

# SECTION 4

## HAZARD IDENTIFICATION

This section describes how the planning team identified the hazards to be included in this plan. It consists of the following five subsections:

- ◆ 4.1 Overview
- ◆ 4.2 Disaster Declarations
- ◆ 4.3 Summary of Hazard Impacts Since Previous Plan
- ◆ 4.4 Hazard Evaluation
- ◆ 4.5 Hazard Identification Results

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### 44 CFR Requirement

**44 CFR Part 201.6(c)(2)(i):** The risk assessment shall include a description of the type, location and extent of all-natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

### 4.1 OVERVIEW

The Southeastern NC Region is vulnerable to a wide range of natural and human-caused hazards that threaten life and property. Current FEMA regulations and guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused hazards (i.e., technological hazards, terrorism, etc.) is encouraged, though not required, for plan approval. However, the Southeastern NC Region has decided to conduct a comprehensive assessment of both types of hazards to align with the hazards found in the North Carolina State Hazard Mitigation Plan and to reflect a more all-hazards approach to planning.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the participating jurisdictions in the Southeastern NC Region have identified a number of hazards that are to be addressed in its Regional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the Southeastern NC Regional Hazard Mitigation Planning Committee members, research of past disaster declarations in the participating counties<sup>1</sup>, and review of the North Carolina State Hazard Mitigation Plan (2018). Therefore, since the development of the previous version of this plan, the hazards identified and included in the plan have changed. A list of all previous hazards covered in the 2016 Southeastern NC Regional Hazard Mitigation Plan is viewable in **Table 4.1**, along with a summary of the hazards assessed in this 2020 update. Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

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<sup>1</sup> A complete list of disaster declarations for the Southeastern NC Region can be found below in Section 4.3.

**SECTION 4: HAZARD IDENTIFICATION**

**TABLE 4.1: 2020 SOUTHEASTERN NC HAZARDS UPDATE**

Identified Hazards for the 2016 Southeastern NC Regional Hazard Mitigation Plan	Identified Hazards for the 2021 Southeastern NC Regional Hazard Mitigation Plan	Sub hazards covered in 2021 Plan and Explanations
Droughts/Heat Waves	Separate hazards of Drought and Excessive Heat	Agricultural Drought, Hydrological Drought
Hurricanes and Coastal Storms	Hurricane and Coastal Hazards	Nor’easters, Storm Surge, Rip Currents
Tornados	Tornadoes/Thunderstorms	Hailstorm, Torrential Rain associated with Severe Thunderstorms, Thunderstorm Wind, Lightning, Waterspout, High Wind
Severe Thunderstorms/Windstorms, Lightning and Hail		Assessed under “Tornadoes/Thunderstorms”
Winter Storms and Freezes	Severe Winter Weather	Freezing Rain, Snowstorms, Blizzards, Wind Chill, Extreme Cold
Dam/Levee Failure	Dam Failures	
Erosion		Assessed under “Geological”
Flooding	Flooding	
Rip Currents	Rip Currents	Assessed under “Hurricanes and Costal Hazards”
Earthquakes	Earthquakes	
Coastal Erosion	Geological Hazards	Sinkholes, Coastal Erosion
Sinkholes	Geological Hazards	Sinkholes, Coastal Erosion
Wildfires	Other Hazards Wildfires	
	Infectious Disease	
Tsunamis	Tsunami	
	Technological Hazards Hazardous Substances	Hazardous Materials, Hazardous Chemicals, Oil Spill
	Radiological Emergency – Fixed Nuclear Facilities	
	Terrorism	Chemical, Biological, Radiological, Nuclear, Explosive
	Cyber	
	Electromagnetic Pulse	

Note: The hazards identified in the previous version of the Onslow County plan varied only slightly from the hazards in the previous Southeastern NC regional plan, primarily in terms of minor changes in terminology used. The only major difference was that the Onslow County plan identified Storm Surge as a separate hazard. For this plan update, storm surge is included as a sub hazard of Hurricanes and Coastal Hazards.

## 4.2 DISASTER DECLARATIONS

Disaster declarations provide initial insight into the hazards that may impact the Southeastern NC regional planning area. Since 1984, nineteen presidential disaster declarations have been reported in the Southeastern NC Region, which can be seen in **Table 4.2** below. Of these disaster declarations, fifteen of the nineteen were related to hurricanes and tropical storms, and three related to severe storms that included flooding and tornadoes. One of the most recent declarations was a result of the global pandemic caused by COVID-19.

**TABLE 4.2: DISASTER DECLARATION IN THE SOUTHEASTERN NORTH CAROLINA REGION**

Year	Disaster Number	Description	Brunswick County	Onslow County	Pender County	New Hanover County
1984	724	HURRICANE DIANA	X		X	X
1989	844	HURRICANE HUGO	X			
1996	1127	HURRICANE BERTHA	X	X	X	X
1996	1134	HURRICANE FRAN	X	X	X	X
1998	1240	HURRICANE BONNIE	X	X	X	X
1999	1292	HURRICANE FLOYD	X	X	X	X
2003	1490	HURRICANE ISABEL	X	X	X	X
2005	1608	HURRICANE OPHELIA	X	X	X	X
2008	1801	TROPICAL STORM HANNA	X			X
2010	1942	SEVERE STORMS, FLOODING, AND STRAIGHT-LINE WINDS	X	X	X	X
2011	1969	SEVERE STORMS, FLOODING, TORNADOES		X		
2011	4019	HURRICANE IRENE	X	X	X	X
2016	4285	HURRICANE MATTHEW	X	X	X	X
2018	4393	HURRICANE FLORENCE	X	X	X	X
2019	4412	TROPICAL STORM MICHAEL	X			
2019	4465	HURRICANE DORIAN	X	X	X	X
2020	4487	COVID-19 PANDEMIC	X	X	X	X
2020	4543	SEVERE STORMS, TORNADOES, AND FLOODING			X	

### 4.3 SUMMARY OF HAZARD IMPACTS SINCE PREVIOUS PLAN

Since the approval date of the previous Southeastern NC Regional Hazard Mitigation Plan (November 16, 2016) and the Onslow County Hazard Mitigation Plan (July 2014), there have been 243 hazard events recorded for the region in the National Center for Environmental Information Storm Events Database. It is important to take note of those hazard events and consider them in the *Hazard Identification* section to help them ensure that the appropriate hazards are being considered in the risk assessment sections and in the Mitigation Strategy. **Table 4.3** documents the hazard events recorded. Details for some of these events are discussed in further detail in the *Hazard Profiles* section and *Appendix H*.

**TABLE 4.3: SUMMARY OF HAZARD EVENTS SINCE PREVIOUS PLAN**

Hazard Type*	Number of Reported Events in Brunswick County	Number of Reported Events in New Hanover County	Number of Reported Events in Onslow County	Number of Reported Events in Pender County
Flash Flood	16	29	6	25
Flood	22	25	1	9
Hail	13	5	10	6
High Wind	0	2	0	0
Lightning	0	3	1	2
Thunderstorm Wind	11	12	15	14
Tornado	3	0	0	0
Tropical Storm	1	1	3	0
Winter Storm	1	2	1	2
Winter Weather	0	0	1	1
<b>TOTAL NUMBER OF REPORTED EVENTS</b>	<b>67</b>	<b>79</b>	<b>38</b>	<b>59</b>

\*The hazard type names that NCEI uses are different than the names of hazards used in this plan; however, one can still get an understanding of the types of hazards that impact the region as the hazard types are similar in name.

### 4.4 HAZARD EVALUATION

**Table 4.4** documents the evaluation process used for determining which of the initially identified hazards are considered significant enough to warrant further evaluation in the risk assessment. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not). Hazard events not identified for inclusion at this time may be addressed during future evaluations and updates of the risk assessment if deemed necessary by the Regional Hazard Mitigation Planning Committee during the plan update process.

**TABLE 4.3: DOCUMENTATION OF THE HAZARD EVALUATION PROCESS**

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
<b>NATURAL HAZARDS</b>			
<b>Avalanche</b>	<b>NO</b>	<ul style="list-style-type: none"> <li>• Review of US Forest Service National Avalanche Center web site</li> <li>• Review of the NC State Hazard Mitigation Plan</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• There is no risk of avalanche events in North Carolina. The United States avalanche hazard is limited to mountainous western states including Alaska, as well as some areas of low risk in New England.</li> <li>• Avalanche was not included in the previous Southeastern NC Regional Hazard Mitigation Plan or the Onslow County Hazard Mitigation Plan.</li> <li>• Avalanche is not included in the previous Southeastern NC Regional Hazard Mitigation Plan or the Onslow County Hazard Mitigation Plan.</li> </ul>
<b>Drought</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of the NC State Hazard Mitigation Plan</li> <li>• Review of the North Carolina Drought Monitor website</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• There are reports of drought conditions in all of the last nineteen years in the Southeastern NC Region, according to the North Carolina Drought Monitor.</li> <li>• Droughts are discussed in NC State Hazard Mitigation Plan.</li> <li>• Drought is included in the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>
<b>Hailstorm</b>	<b>YES (Assessed under Tornadoes/ Thunderstorms)</b>	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCEI Storm Events Database</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Hailstorm events are discussed in the state plan under the Severe Thunderstorm hazard.</li> <li>• NCEI reports 536 hailstorm events (3/4-inch size hail to 2.75 inches) for the Southeastern NC Region between 1966 and November 2019. For these events there are over \$74 thousand in property damages but no deaths or injuries.</li> <li>• Although hail is not addressed as an individual hazard in the previous regional hazard mitigation plan or the Onslow County plan, it is</li> </ul>

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			addressed as a sub-item under various hazards.
<b>Excessive Heat</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NOAA NCEI Storm Events Database</li> <li>• Review of the North Carolina State Hazard Mitigation Plan</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• NCEI reported 23 extreme heat events for the Southeastern NC counties.</li> <li>• The NC State Hazard Mitigation Plan includes Excessive Heat as an identified hazard for North Carolina.</li> <li>• Heat Wave was included as a hazard (combined with Drought) in the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>
<b>Hurricane and Coastal Hazards</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Analysis of NOAA historical tropical cyclone tracks and National Hurricane Center Website</li> <li>• Review of NOAA NCEI Storm Events Database</li> <li>• Review of historical presidential disaster declarations</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• NOAA historical records indicate 55 hurricanes, 38 tropical storms, and 34 tropical depressions have come within 75 miles of the Southeastern NC Region between 1851 and 2018.</li> <li>• Hurricane and tropical storm events are discussed in the state plan.</li> <li>• Seventeen out of twenty disaster declarations in the Southeastern NC Region are directly related to hurricane and tropical storm events.</li> <li>• Hurricane and Tropical Storm hazard was addressed in the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>
<b>Lightning</b>	<b>YES (Assessed under Tornadoes/ Thunderstorms)</b>	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCEI Storm Events Database, NOAA lightning statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Lightning events are discussed in the state plan as part of the Severe Thunderstorm hazard,</li> <li>• NCEI reports 79 (seventy-nine) lightning events for the Southeastern NC region between July 1996 and November 2019. These events have resulted in a recorded 5 (five) deaths, 16</li> </ul>

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		<ul style="list-style-type: none"> <li>Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<p>(sixteen) injuries, and \$4,812,500 in property damage.</p> <ul style="list-style-type: none"> <li>Although lightning is not addressed as an individual hazard in any of the previous Southeastern NC county-level hazard mitigation plans, it is addressed under a larger hazard category such as severe thunderstorms. Given the damage and reported death and injuries, individual analysis is warranted.</li> </ul>
Nor'easter	<p><b>YES</b> (Assessed under Hurricanes/ Coastal Hazards)</p>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of NOAA NCEI Storm Events Database</li> <li>Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Nor'easters are discussed in the state plan as a part of the Hurricane hazard. The coastal region, which includes the Southeastern NC counties, has the highest vulnerability in the state.</li> <li>NCEI does not report any Nor'easter activity for the Southeastern NC Region. However, Nor'easters that have affected the region may have been recorded by NCEI as severe winter storms.</li> <li>This hazard was not addressed as a separate hazard in any of the previous plans.</li> </ul>
Tornadoes	<p><b>YES</b> (Assessed under Tornadoes/ Thunderstorms)</p>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of FEMA's Multi-Hazard Identification and Risk Assessment</li> <li>Review of NOAA NCEI Storm Events Database</li> <li>Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Tornado events are discussed in the NC State Hazard Mitigation Plan under Severe Thunderstorms.</li> <li>NCEI reports one hundred and thirty-one (131) tornado events in Southeastern NC Counties between 1951 and December 2018. These events have resulted ninety-seven (97) injuries and have caused six (6) deaths and \$25,000,000 in property damage with the most severe being an F3.</li> <li>Tornado events were addressed in the previous Southeastern NC regional plan and the Onslow County Hazard Mitigation Plan.</li> </ul>

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<b>Severe Thunderstorm</b>	<b>YES</b> (Assessed under Tornadoes/ Thunderstorms)	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of NOAA NCEI Storm Events Database</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Severe Thunderstorm events are discussed in the NC State Hazard Mitigation Plan. Historical data shows severe thunderstorms are more common in the eastern part of the state, which includes the Southeastern NC region.</li> <li>• NCEI reports 581 thunderstorm events in the Southeastern NC region between 1985 and November 2019. These events have resulted in \$5.7 million in property damage.</li> <li>• Severe Thunderstorm events were addressed in the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>
<b>Severe Winter Weather</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>• Review of historical presidential disaster declarations.</li> <li>• Review of NOAA NCEI Storm Events Database</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>• Severe Winter Weather including snow storms and ice storms is discussed in the state plan.</li> <li>• NCEI reports that the counties in the Southeastern NC region have been affected by 31 snow and ice events between 1993 and January 2018. These events resulted in \$145 thousand in property damages.</li> <li>• One of the twenty presidential disaster declarations for the region was related to severe winter weather.</li> </ul>
<b>Earthquakes</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>• Review of NC State Hazard Mitigation Plan</li> <li>• Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan. USGS Earthquake Hazards Program web site</li> <li>• Review of the National Geophysical Data Center</li> </ul>	<ul style="list-style-type: none"> <li>• Earthquake events are discussed in the state plan and all of the participating counties in the Southeastern NC are considered to be at moderate risk to an earthquake event (no counties are high risk).</li> <li>• Both the previous Southeastern NC regional plan and the Onslow County Hazard Mitigation Plan address earthquakes.</li> </ul>

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		<ul style="list-style-type: none"> <li>Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> </ul>	<ul style="list-style-type: none"> <li>Earthquakes have occurred in and around the State of North Carolina in the past. The state is affected by the Charleston and the New Madrid (near Missouri) Fault lines which have generated a magnitude 8.0 earthquake in the last 200 years.</li> <li>According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for the Southeastern NC Region ranges from 1 to 4%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more.</li> </ul>
<b>Expansive Soils</b>	<b>NO</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>Review of USDA Soil Conservation Service’s Soil Survey</li> <li>Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Expansive soils are not included as a hazard in the state plan.</li> <li>According to FEMA and USDA sources, the Southeastern NC Region is located in an area that has a “little to no” clay swelling potential.</li> <li>Neither the previous Southeastern NC regional hazard mitigation plan nor the Onslow County Hazard Mitigation Plan identify expansive soils as a potential hazard.</li> </ul>
<b>Coastal Hazards (Rip Currents, Storm Surge, Erosion)</b>	<b>YES (Assessed under Hurricanes/ Coastal Hazards)</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of USGS Landslide Incidence and Susceptibility Hazard Map</li> <li>Review of the North Carolina Geological Survey database of historic landslides</li> <li>Review of the previous Southeastern Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Coastal erosion events are identified as a hazard in the state plan under Geologic Hazards. Storm surge is addressed under Hurricanes/Coastal Hazards. Rip currents are not addressed.</li> <li>Both the previous Southeastern NC regional hazard mitigation plan and the Onslow County Hazard Mitigation Plan address coastal erosion and rip currents. The Onslow County plan also addresses Storm Surge.</li> </ul>
<b>Sinkholes</b>	<b>YES (Assessed under</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>The state plan delineates certain areas that are susceptible to land</li> </ul>

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	<b>Geological Hazards)</b>	<ul style="list-style-type: none"> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<p>subsidence hazards in North Carolina and most of these areas are located in Southeastern NC counties.</p> <ul style="list-style-type: none"> <li>Both the previous regional plan and the Onslow County Hazard Mitigation Plan address sinkholes as a hazard.</li> </ul>
<b>Tsunami</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> <li>Review of FEMA’s Multi-Hazard Identification and Risk Assessment</li> <li>Review of FEMA “How-to” mitigation planning guidance (Publication 386-2, “Understanding Your Risks – Identifying Hazards and Estimating Losses).</li> </ul>	<ul style="list-style-type: none"> <li>Tsunamis are not discussed in the 2018 version of the state plan. The risk for the Atlantic coast for tsunamis is very low to low.</li> <li>Both the previous regional plan and the Onslow County Hazard Mitigation Plan address tsunami as a hazard.</li> <li>No record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States.</li> <li>Tsunami inundation zone maps are not available for communities located along the U.S. East Coast.</li> <li>FEMA mitigation planning guidance suggests that locations along the U.S. East Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time.</li> </ul>
<b>Volcano</b>	<b>NO</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of USGS Volcano Hazards Program web site</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>There are no active volcanoes in North Carolina.</li> <li>There has not been a volcanic eruption in North Carolina in over 1 million years.</li> <li>No volcanoes are located near the Southeastern NC Region.</li> </ul>
<b>Dam Failure</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of North Carolina Dam Safety Office’s web site</li> </ul>	<ul style="list-style-type: none"> <li>Dam failure is discussed in the state plan as a hazard of concern for the Southeastern NC Region.</li> <li>Of the 29 dams reported in the region in the National Inventory of Dams, 9 are high hazard (31.02%),</li> </ul>

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		<ul style="list-style-type: none"> <li>Review of U.S. Army Corps of Engineers National Inventory of Dams database</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<p>(High hazard is defined as “where failure or mis operation will probably cause loss of human life.”)</p> <ul style="list-style-type: none"> <li>Both the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan address dam failure.</li> </ul>
<b>Coastal Erosion</b>	<b>YES (Referenced in Geological Hazards)</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Erosion is referenced in both the Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan.</li> <li>Coastal erosion is a major concern for the region</li> </ul>
<b>Flooding</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of historical disaster declarations</li> <li>Review of NOAA NCEI Storm Events Database</li> <li>Review of FEMA’s NFIP Community Status Book and Community Rating System (CRS)</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>The flood hazard is thoroughly discussed in the state plan.</li> <li>Eighteen of twenty Presidential Disaster Declarations were flood-related and/or caused by hurricane or tropical storm related events.</li> <li>NCEI reports that Southeastern NC Region counties have been affected by 350 flood events since 1997.</li> <li>These events in total caused no reported deaths or injuries, but did cause an estimated \$28.6 million (2018 dollars) in property damages.</li> <li>All of the counties and nearly all of the municipalities participate in the NFIP.</li> <li>Both the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan address flood hazard.</li> </ul>
<b>Storm Surge</b>	<b>YES (Assessed under Hurricanes/ Coastal Hazards)</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>Storm surge is discussed in the state plan under the hurricane hazard and indicates that storm surge in eastern NC remains one of the major destructive forces of land-falling tropical storms and hurricanes</li> </ul>

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		<ul style="list-style-type: none"> <li>Review of NOAA NCEI Storm Events Database</li> </ul>	<ul style="list-style-type: none"> <li>The previous Southeastern NC Regional Hazard Mitigation Plan. The Onslow County Hazard Mitigation Plan included storm surge as a hazard.</li> <li>Six historical events were reported by NCEI for the Southeastern NC Region</li> </ul>
<b>OTHER HAZARDS</b>			
<b>Wildfires</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> <li>Review of Southern Wildfire Risk Assessment (SWRA) Data</li> <li>Review of the NC Division of Forest Resources website</li> </ul>	<ul style="list-style-type: none"> <li>Wildfires are identified as a hazard in the state plan.</li> <li>Both the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan addressed wildfire.</li> <li>A review of SWRA data indicates that there are areas of elevated concern in the Southeastern NC Region.</li> <li>According to the North Carolina Division of Forest Resources, the Southeastern NC Region experiences an average of 94 fires each year which burn a combined average of 3,988 acres each year.</li> <li>Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases.</li> </ul>
<b>Hazardous Substances</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of the NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>Hazardous Substances are identified as a hazard in the state plan.</li> <li>Neither the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan include hazardous materials as a hazard. The previous plans focused only on natural hazards.</li> <li>This update assesses hazardous materials, hazardous chemicals, and oil spills under this hazard to better align with the State Plan.</li> </ul>
<b>Infectious Disease</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of the NC State Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>Infectious Disease is identified as a hazard in the State plan.</li> </ul>

**SECTION 4: HAZARD IDENTIFICATION**

Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
		<ul style="list-style-type: none"> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>Although neither of the previous hazard mitigation plans for the region included infectious diseases as a hazard, it is assessed in this update to maintain consistency with the NC State Hazard Mitigation Plan.</li> <li>Infectious Disease has caused one of the twenty disaster declarations in the Southeastern NC Region.</li> </ul>
<b>TECHNOLOGICAL HAZARDS</b>			
<b>Terrorism</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of the NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> <li>Review of local official knowledge</li> </ul>	<ul style="list-style-type: none"> <li>Although none of the previous hazard mitigation plans for the region included terrorism threat as a hazard, it is assessed in this update to maintain consistency with the NC State Hazard Mitigation Plan.</li> <li>This hazard will assess chemical, biological, radiological, nuclear, and explosive terrorism events.</li> </ul>
<b>Radiological Emergency – Fixed Nuclear Facilities</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of the NC State Hazard Mitigation Plan</li> <li>Review of the previous Southeastern NC Regional Hazard Mitigation Plan and the Onslow County Hazard Mitigation Plan</li> <li>Review of IAEA list of fixed nuclear power stations in the United States</li> <li>Discussion with local officials about location of nuclear power stations</li> </ul>	<ul style="list-style-type: none"> <li>The Brunswick Nuclear Plant is located just north of Southport, North Carolina on the Cape Fear River in Brunswick County.</li> <li>Nuclear events can sometimes be caused by natural hazards and deserve some attention in this plan due to some areas of the region being located in the 10 mile evacuation zone for the Brunswick Nuclear Plant.</li> </ul>
<b>Cyber</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>Changing future conditions encourage the assessment of the possibility of a cyberattack with the increase in global technology</li> </ul>
<b>Electro-magnetic Pulse</b>	<b>YES</b>	<ul style="list-style-type: none"> <li>Review of NC State Hazard Mitigation Plan</li> </ul>	<ul style="list-style-type: none"> <li>Changing future conditions encourage the assessment of the possibility of an electromagnetic pulse with the increase in global technology</li> </ul>

## 4.5 HAZARD IDENTIFICATION RESULTS

**Table 4.4** provides a summary of the hazard identification and evaluation process noting which of the 24 initially identified hazards are considered significant enough for further evaluation through this Plan’s risk assessment (marked with a “☑”).

**TABLE 4.4: SUMMARY RESULTS OF THE HAZARD IDENTIFICATION AND EVALUATION PROCESS**

NATURAL HAZARDS	TECHNOLOGICAL HAZARDS
<input type="checkbox"/> Avalanche	<input checked="" type="checkbox"/> Radiological Emergency – Fixed Nuclear Facilities
<input checked="" type="checkbox"/> Drought	<input checked="" type="checkbox"/> Terrorism
<input checked="" type="checkbox"/> Hailstorm**	<input checked="" type="checkbox"/> Cyber
<input checked="" type="checkbox"/> Excessive Heat	<input checked="" type="checkbox"/> Electromagnetic
<input checked="" type="checkbox"/> Hurricane and Coastal Hazards	<b>OTHER HAZARDS</b>
<input checked="" type="checkbox"/> Flooding	<input checked="" type="checkbox"/> Hazardous Substances
<input checked="" type="checkbox"/> Lightning**	<input checked="" type="checkbox"/> Infectious Disease
<input checked="" type="checkbox"/> Nor’easter***	<input checked="" type="checkbox"/> Wildfires
<input checked="" type="checkbox"/> Tornadoes/Thunderstorms	
<input checked="" type="checkbox"/> Severe Winter Weather	
<input checked="" type="checkbox"/> Earthquakes	
<input checked="" type="checkbox"/> Dam Failure	
<input checked="" type="checkbox"/> Geological	
<input checked="" type="checkbox"/> Infectious Disease	
<input type="checkbox"/> Expansive Soils	
<input checked="" type="checkbox"/> Sinkholes	
<input checked="" type="checkbox"/> Tsunami	
<input type="checkbox"/> Volcano	
<input checked="" type="checkbox"/> Storm Surge***	
<input type="checkbox"/> Erosion	

☑ = Hazard considered significant enough for further evaluation in the Southeastern NC Regional hazard risk assessment

\*\* = Hazard is assessed as a sub hazard under the Tornadoes/Thunderstorms hazard.

\*\*\* = Hazard is assessed as a sub-hazard under the Hurricane and Coastal Hazards section.