnerable populations may face additional challenges if power loss results in interruption of heating and cooling services, hospital operations, and potable water supplies.
- Emergency personnel such as police, fire, and EMS may not be able to effectively respond and maintain the safety of its residents.

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

Tornadoes and high wind events can impact buildings and critical infrastructure. Likely damages include:

- Mobile homes, other residential structures, and wood/masonry buildings may be more susceptible to wind damage than commercial and industrial structures.
- Pre-1953 structures may experience more wind damage due to inadequate construction techniques. Eastern Carolina has 54,511 buildings built pre-1953.
- Critical facilities may experience structural damage directly from high winds or falling tree limbs/flying debris, which can also result in the loss of power.
- Transportation infrastructure is vulnerable to the impacts of tornadoes, such as flooding and falling debris. Impacts to transportation infrastructure affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting) transportation needs.

It is anticipated that any new development will be exposed to tornadoes and high wind hazards. However, due to increased standards and codes, new development might be less vulnerable to wind-related hazards compared to older building stock.

F. Impact on Economy

Tornado and high wind events can have short- and long-lasting impacts on the economy. When a business is closed during storm recovery, there is lost revenue and wages to employees. Overall, economic impacts include:

- Loss of business function (e.g., tourism, recreation)
- Damage to inventory (utility outages)
- Relocation costs, wage loss, and rental loss due to building damage
- Impacts to transportation that affect both short-term (e.g., evacuation activities) and long-term (e.g., day-to-day commuting and goods transport) needs
- Damage to utility infrastructure (power lines, gas lines, electrical systems) resulting in loss of power or heat, potentially impacting business operations and heating or cooling provision to the population
- Costly debris management operations for downed vegetation and removal of damaged construction materials

G. Impact on Natural Environmental Systems

Tornadoes and high wind events can be destructive to the natural and local environment. Tornadoes can tear apart habitats causing fragmentation across ecosystems. Overall, as the physical environment becomes more altered, species will begin to contract within their habitat or migrate in response, which may stress the ecosystems within the Eastern Carolina Region.

H. Cascading Impacts on Other Hazards

Tornadoes are often accompanied by excessive precipitation, hail, and lightning. Heavy precipitation often results in secondary hazards such as flooding or structural damage. Lightning can start wildfires. Strong winds can contribute to the rapid spread of a wildfire once ignited. Tornadoes and cyclones can impact various natural land resources that can be easily uprooted by major wind events and storm surge, increasing potential for erosion (USGS n.d.).

XI. WILDFIRE

A. Hazard Description

The Eastern Carolina Region is at risk of wildland fires. A wildland fire can be defined as any non-structural fire that occurs in the wildland. Three distinct types of wildland fires have been defined and include:

- Naturally Occurring Wildfire
- Human-Caused Wildfire
- Prescribed (i.e., controlled) Wildfire

Wildfires can be highly destructive and can be difficult to control. They occur in forested, semi-forested, and less developed areas. Wildfires can result in the destruction of forests, brush, field crops, grasslands, real estate, and personal property and have secondary impacts on other hazards such as flooding by removing vegetation and destroying watersheds. Wildfire events can range in size and intensity. A wildfire's intensity depends significantly on both meteorological conditions and human activity.

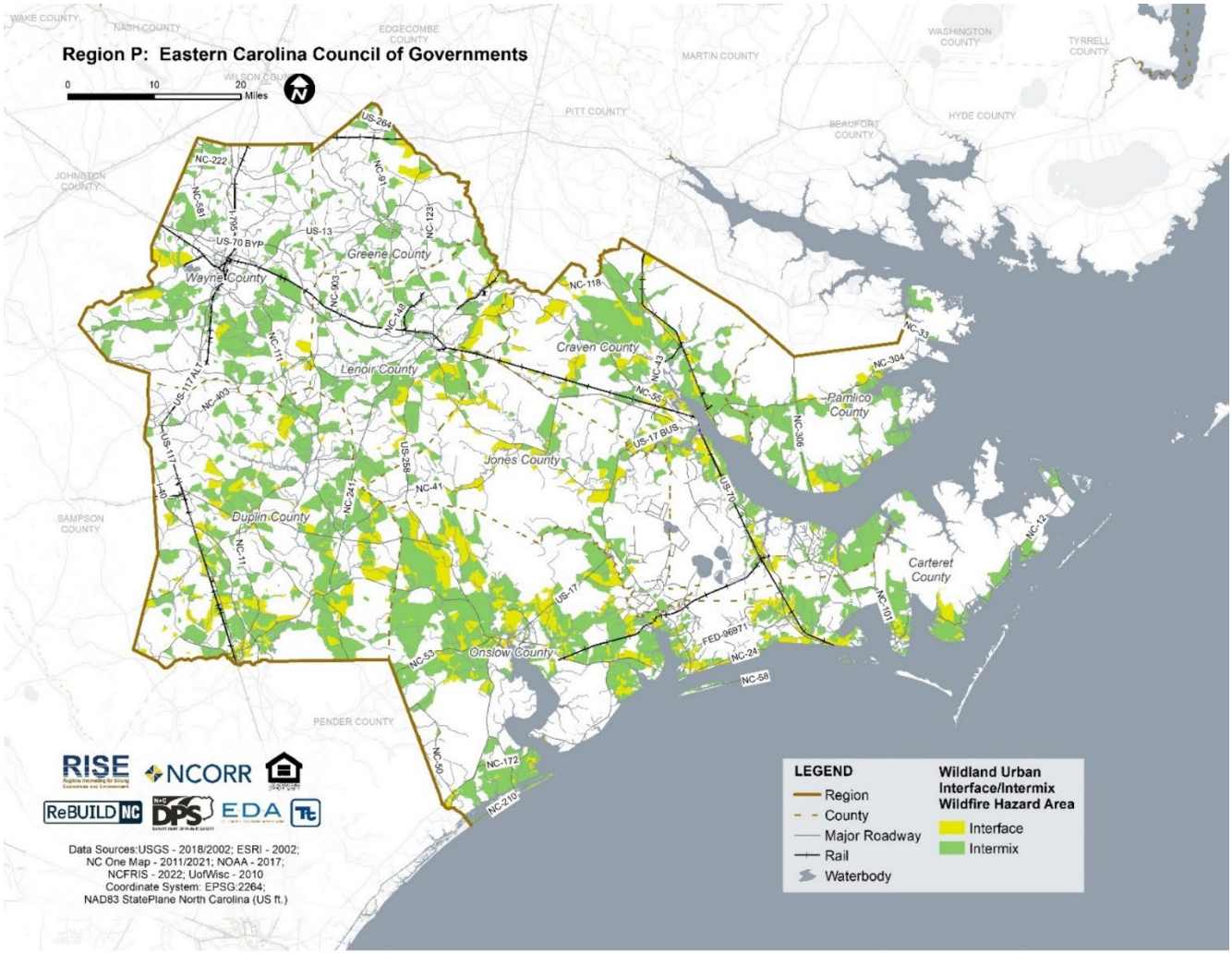
B. Location and Extent

Wildfires occur in natural areas, such as wetlands and forests, and in development adjacent to these areas throughout the Eastern Carolina Region. Areas where vegetation and trees have died due to drought or saltwater intrusion (ghost forests) have an increased risk for wildfire (Velasquez-Manoff 2019).

Figure 29 below displays wildfire hazard areas in the Eastern Carolina Region. Both wildland-urban interface areas (transition zones between wilderness and land developed by human activity) and intermix areas (zones where houses and wildland vegetation directly intermingle) are shown. The map illustrates that wildfire risk is present in throughout the region and is often highest outside of metropolitan areas where develop transitions back to natural lands.

To explore the Eastern Carolina Region's specific exposure to wildfire, visit Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com).

Figure 29. Wildland-Urban Interface/Intermix Wildfire Hazard Areas



C. Climate Change Impacts

The Eastern Carolina Region can expect warmer and drier conditions, which may increase the frequency and intensity of wildfires. Higher temperatures are expected to increase the amount of moisture that evaporates from land and water. These changes have the potential to lead to more frequent and severe droughts, which, in turn, increases the likelihood of wildfires (EPA n.d.). Longer dry seasons and multi-year droughts could create triggers for wildfires. Increased temperature and change in precipitation will also affect fuel moisture during wildfire season and the length of time during which wildfires can burn during a given year (James M. Vose 2012).

Climate change may increase the frequency of lightning strikes. A warmer atmosphere holds more moisture, which is one of the key factors for triggering a lightning strike. Lightning strikes cause approximately half the wildfires in the United States. If the frequency of lightning strikes increases, the potential for wildfires from these strikes also increases. Wildfire incidents are predicted to increase throughout the United States due to climate change, causing at least a doubling of areas burned within the next century (USDA 2012).

It is projected that higher summer temperatures will likely increase the high fire risk in the United States by 10 to 30 percent. Fire occurrence and/or area burned could increase across the U.S. due to the increase of lightning activity, the frequency of surface pressure and associated circulation patterns conductive to surface drying, and fire-weather conditions in general, which is conductive to severe wildfires. Warmer temperatures will extend fire seasons and areas burned (U.S. Forest Service [USFS] 2020).

D. Impact on Social Vulnerability and Equity, Health, and Safety

Wildfires have the potential to impact human health and life of residents and responders, structures, infrastructure, and natural resources. The most vulnerable populations include emergency responders and those within a short distance of the interface between the built environment and the wildland environment. First responders, homeowners who do not get out soon enough, and nearby residents are exposed to the dangers from the initial incident and after-effects from smoke inhalation and heat stroke.

Eastern Carolina's population is expected to grow at a steady rate, exposing more vulnerable individuals to the wildfire hazard. However, much of the growth is projected to be in the coastal areas, which will likely not have as much exposure to wildfire. See **Tables 122 – 127 in Appendix A: Additional Data** for more details on vulnerable populations within the region in wildfire hazard areas.

E. Impact on Housing, Critical Infrastructure, and Community Support Systems

Buildings and critical facilities located in or adjacent to wooded areas are exposed and considered vulnerable to wildfires. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed of brick or concrete.

The Eastern Carolina Region has 614 critical facilities located in the Wildland-Urban Interface area and 690 critical facilities in the Wildland-Urban Intermix area. Combined, this is a total of 1,304 critical facilities, or 39% of all critical facilities in the region, located in a wildfire hazard area. See **Tables 128 – 132 in Appendix A: Additional Data** for more details on critical infrastructure within the region in wildfire hazard areas.

Development in forested areas may expose more structures to the wildfire hazard in the Eastern Carolina Region. Improved building codes and standards, as well as forest management strategies, may allow for decreased impacts to new structures.

F. Impact on Economy

Wildfire events attributed to extreme heat events can have major economic impacts on a community, from the initial loss of structures to the subsequent loss of revenue from destroyed business. These events may cost thousands of taxpayer dollars to suppress and control and may involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from working to fight these fires. See **Tables 133 – 150 in Appendix A: Additional Data** for more details on economic facilities within the region in wildfire hazard areas.

G. Impact on Natural Environmental Systems

According to the USGS, post-fire runoff polluted with debris and contaminants can be extremely harmful to the ecosystem and aquatic life. Studies show that urban fires in particular are more harmful to the environment compared to forest fires (USGS 2018). Chemicals and contaminates can be released from burning infrastructure. These chemicals, such as iron lead, and zinc, may leach into the storm water, contaminate nearby streams, and impair aquatic life.

H. Cascading Impacts on Other Hazards

Wildfires, particularly large-scale fires, can dramatically alter the terrain and ground conditions, making land already devastated by fire susceptible to floods and mudslides. Normally, vegetation absorbs rainfall, reducing runoff. However, wildfires leave the ground charred, barren, and unable to absorb water, thus creating conditions perfect for flash flooding and mudflows. Flood risk in these impacted areas remains significantly higher until vegetation is restored, which can take up to 5 years after a wildfire (FEMA 2013).

Debris and ash left from a wildfire can form mudflows. During and after a rain event, as water moves across charred and denuded ground, it can also pick up soil and sediment and carry it in a stream of floodwaters. These mudflows have the potential to cause significant damage to impacted areas. Areas directly affected by fires and those located below or downstream of burn areas are most at risk for flooding (FEMA 2016).

I. Additional Data Needs

Key gaps in data and understanding that were identified during review of available scientific information and public and stakeholder meetings included:

- State level fire statistics were used as the best available data. Region-specific statistics would provide a more thorough assessment.
- Mapping of areas of anticipated future development would allow for better understanding of changes in exposure to the wildland-urban interface.

XII. KEY TAKEAWAYS FOR REGIONAL CLIMATE HAZARD RESILIENCE

As a low-lying coastal community, the Eastern Carolina Region's vulnerability to flooding and other coastal hazards is not surprising. Hazards such as storm surge, erosion, and severe winds are not uncommon occurrences, and residents and officials alike are generally prepared to manage the impacts of these hazards.

Coastal hazards are changing, however, as the global climate warms. This means that the hazards experienced across the Eastern Carolina Region will be different in the future than what they have been in the past. While hurricanes and tropical storms may not be increasing significantly in frequency, they are increasing measurably in their intensity. Storm surge, flooding, winds, and the cascading impacts of tropical storms are all becoming more impactful as these weather events intensify.

Extreme heat is also anticipated to drive significant change across the region as the global climate warms. Daytime temperatures will increase, exacerbating underlying conditions among vulnerable populations and stressing regional infrastructure such as roadways and power grids. As nighttime temperatures increase, particularly in the warmest months of the summer, gaining respite from intense heat will become more challenging. These conditions will increase cooling costs and pose health risks for residents across the region.

A. Areas of Greatest Concern in the Region by Hazard

While climate hazards as a whole pose a regional concern, each hazard discussed in this assessment has unique impacts focused in specific locations. Below is a list of the climate-related hazards and impacts which pose the greatest threat to the Eastern Carolina Region.

Drought

- Droughts could pose significant risk to the region's strong agricultural industry.

Erosion

- Many beaches in Onslow and Carteret County experience erosion rates upwards of 9 feet per year, with beaches near Camp LeJeune in Onslow County eroding at a rate of 12 feet per year, placing structures and habitats at risk.
- Wetland migration due to sea level rise is likely to lead to significant loss of tidal wetlands in the region, depleting habitats and reducing the natural buffer between coastal hazards and the communities of the region.

Extreme Temperature

- Due to climate change, extreme heat is likely to become more frequent and severe in the entire region.
- Populations that lack proper heating and cooling are most at risk of extreme temperature.
- High heat nights will increase cooling costs and present significant health risks to populations that lack heating, ventilation, and air condition systems (HVAC).

Flood

- The region is exposed to various types of flooding, with coastal flooding and stormwater flooding being the largest concerns.

- 21 percent of the region's population and 8.5 percent of the region's buildings are in the 1-percent annual chance floodplain.
- Stormwater components are not designed to handle larger rainfall and can be damaged or contribute to stormwater flooding.

Hurricane and Severe Storms

- The region experiences a variety of severe weather, including numerous secondary hazards like wind, lightning, and hail.
- These events have led to significant damages and impacts, many taking years to recover from.
- The frequency and severity of these events are likely to increase in the future due to climate change.

Sea Level Rise

- Sea level rise is likely to increase the frequency and severity of coastal flooding. Flood maps do not account for sea level rise and therefore under-represent future risk. The region's rate of sea level rise (roughly 0.18 inches per year) is higher than the global average and roughly twice as fast as the southern portions of the state (Kunkel 2020).

Tornado

- Climate change is increasing the likelihood of tornadoes across the region, particularly in summer months.

Wildfire

- Increasing frequency and severity of wildfire will lead to increased damages of natural systems and potential damages to structures
- Projected increases in wildfire risks and associated emissions can have harmful impacts on health.

B. Future Considerations and Concerns

As temperature increases due to climate change, the likelihood of increased frequency and severity of many hazards, such as droughts and hurricanes, also increases. Current services, protections, and infrastructure designs may not be adequate for future levels of risk. The entire region is exposed to these changes, but socially vulnerable populations are most likely to bear significant health and financial impacts. Development and population growth in urban areas increases the likelihood of coastal hazards having a larger impact on the region in the next 30 years.

C. Considerations for Resilience Portfolio Development

The time to invest in resilience actions is now. There exists a tremendous need to:

- Strengthen the community's capacity to prepare for and respond to disasters;
- Increase and enhance natural lands across the region to help manage water;
- Provide resilience education to residents, businesses, government staff, and elected officials in order to create a culture of safety, preparedness, and awareness of future hazards;
- Seek and secure funding for projects that will enhance the region's capacity to withstand and recover from disasters while simultaneously building a strong regional economy; and
- Commit to equitable solutions to current and future risks on a regional scale.

By investing in regional resilience, the Eastern Carolina Region can increase safety for residents and businesses, enhance its natural resources, continue building a strong regional economy, and upgrade infrastructure and utilities. Regional resilience is an opportunity for the Eastern Carolina Region to build a strong, safe, and prosperous future.

Appendix A: Additional Data

Table 11. Government Buildings in the Eastern Carolina Region

County	Government Buildings
Carteret County	581
Craven County	385
Duplin County	208
Greene County	95
Jones County	72
Lenoir County	152
Onslow County	316
Pamlico County	56
Wayne County	1,334
Eastern Carolina Region (Total)	**3,199**

Sources: NC One Map 2021/2022

Table 12. Religious Buildings in the Eastern Carolina Region

County	Religious Buildings
Carteret County	444
Craven County	448
Duplin County	400
Greene County	117
Jones County	136
Lenoir County	349
Onslow County	502
Pamlico County	121
Wayne County	699
Eastern Carolina Region (Total)	**3,216**

Sources: NC One Map 2021/2022

Table 13. Public Service Facilities in the Eastern Carolina Region

Public Service Facilities in the Eastern Carolina Region	
Public Service Facility	**Total Public Service Facilities**
EMS	166
EOC	9
Fire Stations	202
Library	33
Police	67
Public Health Department	9
Eastern Carolina Region (Total)	**486**

Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Table 14. Health Care Facilities in the Eastern Carolina Region

Health Care Facilities in the Eastern Carolina Region	
Health Care Facility	**Total Health Care Facilities**
Hospital	9
Medical Facility	524
Pharmacy	170
Eastern Carolina Region (Total)	**703**

Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Table 15. Major Economic Development Asset Facilities in the Eastern Carolina Region

Major Economic Development Asset Facilities in the Eastern Carolina Region	
Major Economic Development Asset Facility	**Total Major Economic Development Asset Facilities**
Port Facility	117
Eastern Carolina Region (Total)	**117**

Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Table 16. Emergency Shelters in the Eastern Carolina Region

Total Number of Emergency Shelters in the Eastern Carolina Region	
Carteret County	21
Craven County	24
Duplin County	19
Greene County	5
Jones County	7
Lenoir County	24
Onslow County	43
Pamlico County	6

Wayne County	38
Eastern Carolina Region (Total)	**187**

Sources: NC One Map 2019/2020/2021

Table 17. Miles of Critical Infrastructure by General Category in the Eastern Carolina Region

Miles of Critical Infrastructure by General Category in the Eastern Carolina Region	
Transportation Routes	**Miles of Infrastructure**
NC Route	893
US Route	679
Interstate	86
Railroad	324
Eastern Carolina (Total)	1,982
Evacuation Routes	
Roadway	952
Ferry	2
Eastern Carolina (Total)	954

Sources: NCDOT 2015/2020/2021

Table 18. Total Length of Critical Infrastructure in the Eastern Carolina Region

Total Length of Critical Infrastructure in Eastern Carolina Region (Miles)				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Ferry)**
Carteret County	1,077	14	96	-
Craven County	1,649	32	137	-
Duplin County	1,640	33	206	-
Greene County	546	-	37	-
Jones County	487	-	55	-
Lenoir County	1,137	9	62	-
Onslow County	1,770	-	175	-
Pamlico County	443	-	-	2
Wayne County	1,775	237	183	-
Eastern Carolina (Total)	**10,524**	**325**	**951**	**2**

Sources: NCDOT 2015/2020/2021

Table 19. Number of Residential Structures in the Eastern Carolina Region

County	Number of Residential Structures
Carteret	53,736
Craven	51,333
Duplin	30,748
Greene	13,491
Jones	7,432

County	Number of Residential Structures
Lenoir	33,078
Onslow	140,102
Pamlico	12,281
Wayne	77,383
Eastern Carolina (Total)	**419,584**

Table 20. Vulnerable Population Facilities in the Eastern Carolina Region

Vulnerable Population Facilities in Eastern Carolina Region	
Vulnerable Population Facility	**Total Vulnerable Population Facilities**
Emergency Shelter	187
Mobile Homes	96,118
Nursing Homes	66
Eastern Carolina (Total)	**96,371**

Sources: NCDCR 2022; NC One Map 2019/2020/2021; HIFLD 2016/2021/2022

Table 21. Mobile Homes in the Eastern Carolina Region

Mobile Homes in Eastern Carolina Region		
Counties	**Total Number of Mobile Home Parks per County**	**Total Number of Mobile Home Buildings per County**
Carteret County	86	12,996
Craven County	46	7,358
Duplin County	34	11,998
Greene County	12	3,446
Jones County	1	1,854
Lenoir County	41	7,669
Onslow County	86	18,293
Pamlico County	3	2,185
Wayne County	78	29,932
Eastern Carolina (Total)	**387**	**95,731**

Sources: NC One Map 2021/2022; HIFLD 2022

Table 22. Total Vulnerable Population Located in the 1-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the 1-Percent Annual Chance Flood Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (excluding taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	35,679	8,826	1,538	3,815	6,711	92	686	82	205
Craven County	100,720	22,023	4,193	1,427	3,230	3,397	145	573	28	238
Duplin County	48,715	6,960	1,512	528	1,768	1,597	178	196	3	63
Greene County	20,451	2,379	386	122	495	464	37	64	1	20
Jones County	9,172	1,280	306	58	326	327	-	36	-	9
Lenoir County	55,122	9,336	1,877	550	2,174	2,243	97	448	26	46
Onslow County	204,576	34,525	2,946	2,932	3,893	4,639	124	526	58	1,378
Pamlico County	12,276	4,555	1,373	153	560	889	23	134	7	13
Wayne County	117,333	19,337	3,258	1,359	4,018	3,194	311	700	43	153
Eastern Carolina (Total)	**636,051**	**136,074**	**24,677**	**8,667**	**20,279**	**23,461**	**1,007**	**3,363**	**248**	**2,125**

Table 23. Total Vulnerable Population Located in the 0.2-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the 0.2-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (excluding taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	43,370	10,728	1,869	4,638	8,157	111	834	100	249
Craven County	100,720	25,184	4,795	1,632	3,694	3,885	166	655	32	272
Duplin County	48,715	7,426	1,613	563	1,886	1,704	190	209	3	67
Greene County	20,451	2,684	435	138	558	523	42	72	1	23
Jones County	9,172	1,309	313	60	333	335	-	37	-	9
Lenoir County	55,122	11,324	2,277	667	2,637	2,720	118	544	32	55
Onslow County	204,576	37,194	3,174	3,158	4,193	4,998	134	566	63	1,485
Pamlico County	12,276	5,470	1,649	184	672	1,068	28	160	8	16
Wayne County	117,333	21,034	3,544	1,478	4,371	3,474	338	762	46	167
Eastern Carolina Region (Total)	**636,051**	**154,995**	**28,528**	**9,749**	**22,982**	**26,864**	**1,127**	**3,839**	**285**	**2,343**

Table 24. Total Vulnerable Population of Tracts with SVI Ranking 0.5001-0.75 Located in the 1-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the 1-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (excluding taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	12,969	306	52	197	302	10	37	12	6
Craven County	100,720	13,601	214	128	306	267	5	26	-	1
Duplin County	48,715	9,287	283	65	276	309	27	33	-	15
Greene County	20,451	-	-	-	-	-	-	-	-	-
Jones County	9,172	-	-	-	-	-	-	-	-	-
Lenoir County	55,122	9,982	639	166	413	520	22	90	6	8
Onslow County	204,576	26,594	1,072	921	1,480	1,883	47	197	2	44
Pamlico County	12,276	-	-	-	-	-	-	-	-	-
Wayne County	117,333	-	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**72,433**	**2,514**	**1,332**	**2,672**	**3,281**	**111**	**383**	**20**	**74**

Table 25. Total Vulnerable Population of Tracts with SVI Ranking 0.5001-0.75 Located in the 0.2-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the 0.2-Percent Annual Chance Flood Hazard Area									
		Total Population in Hazard Area	Vulnerable Population Category								
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (excluding taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	15,835	374	64	240	368	12	45	15	7
Craven County	100,720	16,938	267	160	382	332	6	33	-	2
Duplin County	48,715	10,284	314	72	306	343	30	36	-	17
Greene County	20,451	-	-	-	-	-	-	-	-	-
Jones County	9,172	-	-	-	-	-	-	-	-	-
Lenoir County	55,122	12,192	781	202	505	635	27	109	7	10
Onslow County	204,576	27,868	1,123	965	1,551	1,973	49	206	2	47
Pamlico County	12,276	2,209	107	22	64	117	2	13	-	2
Wayne County	117,333	24,561	1,179	380	923	1,126	116	177	20	24
Eastern Carolina Region (Total)	**636,051**	**109,887**	**4,145**	**1,865**	**3,971**	**4,894**	**242**	**619**	**44**	**109**

Table 26. Total Vulnerable Populations of Tracts with SVI Ranking >0.7501 Located in the 1-percent annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking >0.7501 Located in the 1-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (excluding taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	22,921	338	98	313	374	24	101	-	10
Craven County	100,720	20,690	1,649	514	1,884	1,487	106	411	1	77
Duplin County	48,715	6,403	1,195	440	1,436	1,256	145	157	2	48
Greene County	20,451	2,380	386	122	495	464	37	64	1	20
Jones County	9,172	1,275	305	58	324	326	-	36	-	9
Lenoir County	55,122	8,948	1,226	378	1,713	1,684	73	350	20	37
Onslow County	204,576	13,921	114	112	294	191	10	39	4	14
Pamlico County	12,276	7,080	476	60	366	394	5	79	1	6
Wayne County	117,333	26,466	1,959	860	3,658	1,876	242	654	37	101
Eastern Carolina Region (Total)	**636,051**	**110,084**	**7,648**	**2,642**	**10,483**	**8,052**	**642**	**1,891**	**66**	**322**

Table 27. Total Vulnerable Population of Tracts with SVI Ranking >0.7501 Located in the 0.2-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking >0.7501 Located in the 0.2-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (excluding taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	23,653	349	101	323	386	24	104	-	10
Craven County	100,720	23,259	1,854	578	2,118	1,671	119	462	1	87
Duplin County	48,715	6,745	1,259	464	1,513	1,323	153	166	2	50
Greene County	20,451	2,684	435	138	558	523	42	72	1	23
Jones County	9,172	1,304	311	60	332	334	-	37	-	9
Lenoir County	55,122	10,815	1,482	457	2,070	2,035	88	422	24	45
Onslow County	204,576	17,912	147	144	378	246	12	50	5	18
Pamlico County	12,276	7,746	521	66	401	431	6	86	1	6
Wayne County	117,333	28,457	2,106	925	3,933	2,017	260	704	39	108
Eastern Carolina Region (Total)	**636,051**	**122,575**	**8,464**	**2,933**	**11,626**	**8,966**	**704**	**2,103**	**73**	**356**

Table 28. Number of Buildings by General Occupancy Located in the 1-Percent Annual Chance Flood Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by Occupancy Type Located in the 1-Percent Annual Chance Flood Hazard Area							
		Occupancy Type							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	13,789	945	175	30	130	200	109	208
Craven County	57,961	7,011	412	187	43	68	60	112	78
Duplin County	47,845	343	23	137	11	3	2	2	132
Greene County	16,095	129	7	17	1	-	-	-	-
Jones County	9,934	282	24	51	-	1	8	1	-
Lenoir County	40,066	1,150	396	122	6	7	8	25	13
Onslow County	153,924	7,908	343	46	-	10	9	99	665
Pamlico County	13,725	3,298	174	125	3	32	6	41	-
Wayne County	93,879	2,055	554	171	1	33	72	68	135
Eastern Carolina Region (Total)	**493,396**	**35,965**	**2,878**	**1,031**	**95**	**284**	**365**	**457**	**1,231**

Table 29. Number of Buildings by General Occupancy Located in the 0.2-Percent Annual Chance Flood Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the 0.2-Percent Annual Chance Flood Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	20,330	1,354	274	43	190	312	138	245
Craven County	57,961	10,016	609	281	45	101	108	136	103
Duplin County	47,845	656	49	190	11	4	5	3	174
Greene County	16,095	201	18	49	1	1	1	-	-
Jones County	9,934	465	40	59	7	13	19	5	-
Lenoir County	40,066	2,360	586	169	14	35	49	50	14
Onslow County	153,924	10,151	496	71	-	13	13	111	721
Pamlico County	13,725	4,608	235	212	5	49	23	44	-
Wayne County	93,879	2,735	644	285	6	50	87	81	168

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the 0.2-Percent Annual Chance Flood Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Eastern Carolina Region (Total)	**493,396**	**51,522**	**4,031**	**1,590**	**132**	**456**	**617**	**568**	**1,425**

Table 30. Number of Mobile Home Parks and Mobile Home Buildings in the 1-Percent Annual Chance Flood Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the 1-Percent Annual Chance Flood Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	12	3,925
Craven County	46	7,358	8	1,158
Duplin County	34	11,998	-	193
Greene County	12	3,446	-	46
Jones County	1	1,854	-	64
Lenoir County	41	7,669	6	594
Onslow County	86	18,293	-	867
Pamlico County	3	2,185	1	557
Wayne County	78	29,932	4	1,039
Eastern Carolina Region (Total)	**387**	**95,731**	**31**	**8,443**

Table 31. Number of Mobile Home Parks and Mobile Home Buildings in the 0–2-Percent Annual Chance Flood Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the 0.2-Percent Annual Chance Flood Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	27	5,836
Craven County	46	7,358	12	1,836
Duplin County	34	11,998	-	315
Greene County	12	3,446	-	88

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the 0.2-Percent Annual Chance Flood Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Jones County	1	1,854	-	127
Lenoir County	41	7,669	8	1,040
Onslow County	86	18,293	2	1,237
Pamlico County	3	2,185	1	795
Wayne County	78	29,932	6	1,403
Eastern Carolina Region (Total)	**387**	**95,731**	**56**	**12,677**

Table 32. Total Number of Critical Facilities Within the Region Located in the 1-Percent Annual Chance Flood Hazard Area

Total Number of Critical Facilities within the Region Located in the 1-Percent Annual Chance Flood Hazard Area											
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Facility Type								
			Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	106	2	4	10	6	11	25	20	11	17
Craven County	548	75	4	-	16	12	4	4	9	12	14
Duplin County	360	22	-	1	1	-	-	1	13	6	-
Greene County	113	5	-	-	-	-	1	1	-	3	-
Jones County	109	8	-	-	-	2	-	-	4	2	-
Lenoir County	376	32	-	1	6	4	-	1	2	11	7
Onslow County	646	24	1	2	3	1	1	9	3	3	1
Pamlico County	100	17	-	1	-	-	2	2	5	6	1
Wayne County	580	34	2	2	11	-	-	2	4	8	5
Eastern Carolina Region (Total)	**3,326**	**323**	**9**	**11**	**47**	**25**	**19**	**45**	**60**	**62**	**45**

Table 33. Total Number of Critical Facilities Within the Region Located in the 0.2-Percent Annual Chance Flood Hazard Area

Total Number of Critical Facilities within the Region Located in the 0.2-Percent Annual Chance Flood Hazard Area											
			Facility Type								
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	212	3	18	12	4	60	36	22	24	33
Craven County	548	137	5	24	27	2	25	11	9	15	19
Duplin County	360	24	-	1	-	1	-	2	13	6	1
Greene County	113	5	-	-	-	-	1	1	-	3	-
Jones County	109	22	2	1	3	1	-	7	4	2	2
Lenoir County	376	61	4	8	10	1	-	5	2	18	13
Onslow County	646	39	2	3	1	2	13	9	3	3	3
Pamlico County	100	29	1	-	-	1	6	6	5	8	2
Wayne County	580	50	4	16	1	2	-	3	5	10	9
Eastern Carolina Region (Total)	**3,326**	**579**	**21**	**71**	**54**	**14**	**105**	**80**	**63**	**89**	**82**

Table 34. Total Number of Public Service Facilities Located in the Flood Hazard Area

Total Number of Public Service Facilities Located in the Flood Hazard Area		
Public Service Facilities	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
EMS	14	27
EOC	1	4
Fire Stations	22	33
Library	-	4
Police	8	12
Public Health Department	-	-
Eastern Carolina Region (Total)	**45**	**80**

Table 35. Total Number of Education Facilities Located in the Flood Hazard Area

Total Number of Education Facilities Located in the Flood Hazard Area		
Education Facility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
College and University	-	2
Private School	3	3
Public School	6	16
Eastern Carolina Region (Total)	**9**	**21**

Table 36. Total Number of Health Care Facilities Located in the Flood Hazard Area

Total Number of Health Care Facilities Located in the Flood Hazard Area		
Health Care Facility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Hospital	-	1
Medical Facility	42	56
Pharmacy	5	14
Eastern Carolina Region (Total)	**47**	**71**

Table 37. Total Number of Historic and Cultural Resource Facilities Located in the Flood Hazard Areas

Total Number of Historic and Cultural Resource Facilities Located in the Flood Hazard Area		
Historic and Cultural Resource Facility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Historical Site	25	54
Eastern Carolina Region (Total)	**25**	**54**

Table 38. Total Facilities with Impacts to Public Health and Environmental Systems in the Flood Hazard Area

Total Number of Facilities with Impacts to Public Health and Environmental Systems Located in the Flood Hazard Area		
Facility with Impacts to Public Health and Environmental Systems	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Septage Facility	3	5
Solid Landfill	6	7
Yard Waste Facility	2	2
Eastern Carolina Region (Total)	**11**	**14**

Table 39. Total Number of Major Economic Development Asset Facilities Located in the Flood Hazard Area

Total Number of Major Economic Development Asset Facilities Located in the Flood Hazard Area		
Major Economic Development Asset Facility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Port Facility	19	105
Eastern Carolina Region (Total)	**19**	**105**

Table 40. Total Number of Transportation Facilities Located in the Flood Hazard Area

Total Number of Transportation Facilities Located in the Flood Hazard Area		
Transportation Facility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Aircraft Landing Facility	24	24
Airport	-	-
Bus Station	2	3
Ferry Terminal	5	16
Highway Bridges	25	26
Eastern Carolina Region (Total)	**56**	**69**

Table 41Total Number of Utilities Located in the Flood Hazard Area

Total Number of Utilities Located in the Flood Hazard Area		
Utility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
AM Transmission Tower	8	8
Cellular Tower	10	16
FM Transmission Tower	8	10
Gas Plant	1	2
Power Plant	2	4
Sewer Treatment Plant	10	12
Substation	23	37
Eastern Carolina Region (Total)	**62**	**89**

Table 42. Total Number of Vulnerable Population Facilities Located in the Flood Hazard Area

Total Number of Vulnerable Population Facilities Located in the Flood Hazard Area		
Vulnerable Population Facility	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Emergency Shelter	9	19
Mobile Homes	8,474	12,733
Nursing Homes	5	7
Eastern Carolina Region (Total)	**8,488**	**12,759**

Table 43. Total Number of Emergency Shelters in the 1-Percent Annual Chance Flood Hazard Area

Total Number of Emergency Shelters Located in the 1-Percent Annual Chance Flood Hazard Area	
Carteret County	**3**
Craven County	**4**
Duplin County	**-**
Greene County	**-**
Jones County	**-**
Lenoir County	**-**
Onslow County	**1**
Pamlico County	**-**
Wayne County	**1**
Eastern Carolina Region (Total)	**9**
Facility Name	**County**
East Carteret HS	Carteret
Smyrna Elem	Carteret
Tiller School	Carteret
Bridgeton Elem	Craven
J T Barber Elem	Craven
New Bern Nat Guard Armory (New)	Craven
Oaks Road Elem	Craven
Northwoods Park Middle	Onslow

Total Number of Emergency Shelters Located in the 1-Percent Annual Chance Flood Hazard Area	
Goldsboro National Guard Armory (New)	Wayne

Table 44. Total Number of Emergency Shelters in the 0.2-Percent Annual Chance Flood Hazard Area

Total Number of Emergency Shelters Located in the 0.2-Percent Annual Chance Flood Hazard Area	
Carteret County	**4**
Craven County	**5**
Duplin County	**-**
Greene County	**-**
Jones County	**2**
Lenoir County	**4**
Onslow County	**1**
Pamlico County	**1**
Wayne County	**2**
Eastern Carolina Region (Total)	**19**

Facility Name	County
East Carteret Hs	Carteret
Smyrna Elem	Carteret
Beaufort Middle	Carteret
Tiller School	Carteret
West Craven Hs	Craven
J T Barber Elem	Craven
Oaks Road Elem	Craven
Bridgeton Elem	Craven
New Bern Nat Guard Armory (New)	Craven
Jones Middle	Jones
Trenton Elem	Jones
C H Bynum Elem	Lenoir
Rochelle Middle	Lenoir
Southeast Elem	Lenoir
Lenoir Cc	Lenoir
Northwoods Park Middle	Onslow
Pamlico Co Middle	Pamlico
School Street Elem	Wayne
Goldsboro National Guard Armory (New)	Wayne

Table 45. Miles of Critical Infrastructure by General Category in the Flood Hazard Area

Miles of Critical Infrastructure by General Category in the Flood Hazard Area		
Transportation Routes	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
NC Route	86	123
US Route	59	89
Interstate	6	7
Railroad	36	52
Eastern Carolina Region (Total)	**188**	**271**
Evacuation Routes		
Roadway	82	116
Ferry	-	-
Eastern Carolina Region (Total)	**82**	**116**

Table 46. Total Length of Regional Critical Infrastructure in the 1-Percent Annual Chance Flood Hazard Area

Total Length of Critical Infrastructure within the Region Located in the 1-Percent Annual Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Roadway)**	**Evacuation (Ferry)**
Carteret County	47	9	38	-
Craven County	8	5	4	-
Duplin County	15	2	10	-
Greene County	2	-	-	-
Jones County	2	-	1	-
Lenoir County	18	-	9	-
Onslow County	19	-	9	-
Pamlico County	17	-	-	-
Wayne County	25	20	13	-
Eastern Carolina Region (Total)	**152**	**36**	**82**	**-**

Table 47. Total Length of Regional Critical Infrastructure in the 0.2-Percent Annual Chance Flood Hazard Area

Total Length of Critical Infrastructure within the Region Located in the 0.2-Percent Annual Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Roadway)**	**Evacuation (Ferry)**
Carteret County	67	13	45	-
Craven County	21	6	11	-
Duplin County	18	2	13	-
Greene County	2	-	-	-

Total Length of Critical Infrastructure within the Region Located in the 0.2-Percent Annual Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Roadway)**	**Evacuation (Ferry)**
Jones County	4	-	2	-
Lenoir County	27	-	12	-
Onslow County	22	-	11	-
Pamlico County	22	-	-	-
Wayne County	37	31	22	-
Eastern Carolina Region (Total)	**220**	**52**	**116**	**-**

Table 48. Total Area of Historic Districts in the Flood Hazard Area (Acres)

Total Area of Historic Districts in the Flood Hazard Area (Acres)		
Counties	**1-Percent Annual Chance**	**0.2-Percent Annual Chance**
Carteret County	120	120
Craven County	426	426
Duplin County	-	-
Greene County	-	-
Jones County	-	-
Lenoir County	-	49
Onslow County	29	29
Pamlico County	-	-
Wayne County	278	278
Eastern Carolina Region (Total)	**854**	**903**

Table 49. Total Area of Agricultural Land in the 1-Percent Annual Chance Flood Hazard Area

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the 1-Percent Annual Chance Flood Hazard Area (Acres)
Carteret	53,533	27,385
Craven	68,815	5,652
Duplin	194,347	6,076
Greene	84,772	2,580
Jones	61,745	3,599
Lenoir	105,242	7,378
Onslow	59,283	1,695
Pamlico	36,816	7,018
Wayne	156,320	12,976
Eastern Carolina Region (Total)	**820,873**	**74,359**

Table 50. Total Area of Agricultural Land in the 0.2-Percent Annual Chance Flood Hazard Area

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the 0.2-Percent Annual Chance Flood Hazard Area (Acres)
Carteret	53,533	43,202
Craven	68,815	8,263
Duplin	194,347	7,588
Greene	84,772	3,909
Jones	61,745	3,883
Lenoir	105,242	12,245
Onslow	59,283	2,564
Pamlico	36,816	11,485
Wayne	156,320	15,184
Eastern Carolina Region (Total)	**820,873**	**108,324**

Table 51. Total Vulnerable Population Located in the SLOSH Category 1 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the SLOSH Category 1 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	27,009	6,430	1,050	2,695	4,767	69	488	53	152
Craven County	100,720	7,142	1,239	447	1,017	1,018	44	180	9	74
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172	92	9	1	5	10		1		
Lenoir County	55,122									
Onslow County	204,576	8,207	526	516	647	792	26	89	14	319
Pamlico County	12,276	4,300	1,296	145	529	840	22	126	7	12
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**46,750**	**9,500**	**2,160**	**4,893**	**7,427**	**161**	**884**	**83**	**557**

Table 52. Total Vulnerable Population of Tracts with SVI Ranking 0.5001 – 0.75 Located in the SLOSH Category 1 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the SLOSH Category 1 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	4,158	98	17	63	97	3	12	4	2
Craven County	100,720	4,799	76	45	108	94	2	9		1
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172									
Lenoir County	55,122									
Onslow County	204,576	4,053	103	75	114	170	6	17		4
Pamlico County	12,276	1,025	50	10	30	54	1	6		1
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**14,035**	**327**	**147**	**315**	**415**	**12**	**44**	**4**	**8**

Table 53. Total Vulnerable Population of Tracts with SVI Ranking > 0.7501 Located in the SLOSH Category 1 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking > 0.7501 Located in the SLOSH Category 1 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	17,412	257	75	238	284	18	76		7
Craven County	100,720	6,054	483	151	551	435	31	120		23
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172	92	9	1	5	10		1		
Lenoir County	55,122									
Onslow County	204,576	3,819	31	31	81	52	3	11	1	4
Pamlico County	12,276	6,893	463	58	357	383	5	77	1	6
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**34,270**	**1,243**	**316**	**1,232**	**1,164**	**57**	**285**	**2**	**40**

Table 54. Total Vulnerable Population Located in the SLOSH Category 2 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the SLOSH Category 2 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	42,534	10,521	1,833	4,548	8,000	109	818	98	244
Craven County	100,720	14,514	2,763	941	2,129	2,239	96	378	19	157
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172	155	15	2	8	17		2		
Lenoir County	55,122	55	2		1	2				
Onslow County	204,576	14,044	923	909	1,168	1,393	44	159	24	547
Pamlico County	12,276	7,064	2,129	238	868	1,379	36	207	11	20
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**78,366**	**16,353**	**3,923**	**8,722**	**13,030**	**285**	**1,564**	**152**	**968**

Table 55. Total Vulnerable Population with SVI Ranking 0.5001 – 0.75 Located in the SLOSH Category 2 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population with Overall SVI Ranking 0.5001 - 0.75 Located in the SLOSH Category 2 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	15,152	358	61	230	352	12	43	15	7
Craven County	100,720	10,731	169	101	242	210	4	21		1
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172									
Lenoir County	55,122	1								
Onslow County	204,576	6,847	185	139	222	305	10	32	1	7
Pamlico County	12,276	1,976	96	19	58	105	2	11		2
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**34,707**	**808**	**320**	**752**	**972**	**28**	**107**	**16**	**17**

Table 56. Total Vulnerable Population with SVI Ranking > 0.7501 Located in the SLOSH Category 2 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population with Overall SVI Ranking > 0.7501 Located in the SLOSH Category 2 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	24,342	359	104	332	397	25	107		10
Craven County	100,720	11,775	938	293	1,072	846	60	234	1	44
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172	155	15	2	8	17		2		
Lenoir County	55,122	85	1		1	2				
Onslow County	204,576	6,994	57	56	148	96	5	20	2	7
Pamlico County	12,276	9,860	663	84	510	549	7	110	2	8
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**53,211**	**2,033**	**539**	**2,071**	**1,907**	**97**	**473**	**5**	**69**

Table 57. Total Vulnerable Population Located in the SLOSH Category 3 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the SLOSH Category 3 Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	46,746	11,563	2,015	4,999	8,792	120	899	108	269
Craven County	100,720	22,652	4,313	1,468	3,322	3,495	149	589	29	245
Duplin County	48,715									
Greene County	20,451	2								
Jones County	9,172	510	122	23	130	130		15		4
Lenoir County	55,122	725	30	6	31	33	1	6	1	1
Onslow County	204,576	20,464	1,565	1,559	2,018	2,389	68	275	35	803
Pamlico County	12,276	8,764	2,642	295	1,077	1,711	44	257	14	25
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**99,863**	**20,235**	**5,366**	**11,577**	**16,550**	**382**	**2,041**	**187**	**1,347**

Table 58. Total Vulnerable Population with SVI Ranking 0.5001 – 0.75 Located in the SLOSH Category 3 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population with Overall SVI Ranking 0.5001 - 0.75 Located in the SLOSH Category 3 Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	19,014	449	77	288	442	15	54	18	9
Craven County	100,720	23,761	375	224	535	466	8	46		3
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172									
Lenoir County	55,122	558	9	3	7	7	1	1		
Onslow County	204,576	10,959	345	284	455	583	16	61	1	11
Pamlico County	12,276	2,518	122	25	73	133	2	14		2
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**56,810**	**1,300**	**613**	**1,358**	**1,631**	**42**	**176**	**19**	**25**

Table 59. Total Vulnerable Population with SVI Ranking > 0.7501 Located in the SLOSH Category 3 Hazard Areas

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population with Overall SVI Ranking > 0.7501 Located in the SLOSH Category 3 Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	34,742	512	149	474	567	36	152		15
Craven County	100,720	18,103	1,443	450	1,649	1,301	93	360	1	67
Duplin County	48,715									
Greene County	20,451	2								
Jones County	9,172	510	122	23	130	130		15		4
Lenoir County	55,122	815	21	3	25	27		5	1	
Onslow County	204,576	13,070	107	105	276	179	9	37	3	13
Pamlico County	12,276	11,624	781	98	601	647	9	130	2	9
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**78,866**	**2,986**	**828**	**3,155**	**2,851**	**147**	**699**	**7**	**108**

Table 60. Total Vulnerable Population Located in the SLOSH Category 4 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the SLOSH Category 4 Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	51,590	12,761	2,223	5,517	9,703	133	992	119	296
Craven County	100,720	30,863	5,876	2,000	4,527	4,761	203	803	40	333
Duplin County	48,715									
Greene County	20,451	97	9	3	13	12	1	2		1
Jones County	9,172	781	187	36	199	200		22		5
Lenoir County	55,122	1,544	104	30	155	128	7	30	2	3
Onslow County	204,576	28,206	2,326	2,330	3,046	3,655	98	418	48	1,123
Pamlico County	12,276	9,164	2,762	308	1,127	1,789	46	269	14	26
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**122,245**	**24,025**	**6,930**	**14,584**	**20,248**	**488**	**2,536**	**223**	**1,787**

Table 61. Total Vulnerable Population with SVI Ranking 0.5001 – 0.75 Located in the SLOSH Category 4 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population with Overall SVI Ranking 0.5001 - 0.75 Located in the SLOSH Category 4 Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	27,282	644	110	414	634	21	77	26	13
Craven County	100,720	36,160	570	341	815	709	13	70		4
Duplin County	48,715									
Greene County	20,451									
Jones County	9,172									
Lenoir County	55,122	1,362	21	7	17	18	2	3		1
Onslow County	204,576	15,723	589	508	800	1,038	26	110	1	24
Pamlico County	12,276	2,875	139	28	84	152	3	16		3
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**83,402**	**1,963**	**994**	**2,130**	**2,551**	**65**	**276**	**27**	**45**

Table 62. Total Vulnerable Population with SVI Ranking > 0.7501 Located in the SLOSH Category 4 Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population with Overall SVI Ranking > 0.7501 Located in the SLOSH Category 4 Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	60,812	897	261	830	993	63	267		26
Craven County	100,720	24,654	1,965	613	2,245	1,771	126	490	1	92
Duplin County	48,715									
Greene County	20,451	97	9	3	13	12	1	2		1
Jones County	9,172	781	187	36	199	200		22		5
Lenoir County	55,122	1,645	85	23	145	115	6	29	2	3
Onslow County	204,576	23,287	191	188	492	319	16	65	6	24
Pamlico County	12,276	11,732	788	99	607	653	9	131	2	10
Wayne County	117,333									
Eastern Carolina Region (Total)	**636,051**	**123,008**	**4,122**	**1,223**	**4,531**	**4,063**	**221**	**1,006**	**11**	**161**

Table 63. Total Number of Public Service Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Public Service Facilities Located in the SLOSH Storm Surge Hazard Areas				
Public Service Facilities	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
EMS	6	16	31	39
EOC	1	3	3	4
Fire Stations	13	26	38	50
Library		3	6	8
Police	2	13	20	28
Public Health Department		1	2	2
Eastern Carolina Region (Total)	**22**	**62**	**100**	**131**

Table 64. Total Number of Education Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Education Facilities Located in the SLOSH Storm Surge Hazard Areas				
Education Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
College and University				
Private School	1	4	8	12
Public School		13	19	26
Eastern Carolina Region (Total)	**1**	**17**	**27**	**38**

Table 65. Total Number of Health Care Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Health Care Facilities Located in the SLOSH Storm Surge Hazard Areas				
Health Care Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Hospital			1	1
Medical Facility	8	36	63	96
Pharmacy	2	13	22	37
Eastern Carolina Region (Total)	**10**	**49**	**86**	**134**

Table 66. Total Number of Historic and Cultural Resource Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Historic and Cultural Resource Facilities Located in the SLOSH Storm Surge Hazard Areas				
Historic and Cultural Resource Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Historical Site	9	52	80	85

Total Number of Historic and Cultural Resource Facilities Located in the SLOSH Storm Surge Hazard Areas				
Historic and Cultural Resource Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Eastern Carolina Region (Total)	**9**	**52**	**80**	**85**

Table 67. Total Number of Facilities with Impacts to Public Health and Environmental Systems Located in the SLOSH Storm Surge Hazard Areas

Total Number of Facilities with Impacts to Public Health and Environmental Systems Located in the SLOSH Storm Surge Hazard Areas				
Facility with Impacts to Public Health and Environmental Systems	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Septage Facility	1	2	4	9
Solid Landfill		1	2	7
Yard Waste Facility		1	1	1
Eastern Carolina Region (Total)	**1**	**4**	**7**	**17**

Table 68. Total Number of Major Economic Development Asset Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Major Economic Development Asset Facilities Located in the SLOSH Storm Surge Hazard Areas				
Major Economic Development Asset Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Port Facility	9	21	21	21
Eastern Carolina Region (Total)	**9**	**21**	**21**	**21**

Table 69. Total Number of Transportation Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Transportation Facilities Located in the SLOSH Storm Surge Hazard Areas				
Transportation Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Aircraft Landing Facility	12	15	27	33
Airport			1	1
Bus Station	1	1	3	3
Ferry Terminal		1	1	1
Highway Bridges	1	4	6	6
Eastern Carolina Region (Total)	**14**	**21**	**38**	**44**

Table 70. Total Number of Utilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Utilities Located in the SLOSH Storm Surge Hazard Areas				
Utility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
AM Transmission Tower		1	2	4
Cellular Tower	8	18	24	30
FM Transmission Tower	4	6	9	12
Gas Plant		1	1	1
Power Plant		1	4	8
Sewer Treatment Plant	1	5	10	13
Substation	5	18	32	48
Eastern Carolina Region (Total)	**18**	**50**	**82**	**116**

Table 71. Total Number of Vulnerable Population Facilities Located in the SLOSH Storm Surge Hazard Areas

Total Number of Vulnerable Population Facilities Located in the SLOSH Storm Surge Hazard Areas				
Vulnerable Population Facility	**SLOSH Category 1**	**SLOSH Category 2**	**SLOSH Category 3**	**SLOSH Category 4**
Emergency Shelter	2	13	20	31
Mobile Homes	3,627	9,268	13,770	18,319
Nursing Homes		6	9	12
Eastern Carolina Region (Total)	**3,629**	**9,287**	**13,799**	**18,362**

Table 72. Total Number of Critical Facilities Within the Region Located in the SLOSH Category 1 Hazard Area

Total Number Of Critical Facilities Within The Region Located In The SLOSH Category 1 Hazard Area											
			Facility Type								
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	62			6	3	7	16	14	7	9
Craven County	548	21	1		3	6	1	1	4	2	3
Duplin County	360										
Greene County	113										
Jones County	109										
Lenoir County	376										
Onslow County	646	5			1			3		1	
Pamlico County	100	17		1			1	2	4	8	1
Wayne County	580										
Eastern Carolina Region (Total)	**3,326**	**105**	**1**	**1**	**10**	**9**	**9**	**22**	**22**	**18**	**13**

Table 73. Total Number of Emergency Shelters Located in the SLOSH Category 1 Hazard Area

Total Number of Emergency Shelters Located in the SLOSH Category 1 Hazard Area	
Carteret County	1
Craven County	1
Duplin County	
Greene County	
Jones County	
Lenoir County	
Onslow County	
Pamlico County	
Wayne County	
Eastern Carolina Region (Total)	2
Facility Name	**County**
Tiller School	Carteret
Oaks Road Elem	Craven

Table 74. Miles of Critical Infrastructure in the SLOSH Category 1 Hazard Area

Miles of Critical Infrastructure in the SLOSH Category 1 Hazard Area	
Transportation Routes	**Miles in Hazard**
NC Route	39
US Route	23
Interstate	
Railroad	8
Eastern Carolina Region (Total)	70
Evacuation Routes	**Miles in Hazard**
Roadway	32
Ferry	
Eastern Carolina Region (Total)	32

Table 75. Total Miles of Critical Infrastructure per County Within the Region in the SLOSH Category 1 Chance Flood Hazard Area

Total Miles of Critical Infrastructure Per County within the Region in the SLOSH Category 1 Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Ferry)**
Carteret County	36	4	31	
Craven County	3		1	
Duplin County				
Greene County				
Jones County				

Total Miles of Critical Infrastructure Per County within the Region in the SLOSH Category 1 Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Ferry)**
Lenoir County				
Onslow County	4			
Pamlico County	18			
Wayne County		3		
Eastern Carolina Region (Total)	**61**	**7**	**32**	

Table 76. Total Area of Historic Districts in the SLOSH Category 1 Hazard Area

Total Area of Historic Districts in the SLOSH Category 1 Hazard Area	
Counties	**Area (Acres)**
Carteret County	120
Craven County	426
Duplin County	
Greene County	
Jones County	
Lenoir County	
Onslow County	29
Pamlico County	
Wayne County	
Eastern Carolina Region (Total)	**576**

Table 77. Total Number of Critical Facilities Within the Region Located in the SLOSH Category 2 Hazard Area

Total Number Of Critical Facilities Within The Region Located In The SLOSH Category 2 Hazard Area											
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Facility Type								
			Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	170	7	3	20	15	15	35	17	26	32
Craven County	548	104	5		22	34	1	8	8	13	13
Duplin County	360										
Greene County	113										
Jones County	109										
Lenoir County	376										
Onslow County	646	12			1	2		7	1	1	
Pamlico County	100	51	5	1	6	1	5	12	5	10	6
Wayne County	580										
Eastern Carolina Region (Total)	**3,326**	**337**	**17**	**4**	**49**	**52**	**21**	**62**	**31**	**50**	**51**

Table 78. Total Number of Emergency Shelters Located in the SLOSH Category 2 Hazard Area

Total Number of Emergency Shelters Located in the SLOSH Category 2 Hazard Area		
Carteret County		5
Craven County		4
Duplin County		
Greene County		
Jones County		
Lenoir County		
Onslow County		
Pamlico County		4
Wayne County		
Eastern Carolina Region (Total)		13
Facility Name		**County**
East Carteret Hs		Carteret
Smyrna Elem		Carteret
Beaufort Middle		Carteret
Harker's Island Elem		Carteret
Tiller School		Carteret
J T Barber Elem		Craven
Oaks Road Elem		Craven
Bridgeton Elem		Craven
New Bern Nat Guard Armory (New)		Craven
Fred A Anderson Elem		Pamlico
Pamlico County Hs		Pamlico
Pamlico Co Primary		Pamlico
Pamlico Co Middle		Pamlico

Table 79. Miles of Critical Infrastructure in the SLOSH Category 2 Hazard Area

Miles of Critical Infrastructure in the SLOSH Category 2 Hazard Area	
Transportation Routes	**Miles in Hazard**
NC Route	79
US Route	47
Interstate	
Railroad	25
Eastern Carolina Region (Total)	151
Evacuation Routes	**Miles in Hazard**
Roadway	60
Ferry	
Eastern Carolina Region (Total)	60

Table 80. Total Miles of Critical Infrastructure Per County Within the Region in the SLOSH Category 2 Hazard Area

Total Miles of Critical Infrastructure Per County within the Region in the SLOSH Category 2 Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Ferry)**
Carteret County	65	13	47	
Craven County	18	2	11	
Duplin County				
Greene County				
Jones County				
Lenoir County				
Onslow County	11		2	
Pamlico County	32			
Wayne County		10		
Eastern Carolina Region (Total)	**126**	**25**	**60**	

Table 81. Total Area of Historic Districts in the SLOSH Category 2 Hazard Area

Total Area of Historic Districts in the SLOSH Category 2 Hazard Area	
Counties	**Area (Acres)**
Carteret County	120
Craven County	426
Duplin County	
Greene County	
Jones County	
Lenoir County	
Onslow County	29
Pamlico County	
Wayne County	
Eastern Carolina Region (Total)	**576**

Table 82. Total Number of Critical Facilities Within the Region Located in the SLOSH Category 3 Hazard Area

Total Number Of Critical Facilities Within The Region Located In The SLOSH Category 3 Hazard Area											
			Facility Type								
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	239	11	4	26	15	15	52	27	43	46
Craven County	548	205	10	2	46	60	1	21	14	23	28
Duplin County	360										
Greene County	113										
Jones County	109	8				1		5		2	
Lenoir County	376										
Onslow County	646	24	1		2	3		9	2	4	3
Pamlico County	100	61	5	1	12	1	5	13	6	10	8
Wayne County	580										
Eastern Carolina Region (Total)	**3,326**	**537**	**27**	**7**	**86**	**80**	**21**	**100**	**49**	**82**	**85**

Table 83. Total Number of Emergency Shelters Located in the SLOSH Category 3 Hazard Area

Total Number of Emergency Shelters Located in the SLOSH Category 3 Hazard Area		
Carteret County		8
Craven County		7
Duplin County		
Greene County		
Jones County		
Lenoir County		
Onslow County		1
Pamlico County		4
Wayne County		
Eastern Carolina Region (Total)		20
Facility Name		**County**
East Carteret Hs		Carteret
Smyrna Elem		Carteret
Beaufort Middle		Carteret
Harker's Island Elem		Carteret
Tiller School		Carteret
Beaufort Elem		Carteret
White Oak Elem		Carteret
Cape Lookout Hs		Carteret
West Craven Hs		Craven
J T Barber Elem		Craven
Oaks Road Elem		Craven
Bridgeton Elem		Craven
New Bern Nat Guard Armory (New)		Craven
Albert H Bangert El		Craven
West Craven Middle		Craven
White Oak Hs		Onslow
Fred A Anderson Elem		Pamlico
Pamlico County Hs		Pamlico
Pamlico Co Primary		Pamlico
Pamlico Co Middle		Pamlico

Table 84. Miles of Critical Infrastructure in the SLOSH Category 3 Hazard Area

Miles of Critical Infrastructure in the SLOSH Category 3 Hazard Area	
Transportation Routes	**Miles in Hazard**
NC Route	111
US Route	63
Interstate	
Railroad	33
Eastern Carolina Region (Total)	206
Evacuation Routes	Miles in Hazard
Roadway	79
Ferry	
Eastern Carolina Region (Total)	**79**

Table 85. Total Miles of Critical Infrastructure per County within the Region in the SLOSH Category 3 Hazard Area

Total Miles of Critical Infrastructure Per County within the Region in the SLOSH Category 3 Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Ferry)**
Carteret County	87	13	56	
Craven County	34	5	18	
Duplin County				
Greene County				
Jones County	2		1	
Lenoir County				
Onslow County	17		5	
Pamlico County	33			
Wayne County		15		
Eastern Carolina Region (Total)	**173**	**33**	**80**	

Table 86. Total Area of Historic Districts in the SLOSH Category 3 Hazard Area

Total Area of Historic Districts in the SLOSH Category 3 Hazard Area	
Counties	**Area (Acres)**
Carteret County	120
Craven County	426
Duplin County	
Greene County	
Jones County	
Lenoir County	
Onslow County	29
Pamlico County	
Wayne County	
Eastern Carolina Region (Total)	**576**

Table 87. Total Number of Critical Facilities within the Region Located in the SLOSH Category 4 Hazard Area

Total Number Of Critical Facilities Within The Region Located In The SLOSH Category 4 Hazard Area											
			Facility Type								
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	307	16	9	33	15	15	64	33	53	69
Craven County	548	272	13	6	77	61	1	28	14	32	40
Duplin County	360										
Greene County	113										
Jones County	109	13	1		1	2		5		3	1
Lenoir County	376										
Onslow County	646	66	3	1	11	6		21	2	16	6
Pamlico County	100	62	5	1	12	1	4	13	6	12	8
Wayne County	580										
Eastern Carolina Region (Total)	**3,326**	**720**	**38**	**17**	**134**	**85**	**20**	**131**	**55**	**116**	**124**

Table 88. Total Number of Emergency Shelters Located in the SLOSH Category 4 Hazard Area

Total Number of Emergency Shelters Located in the SLOSH Category 4 Hazard Area	
Carteret County	12
Craven County	11
Duplin County	
Greene County	
Jones County	1
Lenoir County	
Onslow County	3
Pamlico County	4
Wayne County	
Eastern Carolina Region (Total)	**31**

Facility Name		County
East Carteret Hs		Carteret
Smyrna Elem		Carteret
Beaufort Middle		Carteret
Harker's Island Elem		Carteret
Tiller School		Carteret
Beaufort Elem		Carteret
White Oak Elem		Carteret
Cape Lookout Hs		Carteret
Bogue Sound Elem		Carteret
Croatan Hs		Carteret
Morehead City Pri		Carteret
Carteret Cc		Carteret
West Craven Hs		Craven
J T Barber Elem		Craven
Oaks Road Elem		Craven
Bridgeton Elem		Craven
New Bern Nat Guard Armory (New)		Craven
Albert H Bangert El		Craven
Ben D Quinn Elem		Craven
Grover C Fields Middle		Craven
Graham A Barden Elem		Craven
West Craven Middle		Craven
Trent Park Elem		Craven
Pollocksville Elem		Jones
White Oak Hs		Onslow
Walter Thompson Elem		Onslow
Northwoods Park Middle		Onslow
Fred A Anderson Elem		Pamlico
Pamlico County Hs		Pamlico

Facility Name		County
Pamlico Co Primary		Pamlico
Pamlico Co Middle		Pamlico

Table 89. Miles of Critical Infrastructure in the SLOSH Category 4 Hazard Area

Miles of Critical Infrastructure in the SLOSH Category 4 Hazard Area	
Transportation Routes	**Miles in Hazard**
NC Route	139
US Route	89
Interstate	
Railroad	46
Eastern Carolina Region (Total)	274
Evacuation Routes	**Miles in Hazard**
Roadway	108
Ferry	
Eastern Carolina Region (Total)	108

Table 90. Total Miles of Critical Infrastructure per County within the Region in the SLOSH Category 4 Hazard Area

Total Miles of Critical Infrastructure Per County within the Region in the SLOSH Category 4 Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Ferry)**
Carteret County	105	13	69	
Craven County	57	6	27	
Duplin County		1		
Greene County				
Jones County	4		2	
Lenoir County	1			
Onslow County	27		10	
Pamlico County	34			
Wayne County		26		
Eastern Carolina Region (Total)	**228**	**46**	**108**	

Table 91. Total Area of Historic Districts in the SLOSH Category 4 Hazard Area

Total Area of Historic Districts in the SLOSH Category 4 Hazard Area	
Counties	**Area (Acres)**
Carteret County	120
Craven County	426

Total Area of Historic Districts in the SLOSH Category 4 Hazard Area	
Counties	**Area (Acres)**
Duplin County	
Greene County	
Jones County	
Lenoir County	
Onslow County	29
Pamlico County	
Wayne County	
Eastern Carolina Region (Total)	**576**

Table 92. Number of Buildings by General Occupancy Located in the SLOSH Category 1 Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the SLOSH Category 1 Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	6,275	508	98	12	70	111	65	124
Craven County	57,961	3,820	150	52	5	30	23	14	32
Duplin County	47,845								
Greene County	16,095								
Jones County	9,934	18	3						
Lenoir County	40,066								
Onslow County	153,924	3,091	89	3		2	3	45	519
Pamlico County	13,725	3,885	180	155	4	36	8	41	
Wayne County	93,879								
Eastern Carolina Region (Total)	**493,396**	**17,089**	**930**	**308**	**21**	**138**	**145**	**165**	**675**

Table 93. Number of Buildings by General Occupancy Located in the SLOSH Category 2 Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the SLOSH Category 2 Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	18,369	1,354	246	65	200	332	174	241
Craven County	57,961	10,516	576	175	29	101	127	102	87
Duplin County	47,845								
Greene County	16,095								
Jones County	9,934	69	8			1			
Lenoir County	40,066	1							
Onslow County	153,924	8,094	312	8		11	6	90	701
Pamlico County	13,725	6,376	480	269	28	71	35	56	
Wayne County	93,879								
Eastern Carolina Region (Total)	**493,396**	**43,425**	**2,730**	**698**	**122**	**384**	**500**	**422**	**1,029**

Table 94. Number of Buildings by General Occupancy Located in the SLOSH Category 3 Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the SLOSH Category 3 Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	27,253	2,135	394	79	306	427	262	326
Craven County	57,961	17,040	983	361	57	197	178	169	146
Duplin County	47,845								
Greene County	16,095								
Jones County	9,934	412	34	46	2	5	7	1	
Lenoir County	40,066	11	1	1					2
Onslow County	153,924	11,720	542	27	3	25	31	106	777
Pamlico County	13,725	6,798	565	294	30	73	41	58	
Wayne County	93,879								
Eastern Carolina Region (Total)	**493,396**	**63,234**	**4,260**	**1,123**	**171**	**606**	**684**	**596**	**1,251**

Table 95. Number of Buildings by General Occupancy Located in the SLOSH Category 4 Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the SLOSH Category 4 Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	34,010	2,735	541	99	361	493	353	421
Craven County	57,961	23,516	1,432	578	71	244	200	209	226
Duplin County	47,845								
Greene County	16,095								
Jones County	9,934	645	45	76	6	9	19	3	
Lenoir County	40,066	61	1	2		1			2
Onslow County	153,924	17,951	1,084	88	31	49	81	146	813
Pamlico County	13,725	7,001	610	301	32	73	41	57	
Wayne County	93,879								
Eastern Carolina Region (Total)	**493,396**	**83,184**	**5,907**	**1,586**	**239**	**737**	**834**	**768**	**1,462**

Table 96. Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 1 Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 1 Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	8	2,229
Craven County	46	7,358	2	397
Duplin County	34	11,998		
Greene County	12	3,446		
Jones County	1	1,854		3
Lenoir County	41	7,669		
Onslow County	86	18,293		370
Pamlico County	3	2,185	1	617
Wayne County	78	29,932		
Eastern Carolina Region (Total)	**387**	**95,731**	**11**	**3,616**

Table 97. Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 2 Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 2 Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	24	5,764
Craven County	46	7,358	7	1,380
Duplin County	34	11,998		
Greene County	12	3,446		
Jones County	1	1,854		10
Lenoir County	41	7,669		
Onslow County	86	18,293		922
Pamlico County	3	2,185	1	1,160
Wayne County	78	29,932		
Eastern Carolina Region (Total)	**387**	**95,731**	**32**	**9,236**

Table 98. Number of Mobile Home Parks and Mobile Home Buildings Locates in the SLOSH Category 3 Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 3 Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	35	8,310
Craven County	46	7,358	17	2,702
Duplin County	34	11,998		
Greene County	12	3,446		
Jones County	1	1,854		68
Lenoir County	41	7,669		8
Onslow County	86	18,293	2	1,347
Pamlico County	3	2,185	2	1,279
Wayne County	78	29,932		
Eastern Carolina Region (Total)	**387**	**95,731**	**56**	**13,714**

Table 99. Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 4 Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the SLOSH Category 4 Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	52	10,622
Craven County	46	7,358	24	3,986
Duplin County	34	11,998		
Greene County	12	3,446		
Jones County	1	1,854		132
Lenoir County	41	7,669		39
Onslow County	86	18,293	3	2,134
Pamlico County	3	2,185	2	1,325
Wayne County	78	29,932		
Eastern Carolina Region (Total)	**387**	**95,731**	**81**	**18,238**

Table 100. Total Area of Agricultural Land Located in the SLOSH Category 1 Hazard Area (Acres)

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the SLOSH Category 1 Hazard Area (Acres)
Carteret	53,533	21,340
Craven	68,815	696
Duplin	194,347	0
Greene	84,772	0
Jones	61,745	72
Lenoir	105,242	0
Onslow	59,283	49
Pamlico	36,816	7,828
Wayne	156,320	0
Eastern Carolina Region (Total)	**820,873**	**29,986**

Table 101. Total Area of Agricultural Land Located in the SLOSH Category 2 Hazard Area (Acres)

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the SLOSH Category 2 Hazard Area (Acres)
Carteret	53,533	46,916
Craven	68,815	2,992
Duplin	194,347	0
Greene	84,772	0
Jones	61,745	277
Lenoir	105,242	0
Onslow	59,283	416
Pamlico	36,816	22,949
Wayne	156,320	0
Eastern Carolina Region (Total)	**820,873**	**73,550**

Table 102. Total Area of Agricultural Land Located in the SLOSH Category 3 Hazard Area (Acres)

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the SLOSH Category 3 Hazard Area (Acres)
Carteret	53,533	48,536
Craven	68,815	8,435
Duplin	194,347	0
Greene	84,772	1
Jones	61,745	1,928
Lenoir	105,242	16
Onslow	59,283	1,248
Pamlico	36,816	31,638
Wayne	156,320	0
Eastern Carolina Region (Total)	**820,873**	**91,803**

Table 103. Total Area of Agricultural Land Located in the SLOSH Category 4 Hazard Area (Acres)

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the SLOSH Category 4 Hazard Area (Acres)
Carteret	53,533	50,732
Craven	68,815	14,500
Duplin	194,347	0
Greene	84,772	6
Jones	61,745	3,995
Lenoir	105,242	230
Onslow	59,283	3,202
Pamlico	36,816	32,410
Wayne	156,320	0
Eastern Carolina Region (Total)	**820,873**	**105,076**

Table 104. Number of Buildings Built Pre-1953

Number of Buildings Built Pre-1953		
Counties	**Total Number of Buildings per County**	**Number of Buildings**
Carteret County	59,967	6,376
Craven County	57,961	7,807
Duplin County	47,845	7,829
Greene County	16,095	2
Jones County	9,934	5
Lenoir County	40,066	3,027
Onslow County	153,924	11,324
Pamlico County	13,725	2,405
Wayne County	93,879	15,736
Eastern Carolina Region (Total)	**493,396**	**54,511**

Table 105. Total Vulnerable Population in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located In The Projected 2050 1-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	35,683	8,827	1,538	3,816	6,712	92	686	82	205
Craven County	100,720	21,998	4,188	1,426	3,226	3,394	145	572	28	238
Duplin County	48,715	6,960	1,512	528	1,768	1,597	178	196	3	63
Greene County	20,451	2,379	386	122	495	464	37	64	1	20
Jones County	9,172	1,309	313	60	333	335	-	37	-	9
Lenoir County	55,122	9,335	1,877	550	2,174	2,243	97	448	26	46
Onslow County	204,576	34,580	2,950	2,936	3,899	4,646	125	526	58	1,381
Pamlico County	12,276	4,556	1,373	153	560	890	23	134	7	13
Wayne County	117,333	19,337	3,258	1,359	4,018	3,194	311	700	43	153
Eastern Carolina Region (Total)	**636,051**	**136,137**	**24,684**	**8,672**	**20,289**	**23,475**	**1,008**	**3,363**	**248**	**2,128**

Table 106. Total Vulnerable Population with SVI Ranking 0.5001-0.75 in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population With Overall SVI Ranking 0.5001 - 0.75 Located In The Projected 2050 1-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	12,983	307	52	197	302	10	37	12	6
Craven County	100,720	13,602	214	128	306	267	5	26	-	1
Duplin County	48,715	9,287	283	65	276	309	27	33	-	15
Greene County	20,451		-	-	-	-	-	-	-	-
Jones County	9,172		-	-	-	-	-	-	-	-
Lenoir County	55,122	9,982	639	166	413	520	22	90	6	8
Onslow County	204,576	26,602	1,072	921	1,480	1,883	47	197	2	44
Pamlico County	12,276	1,868	91	18	54	99	2	11	-	2
Wayne County	117,333	22,841	1,097	353	858	1,047	107	164	19	23
Eastern Carolina Region (Total)	**636,051**	**97,165**	**3,703**	**1,703**	**3,584**	**4,427**	**220**	**558**	**39**	**99**

Table 107. Total Vulnerable Population with SVI Ranking >0.7501 in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population With Overall SVI Ranking > 0.7501 Located In The Projected 2050 1-Percent Annual Chance Flood Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	22,928	338	98	313	374	24	101	-	10
Craven County	100,720	20,643	1,645	513	1,880	1,483	106	410	1	77
Duplin County	48,715	6,403	1,195	440	1,436	1,256	145	157	2	48
Greene County	20,451	2,380	386	122	495	464	37	64	1	20
Jones County	9,172	1,304	311	60	332	334	-	37	-	9
Lenoir County	55,122	8,948	1,226	378	1,713	1,684	73	349	20	37
Onslow County	204,576	13,974	115	113	295	192	10	39	4	14
Pamlico County	12,276	7,083	476	60	366	394	5	79	1	6
Wayne County	117,333	26,466	1,959	860	3,657	1,876	242	654	37	101
Eastern Carolina Region (Total)	**636,051**	**110,129**	**7,651**	**2,644**	**10,487**	**8,057**	**642**	**1,890**	**66**	**322**

Table 108. Total Number of Regional Critical Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number Of Critical Facilities Within The Region Located In The Projected 2050 1-Percent Annual Chance Flood Hazard Area											
			Facility Type								
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Education Facilities	Facilities with Impacts to Public Health and Environmental Systems	Healthcare Facilities	Historic and Cultural Resource Facilities	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	151	2	4	10	7	54	25	21	11	17
Craven County	548	98	4	-	16	12	27	4	9	12	14
Duplin County	360	22	-	1	1	-	-	1	13	6	-
Greene County	113	5	-	-	-	-	1	1	-	3	-
Jones County	109	8	-	-	-	2	-	-	4	2	-
Lenoir County	376	32	-	1	6	4	-	1	2	11	7
Onslow County	646	36	1	2	3	1	13	9	3	3	1
Pamlico County	100	27	-	1	-	-	12	2	5	6	1
Wayne County	580	34	2	2	11	-	-	2	4	8	5
Eastern Carolina Region (Total)	**3,326**	**413**	**9**	**11**	**47**	**26**	**107**	**45**	**61**	**62**	**45**

Table 109. Total Number of Public Service Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Public Service Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area		
Public Service Facilities		**Total**
Police		8
Fire Stations		22
EOC		1
EMS		14
Library		-
Public Health Department		-
Eastern Carolina Region (Total)		**45**

Table 110. Total Number of Education Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Education Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Education Facility	**Total**
College and University	-
Private School	3
Public School	6
Eastern Carolina Region (Total)	**9**

Table 111. Total Number of Health Care Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Health Care Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Health Care Facility	**Total**
Hospital	-
Medical Facility	42
Pharmacy	5
Eastern Carolina Region (Total)	**47**

Table 112. Total Number of Historic and Cultural Resource Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Historic and Cultural Resource Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Historic and Cultural Resource Facility	**Total**
Historical Site	26
Eastern Carolina Region (Total)	**26**

Table 113. Total Facilities with Impacts to Public Health and Environmental Systems in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Facilities with Impacts to Public Health and Environmental Systems Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Facility with Impacts to Public Health and Environmental Systems	**Total**
Septage Facility	3
Solid Landfill	6
Yard Waste Facility	2
Eastern Carolina Region (Total)	**11**

Table 114. Total Major Economic Development Asset Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Major Economic Development Asset Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Major Economic Development Asset Facility	**Total**
Port Facility	107
Eastern Carolina Region (Total)	**107**

Table 115. Total Transportation Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Transportation Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Transportation Facility	**Total**
Aircraft Landing Facility	24
Airport	-
Bus Station	2
Ferry Terminal	16
Highway Bridges	26

Total Number of Transportation Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Transportation Facility	**Total**
Eastern Carolina Region (Total)	**68**

Table 116. Total Utilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Utilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Utility	**Total**
AM Transmission Tower	8
Cellular Tower	10
FM Transmission Tower	8
Gas Plant	1
Power Plant	2
Sewer Treatment Plant	10
Substation	23
Eastern Carolina Region (Total)	**62**

Table 117. Total Vulnerable Population Facilities in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Vulnerable Population Facilities Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Vulnerable Population Facility	**Total**
Emergency Shelter	9
Mobile Homes	8,485
Nursing Homes	5
Eastern Carolina Region (Total)	**8,499**

Table 118. Total Emergency Shelters in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Number of Emergency Shelters Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Carteret County	3
Craven County	4
Duplin County	-
Greene County	-
Jones County	-
Lenoir County	-
Onslow County	1
Pamlico County	-
Wayne County	1

Total Number of Emergency Shelters Located in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Eastern Carolina Region (Total)	9
Facility Name	**County**
East Carteret Hs	Carteret
Smyrna Elem	Carteret
J T Barber Elem	Craven
Oaks Road Elem	Craven
Northwoods Park Middle	Onslow
Tiller School	Carteret
Bridgeton Elem	Craven
Goldsboro National Guard Armory (New)	Wayne
New Bern Nat Guard Armory (New)	Craven

Table 119. Miles of Critical Infrastructure in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Miles of Critical Infrastructure in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Transportation Routes	**Miles in Hazard**
NC Route	88
US Route	66
Interstate	6
Railroad	37
Eastern Carolina Region (Total)	197
Evacuation Routes	**Miles in Hazard**
Roadway	89
Ferry	2
Eastern Carolina Region (Total)	91

Table 120. Total Miles of Regional Critical Infrastructure Per County in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Miles of Critical Infrastructure Per County within the Region in the Projected 2050 1-Percent Annual Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Road)**
Carteret County	49	10	39	-
Craven County	12	5	8	-
Duplin County	15	2	10	-
Greene County	2	-	-	-
Jones County	2	-	1	-
Lenoir County	18	-	9	-
Onslow County	20	-	10	-
Pamlico County	17	-	-	2
Wayne County	25	21	13	-

Total Miles of Critical Infrastructure Per County within the Region in the Projected 2050 1-Percent Annual Chance Flood Hazard Area				
Counties	**Roadway**	**Rail**	**Evacuation (Road)**	**Evacuation (Road)**
Eastern Carolina Region (Total)	**160**	**37**	**89**	**2**

Table 121. Total Area of Historic Districts in the Projected 2050 1-Percent Annual Chance Flood Hazard Area

Total Area of Historic Districts in the Projected 2050 1-Percent Annual Chance Flood Hazard Area	
Counties	Area (Acres)
Carteret County	120
Craven County	426
Duplin County	-
Greene County	-
Jones County	-
Lenoir County	-
Onslow County	29
Pamlico County	-
Wayne County	-
Eastern Carolina Region (Total)	**576**

Table 122. Total Vulnerable Population Located in the Wildland-Urban Interface Wildfire Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the Wildland-Urban Interface Wildfire Hazard Area								
			Vulnerable Population Category							
		Total Population in Hazard Area	Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number of Persons With a Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	4,904	1,213	211	524	922	13	94	11	28
Craven County	100,720	8,448	1,609	547	1,239	1,303	56	220	11	91
Duplin County	48,715	3,982	-	-	-	-	-	-	-	-
Greene County	20,451	608	58	16	83	73	4	10	-	4
Jones County	9,172	462	110	21	117	118	-	13	-	3
Lenoir County	55,122	3,005	202	58	302	249	13	58	4	7
Onslow County	204,576	21,608	1,782	1,785	2,333	2,800	75	320	36	860
Pamlico County	12,276	490	148	16	60	96	2	14	1	1
Wayne County	117,333	3,100	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**46,607**	**5,122**	**2,654**	**4,658**	**5,561**	**163**	**729**	**63**	**994**

Table 123. Total Vulnerable Population Located in the Wildland-Urban Intermix Wildfire Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population Located in the Wildland-Urban Intermix Wildfire Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number Of Persons With A Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	13,685	3,385	590	1,463	2,574	35	263	32	79
Craven County	100,720	23,397	4,455	1,516	3,432	3,609	154	609	30	253
Duplin County	48,715	12,856	-	-	-	-	-	-	-	-
Greene County	20,451	2,716	259	72	369	326	16	45	1	17
Jones County	9,172	854	204	39	217	218	-	24	-	6
Lenoir County	55,122	14,196	955	272	1,427	1,176	64	276	19	32
Onslow County	204,576	69,936	5,767	5,776	7,552	9,062	244	1,036	118	2,784
Pamlico County	12,276	2,801	844	94	344	547	14	82	4	8
Wayne County	117,333	26,836	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**167,277**	**15,869**	**8,359**	**14,804**	**17,512**	**527**	**2,335**	**204**	**3,179**

Table 124. Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the Wildland-Urban Interface Wildfire Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the Wildland-Urban Interface Wildfire Hazard Area									
		Total Population in Hazard Area	Vulnerable Population Category								
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number Of Persons With A Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	12,096	286	49	184	281	9	34	12	6
Craven County	100,720	7,215	114	68	163	141	3	14	-	1
Duplin County	48,715	4,796	-	-	-	-	-	-	-	-
Greene County	20,451	-	-	-	-	-	-	-	-	-
Jones County	9,172	-	-	-	-	-	-	-	-	-
Lenoir County	55,122	6,361	98	33	80	82	7	13	1	3
Onslow County	204,576	25,763	965	832	1,311	1,701	42	180	2	40
Pamlico County	12,276	59	3	1	2	3	-	-	-	-
Wayne County	117,333	-	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**56,290**	**1,466**	**983**	**1,740**	**2,208**	**61**	**241**	**15**	**50**

Table 125. Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the Wildland-Urban Intermix Wildfire Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking 0.5001 - 0.75 Located in the Wildland-Urban Intermix Wildfire Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number Of Persons With A Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	21,401	505	86	325	498	16	61	21	10
Craven County	100,720	27,692	437	261	624	543	10	54	-	3
Duplin County	48,715	15,327	-	-	-	-	-	-	-	-
Greene County	20,451	-	-	-	-	-	-	-	-	-
Jones County	9,172	-	-	-	-	-	-	-	-	-
Lenoir County	55,122	13,608	209	70	171	176	15	28	1	6
Onslow County	204,576	106,256	3,979	3,433	5,407	7,013	174	742	9	165
Pamlico County	12,276	3,558	172	35	104	188	3	20	1	3
Wayne County	117,333	36,063	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**223,905**	**5,302**	**3,885**	**6,631**	**8,418**	**218**	**905**	**32**	**187**

Table 126. Total Vulnerable Population of Tracts with Overall SVI Ranking >0.7501 Located in the Wildland-Urban Interface Wildfire Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking >0.7501 Located in the Wildland-Urban Interface Wildfire Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number Of Persons With A Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	22,752	335	97	311	371	24	100	-	10
Craven County	100,720	9,911	790	246	903	712	51	197	-	37
Duplin County	48,715	3,786	-	-	-	-	-	-	-	-
Greene County	20,451	607	58	16	82	73	4	10	-	4
Jones County	9,172	464	111	21	118	119	-	13	-	3
Lenoir County	55,122	1,169	61	16	103	82	4	20	1	2
Onslow County	204,576	33,362	273	269	705	457	23	94	8	34
Pamlico County	12,276	482	32	4	25	27	-	5	-	-
Wayne County	117,333	5,722	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**78,255**	**1,660**	**669**	**2,247**	**1,841**	**106**	**439**	**9**	**90**

Table 127. Total Vulnerable Population of Tracts with Overall SVI Ranking >0.7501 Located in the Wildland-Urban Intermix Wildfire Hazard Area

Counties	Total Population (2020 Decennial Census Population)	Total Vulnerable Population of Tracts with Overall SVI Ranking >0.7501 Located in the Wildland-Urban Intermix Wildfire Hazard Area								
		Total Population in Hazard Area	Vulnerable Population Category							
			Number of Persons Over 65	Number of Persons Below 5	Number of Persons Below Poverty Level	Number Of Persons With A Disability	Number of Persons Limited English Speaking	Number Of Persons Without Vehicle	Number of Persons 16 and Over Commuting to Work with Public Transportation (Excluding Taxicab)	Number of Persons 16 and Over Commuting to Work by Walking
Carteret County	67,686	25,828	381	111	353	422	27	113	-	11
Craven County	100,720	24,009	1,913	597	2,186	1,725	123	477	1	89
Duplin County	48,715	12,226	-	-	-	-	-	-	-	-
Greene County	20,451	2,729	261	72	371	328	16	46	1	17
Jones County	9,172	853	204	39	217	218	-	24	-	6
Lenoir County	55,122	14,448	750	203	1,270	1,010	49	251	18	26
Onslow County	204,576	96,472	791	778	2,038	1,323	66	271	25	100
Pamlico County	12,276	1,489	100	13	77	83	1	17	-	1
Wayne County	117,333	29,699	-	-	-	-	-	-	-	-
Eastern Carolina Region (Total)	**636,051**	**207,753**	**4,400**	**1,813**	**6,512**	**5,109**	**282**	**1,199**	**45**	**250**

Table 128. Total Number of Critical Facilities within the Region Located in the Wildland-Urban Interface Wildfire Hazard Area

Total Number Of Critical Facilities Within The Region Located In The Wildland-Urban Interface Wildfire Hazard Area											
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Facility Type								
			Education Facilities	Healthcare Facilities	Historic and Cultural Resource Facilities	Facilities with Impacts to Public Health and Environmental Systems	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	131	9	16	-	8	-	16	6	21	55
Craven County	548	161	15	44	24	2	-	24	5	16	31
Duplin County	360	54	3	9	3	-	-	10	1	11	17
Greene County	113	-	-	-	-	-	-	-	-	-	-
Jones County	109	39	1	6	4	-	-	15	3	7	3
Lenoir County	376	16	1	-	-	-	-	4	-	5	6
Onslow County	646	177	19	37	3	14	-	33	-	18	53
Pamlico County	100	20	1	4	-	-	-	5	1	6	3
Wayne County	580	16	1	2	-	-	-	2	4	3	4
Eastern Carolina Region (Total)	**3,326**	**614**	**50**	**118**	**34**	**24**	**-**	**109**	**20**	**87**	**172**

Table 129. Total Number of Critical Facilities within the Region Located in the Wildland-Urban Intermix Wildfire Hazard Area

Total Number Of Critical Facilities Within The Region Located In The Wildland-Urban Intermix Wildfire Hazard Area											
Counties	Total Number of Critical Facilities Per County	Total Number of Critical Facilities Per County in Hazard Area	Facility Type								
			Education Facilities	Healthcare Facilities	Historic and Cultural Resource Facilities	Facilities with Impacts to Public Health and Environmental Systems	Major Economic Development Asset Facilities	Public Service Facilities	Transportation Facilities	Utilities	Vulnerable Population Facilities
Carteret County	494	86	3	10	-	1	-	19	13	17	23
Craven County	548	103	6	21	3	12	1	12	3	21	24
Duplin County	360	92	8	12	1	6	-	8	11	28	18
Greene County	113	26	3	5	2	-	1	2	-	4	9
Jones County	109	18	1	1	-	2	-	3	-	10	1
Lenoir County	376	66	3	12	2	2	-	7	3	19	18
Onslow County	646	202	15	22	4	9	-	18	11	64	59
Pamlico County	100	33	3	7	1	-	-	9	4	5	4
Wayne County	580	64	2	9	-	7	-	11	4	12	19
Eastern Carolina Region (Total)	**3,326**	**690**	**44**	**99**	**13**	**39**	**2**	**89**	**49**	**180**	**175**

Table 130. Total Number of Public Service Facilities Located in the Wildfire Hazard Area

Total Number of Public Service Facilities Located in the Wildfire Hazard Area		
Public Service Facilities	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
EMS	37	32
EOC	2	1
Fire Stations	44	50
Library	12	3
Police	13	3
Public Health Department	1	-
Eastern Carolina Region (Total)	**109**	**89**

Table 131. Total Number of Education Facilities Located in the Wildfire Hazard Area

Total Number of Education Facilities Located in the Wildfire Hazard Area		
Education Facility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
College and University	2	-
Private School	12	6
Public School	36	38
Eastern Carolina Region (Total)	**50**	**44**

Table 132. Total Number of Health Care Facilities Located in the Wildfire Hazard Area

Total Number of Health Care Facilities Located in the Wildfire Hazard Area		
Health Care Facility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Hospital	1	1
Medical Facility	96	83
Pharmacy	21	15
Eastern Carolina Region (Total)	**118**	**99**

Table 133. Total Number of Historic and Cultural Resource Facilities Located in the Wildfire Hazard Area

Total Number of Historic and Cultural Resource Facilities Located in the Wildfire Hazard Area		
Historic and Cultural Resource Facility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Historical Site	34	13
Eastern Carolina Region (Total)	**34**	**13**

Table 134. Total Number of Facilities with Impacts to Public Health and Environmental Systems Located in the Wildfire Hazard Area

Total Number of Facilities with Impacts to Public Health and Environmental Systems Located in the Wildfire Hazard Area		
Facility with Impacts to Public Health and Environmental Systems	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Septage Facility	12	25
Solid Landfill	10	10
Yard Waste Facility	2	4
Eastern Carolina Region (Total)	**24**	**39**

Table 135. Total Number of Major Economic Development Asset Facilities Located in the Wildfire Hazard Area

Total Number of Major Economic Development Asset Facilities Located in the Wildfire Hazard Area		
Major Economic Development Asset Facility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Port Facility	-	2
Eastern Carolina Region (Total)	**-**	**2**

Table 136. Total Number of Transportation Facilities Located in the Wildfire Hazard Area

Total Number of Transportation Facilities Located in the Wildfire Hazard Area		
Transportation Facility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Aircraft Landing Facility	15	36
Airport	1	-
Bus Station	2	-
Ferry Terminal	-	2
Highway Bridges	2	11
Eastern Carolina Region (Total)	**20**	**49**

Table 137. Total Number of Utilities Located in the Wildfire Hazard Area

Total Number of Utilities Located in the Wildfire Hazard Area		
Utility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
AM Transmission Tower	-	7
Cellular Tower	26	56
FM Transmission Tower	9	22
Gas Plant	-	-
Power Plant	16	12
Sewer Treatment Plant	3	9
Substation	33	74
Eastern Carolina Region (Total)	**87**	**180**

Table 138. Total Number of Vulnerable Population Facilities Located in the Wildfire Hazard Area

Total Number of Vulnerable Population Facilities Located in the Wildfire Hazard Area		
Vulnerable Population Facility	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Emergency Shelter	42	33
Mobile Homes	17,988	37,224
Nursing Homes	18	12
Eastern Carolina Region (Total)	**18,048**	**37,269**

Table 139. Total Number of Emergency Shelters Located in the Wildland-Urban Interface Wildfire Hazard Area

Total Number of Emergency Shelters Located in the Wildland-Urban Interface Wildfire Hazard Area	
Carteret County	11
Craven County	9
Duplin County	3
Greene County	-
Jones County	1
Lenoir County	1
Onslow County	16
Pamlico County	-
Wayne County	1
Eastern Carolina Region (Total)	**42**

Facility Name	County
ATLANTIC ELEM	Carteret
BOGUE SOUND ELEM	Carteret
CAMP GLENN ELEM	Carteret
CARTERET CC	Carteret
CROATAN HS	Carteret
MOREHEAD CITY MIDDLE	Carteret
MOREHEAD CITY NATIONAL GUARD ARMORY	Carteret
MOREHEAD CITY PRI	Carteret
NEWPORT ELEM	Carteret
WEST CARTERET HS	Carteret
WHITE OAK ELEM	Carteret
ARTHUR W EDWARDS EL	Craven
BRIDGETON ELEM	Craven
CRAVEN CC	Craven
GRAHAM A BARDEN ELEM	Craven
HAVELOCK HS	Craven
NEW BERN HS	Craven
ROGER R BELL ELEM	Craven
VANCEBORO-FARM LIFE	Craven
WEST CRAVEN MIDDLE	Craven
E E SMITH MIDDLE	Duplin
JAMES SPRUNT CC	Duplin
WALLACE NATIONAL GUARD ARMORY	Duplin
POLLOCKSVILLE ELEM	Jones
SOUTHWOOD ELEM	Lenoir
BERKLEY MANOR ELEM	Onslow
JACKSONVILLE COM MIDDLE	Onslow
JACKSONVILLE HS	Onslow
JACKSONVILLE NATIONAL GUARD ARMORY	Onslow
NORTHSIDE HS	Onslow
NORTHWOODS ELEM	Onslow
NORTHWOODS PARK MIDDLE	Onslow
PARKWOOD ELEM	Onslow
QUEENS CREEK ELEM	Onslow
SAND RIDGE ELEM	Onslow
SOUTHWEST MIDDLE	Onslow
SUMMERSILL ELEM	Onslow
SWANSBORO ELEM	Onslow
TARAWA TERRACE I	Onslow
WALTER THOMPSON ELEM	Onslow
WHITE OAK HS	Onslow
SPRING CREEK HS	Wayne

Table 140. Total Number of Emergency Shelters Located in the Wildland-Urban Intermix Wildfire Hazard Area

Total Number of Emergency Shelters Located in the Wildland-Urban Intermix Wildfire Hazard Area	
Carteret County	4
Craven County	4
Duplin County	7
Greene County	2
Jones County	1
Lenoir County	2
Onslow County	10
Pamlico County	2
Wayne County	1
Eastern Carolina Region (Total)	**33**

Facility Name	County
BROAD CREEK MIDDLE	Carteret
NEWPORT MIDDLE	Carteret
SMYRNA ELEM	Carteret
TILLER SCHOOL	Carteret
BRINSON MEMORIAL EL	Craven
NEW BERN NAT GUARD ARMORY (NEW)	Craven
OAKS ROAD ELEM	Craven
WEST CRAVEN HS	Craven
CHARITY MIDDLE	Duplin
CHINQUAPIN ELEM	Duplin
EAST DUPLIN HS	Duplin
KENANSVILLE ELEM	Duplin
ROSE HILL-MAGNOLIA	Duplin
WALLACE ELEM	Duplin
WALLACE-ROSE HILL HS	Duplin
GREENE CENTRAL HS	Greene
SNOW HILL NATIONAL GUARD ARMORY	Greene
JONES MIDDLE	Jones
CONTENTNEA ELEM	Lenoir
SOUTH LENOIR HS	Lenoir
BLUE CREEK ELEM	Onslow
DIXON ELEM	Onslow
DIXON MIDDLE	Onslow
JACKSONVILLE COM ELM	Onslow
MORTON ELEM	Onslow
RICHLANDS ELEM	Onslow
SILVERDALE ELEM	Onslow

Facility Name	County
SOUTHWEST ELEM	Onslow
SOUTHWEST HS	Onslow
TREXLER MIDDLE	Onslow
FRED A ANDERSON ELEM	Pamlico
PAMLICO CC	Pamlico
NORTHEAST ELEM	Wayne

Table 141. Miles of Critical Infrastructure by General Category in the Wildfire Hazard Area

Miles of Critical Infrastructure by General Category in the Wildfire Hazard Area		
Transportation Routes	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
NC Route	115	247
US Route	64	116
Interstate	3	9
Railroad	28	54
Eastern Carolina Region (Total)	**209**	**426**
Evacuation Routes		
Roadway	106	190
Ferry	-	-
Eastern Carolina Region (Total)	**106**	**190**

Table 142. Total Length of Critical Infrastructure within the Region Located in the Wildland-Urban Interface Wildfire Hazard Area

Total Length of Critical Infrastructure within the Region Located in the Wildland-Urban Interface Wildfire Hazard Area				
Counties	Roadway	Rail	Evacuation (Roadway)	Evacuation (Ferry)
Carteret County	20	0	15	-
Craven County	44	3	24	-
Duplin County	33	4	24	-
Greene County	3	-	3	-
Jones County	20	-	12	-
Lenoir County	12	-	2	-
Onslow County	36	-	27	-
Pamlico County	11	-	-	-
Wayne County	2	22	-	-
Eastern Carolina Region (Total)	**181**	**28**	**106**	**-**

Table 143. Total Length of Critical Infrastructure within the Region Located in the Wildland-Urban Intermix Wildfire Hazard Area

Total Length of Critical Infrastructure within the Region Located in the Wildland-Urban Intermix Wildfire Hazard Area				
Counties	Roadway	Rail	Evacuation (Roadway)	Evacuation (Ferry)
Carteret County	43	0	28	-
Craven County	43	6	15	-
Duplin County	77	12	44	-
Greene County	15	-	6	-
Jones County	17	-	13	-
Lenoir County	42	3	12	-
Onslow County	70	-	53	-
Pamlico County	25	-	-	-
Wayne County	39	32	19	-
Eastern Carolina Region (Total)	**372**	**54**	**190**	**-**

Table 144. Total Area of Historic Districts in the Wildfire Hazard Area (Acres)

Total Area of Historic Districts in the Wildfire Hazard Area (Acres)		
Counties	Wildland-Urban Interface Wildfire Hazard Area	Wildland-Urban Intermix Wildfire Hazard Area
Carteret County	-	-
Craven County	162	-
Duplin County	-	-
Greene County	-	-
Jones County	-	-
Lenoir County	-	-
Onslow County	-	-
Pamlico County	-	-
Wayne County	-	-
Eastern Carolina Region (Total)	**162**	**-**

Table 145. Number of Buildings by General Occupancy Located in the Wildland-Urban Interface Wildfire Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the Wildland-Urban Interface Wildfire Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	11,598	918	191	82	117	74	177	109
Craven County	57,961	18,741	1,048	401	87	151	110	83	141
Duplin County	47,845	3,958	354	1,309	14	78	37	55	734
Greene County	16,095	342	10	47	-	-	-	-	-
Jones County	9,934	1,730	87	231	20	52	19	5	-
Lenoir County	40,066	1,341	46	278	5	11	5	2	-
Onslow County	153,924	44,478	2,315	684	126	175	85	147	259
Pamlico County	13,725	2,322	195	15	7	36	11	12	-
Wayne County	93,879	999	66	241	33	15	2	9	70
Eastern Carolina Region (Total)	**493,396**	**85,509**	**5,039**	**3,397**	**374**	**635**	**343**	**490**	**1,313**

Table 146. Number of Buildings by General Occupancy Located in the Wildland-Urban Intermix Wildfire Hazard Area

Counties	Total Number of Buildings per County	Number of Buildings by General Occupancy Located in the Wildland-Urban Intermix Wildfire Hazard Area							
		General Occupancy							
		Residential	Commercial	Agricultural	Education	Religion	Government	Industrial	Vacant
Carteret County	59,967	11,655	689	310	18	179	109	132	240
Craven County	57,961	14,106	468	600	60	116	49	62	234
Duplin County	47,845	6,668	448	2,402	35	115	38	91	1,510
Greene County	16,095	2,190	88	183	40	27	9	22	-
Jones County	9,934	1,830	57	290	2	28	12	6	-
Lenoir County	40,066	5,804	308	832	33	65	7	56	13
Onslow County	153,924	52,872	2,559	986	130	180	40	159	452
Pamlico County	13,725	6,037	331	121	20	60	23	52	-
Wayne County	93,879	9,717	480	801	41	100	18	126	479
Eastern Carolina Region (Total)	**493,396**	**110,879**	**5,428**	**6,525**	**379**	**870**	**305**	**706**	**2,928**

Table 147. Number of Mobile Home Parks and Mobile Home Buildings Located in the Wildland-Urban Interface Wildfire Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the Wildland-Urban Interface Wildfire Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	41	4,622
Craven County	46	7,358	16	2,290
Duplin County	34	11,998	10	2,268
Greene County	12	3,446	-	142
Jones County	1	1,854	1	516
Lenoir County	41	7,669	5	538
Onslow County	86	18,293	34	5,658
Pamlico County	3	2,185	2	429
Wayne County	78	29,932	3	1,413
Eastern Carolina Region (Total)	**387**	**95,731**	**112**	**17,876**

Table 148. Number of Mobile Home Parks and Mobile Home Buildings Located in the Wildland-Urban Intermix Wildfire Hazard Area

Counties	Total Number of Mobile Home Parks per County	Total Number of Mobile Home Buildings per County	Number of Mobile Home Parks and Mobile Home Buildings Located in the Wildland-Urban Intermix Wildfire Hazard Area	
			Number of Mobile Home Parks	Number of Mobile Home Buildings
Carteret County	86	12,996	16	4,188
Craven County	46	7,358	18	3,143
Duplin County	34	11,998	8	4,849
Greene County	12	3,446	5	755
Jones County	1	1,854	-	605
Lenoir County	41	7,669	15	2,484
Onslow County	86	18,293	49	11,056
Pamlico County	3	2,185	1	1,372
Wayne County	78	29,932	18	8,642
Eastern Carolina Region (Total)	**387**	**95,731**	**130**	**37,094**

Table 149. Area of Agricultural Land Located in the Wildland-Urban Interface Wildfire Hazard Area (Acres)

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the Wildland-Urban Interface Wildfire Hazard Area (Acres)
Carteret	53,533	4,700
Craven	68,815	13,198
Duplin	194,347	22,490
Greene	84,772	3,240
Jones	61,745	8,461
Lenoir	105,242	8,347
Onslow	59,283	17,550
Pamlico	36,816	3,993
Wayne	156,320	5,470
Eastern Carolina Region (Total)	**820,873**	**87,449**

Table 150. Area of Agricultural Land Located in the Wildland-Urban Intermix Wildfire Hazard Area (Acres)

Counties	Total Agricultural Land per County (Acres)	Area of Agricultural Land Located in the Wildland-Urban Intermix Wildfire Hazard Area (Acres)
Carteret	53,533	6,187
Craven	68,815	15,934
Duplin	194,347	43,786
Greene	84,772	7,744
Jones	61,745	6,546
Lenoir	105,242	20,393
Onslow	59,283	25,542
Pamlico	36,816	6,644
Wayne	156,320	24,435
Eastern Carolina Region (Total)	**820,873**	**157,211**

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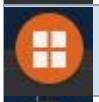
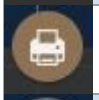
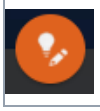
Appendix C: Mapping Solution

The RISE Regional Resilience Portfolio program aims to support resilience efforts throughout the region by engaging local leaders and the community. The web map in combination with the vulnerability assessment bridges science and local knowledge to identify current and future hazards impacting the region. The vulnerability assessment profiles natural hazards and climate risks, provides an analysis of the hazards' impacts on the region, and provides key takeaways for building resilience across the region. The web map is a companion tool to allow users to further explore hazard data and the exposure of critical assets throughout the region. The webmap can be accessed at: Eastern Carolina Region - Resilience Portfolio Web Map (arcgis.com)

The table below provides an overview of the symbols available in the application:

Table 151: Map Symbology

Icon	Explanation
	Click on this tool to view the legend of layers shown in the web map.
	Click on this tool to turn layers on and off, open the attribute table, or view the layer's information to download the data.
	Click on this tool to change the basemap.
	Click on this tool to print out a static copy of the web map.
	Click on this tool to add data to the web map.
	Click on this tool to bookmark a location on the web map.
	Click on this tool to measure a length on the web map.
	Click on this tool to draw on the web map.
	Click on this tool to swipe one or more layers on the web map.
	Click on this tool for more information about the tools available in this web map.
	Click on this tool to share this web map.
	Click on this tool to add a note or delete a note you have added to the web map. You are encouraged to add comments about the data shown in the web map, which will be shared with other viewers of the web map.

Icon	Explanation
	Click on this tool to select data shown on the web map. You may use this tool to extract and export data.

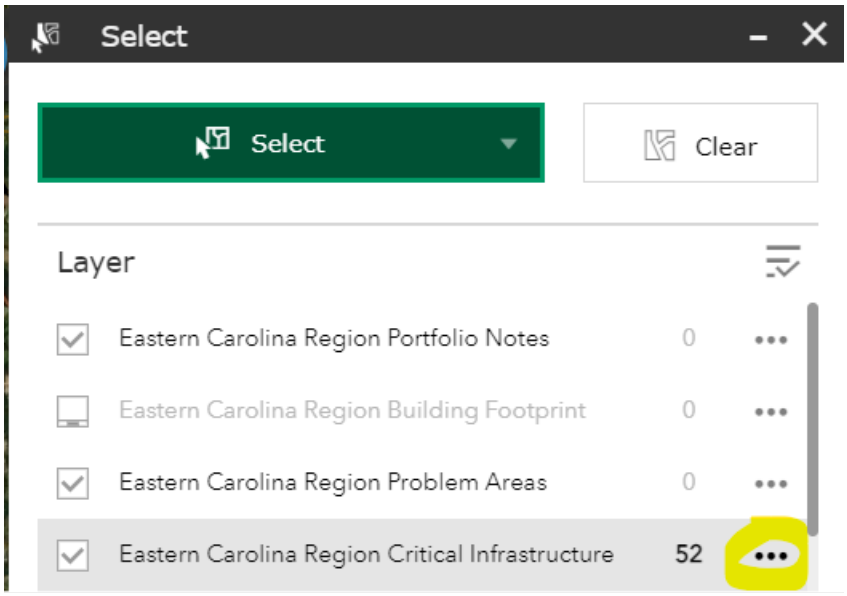
The following layers are available on the maps to visualize the identified hazards:

Table 152: Map Layers and Hazards

Layer	Hazard
Urban Heat Island	Extreme Temperature
• Wildland Urban Interface Wildfire Hazard Area • Wildland Urban Intermix Wildfire Hazard Area	Wildfire
• Storm Surge SLOSH Category 1 • Storm Surge SLOSH Category 2 • Storm Surge SLOSH Category 3 • Storm Surge SLOSH Category 4 • Projected 2050 1-Percent Annual Chance Flood Event • 1-Percent Annual Chance Flood Event • 0.2-Percent Annual Chance Flood Event	Flood
• Storm Surge SLOSH Category 1 • Storm Surge SLOSH Category 2 • Storm Surge SLOSH Category 3 • Storm Surge SLOSH Category 4	Hurricanes and Severe Storms
Short-Term (~30 Year) Historical Shoreline Change Rates Short-Term (~30 Year) Historical End Point Shoreline Change Rates Marsh Migration Zone with 1-Foot Sea Level Rise Marsh Migration Zone with 0-Foot Sea Level Rise	Erosion
Marsh Migration Zone with 1-Foot Sea Level Rise Marsh Migration Zone with 0-Foot Sea Level Rise	Sea Level Rise

Once you have selected the features using the Select Tool, click on the ellipses next to the layer you would like to extract. You can only extract layers that have a value greater than 0 next to the ellipses.

Figure 30: Layer Extraction



The following data sources were used to build the webmap application:

Table 153: Data Sources for Webmap

Data	Source	Date
Social Vulnerability Index	CDC/ATSDR SVI	2018
Building Footprints	NCEM	2020
Parcel Boundaries	NC One Map	2021/2022
Critical facilities	NC OneMap; HIFLD	2011/2016/2018/2019; 2020/2021/2022
2019 Land Cover	USGS/NLCD	2021
Marsh Migration	NOAA	2016
Erosion Rate	USGS; NC Division of Coastal Management	2017;2020
Urban Heat Island	The Trust for Public Land	2019
Digitized Effective FIRM maps	NCFRIS; FEMA	2022; 2018/2019/2020/2021
Sea Level Rise	NOAA	2017
Sea-Lake Overland Surge from Hurricanes (SLOSH) Model	NOAA	

Appendix D: Acronyms Table

Acronym/Abbreviation	Definition
CDC	Centers for Disease Control and Prevention
DFIRM	Digital Flood Insurance Rate Map
EMS	Emergency Medical Services
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
IPCC	Intergovernmental Panel on Climate Change
MRCC	Midwest Regional Climate Center
NCDEQ	North Carolina Department of Environmental Quality
NCDPS	North Carolina Department of Public Safety
NCORR	North Carolina Office of Recovery and Resiliency
NCSU	North Carolina State University
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NSSL	NOAA National Severe Storms Laboratory
NWS	National Weather Service
RHMP	Regional Hazard Mitigation Plan
RISE	Regions Innovating for Strong Economies and Environment Program
SFHA	Special Flood Hazard Area
SLOSH	Sea, Lake, and Overland Surges from Hurricanes
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WCT	Wind Chill Temperature