# CHAPTER 9: THE REGION

## INTRODUCTION

The Eastern Shore of Virginia is a two-county peninsula situated between the Chesapeake Bay and the Atlantic Ocean (Figure 1). Along the Eastern Shore's approximately 70-mile length lie 19 incorporated towns and the longest expanse of coastal wilderness remaining on the Atlantic seaboard. The region is unique compared to neighboring regions in the Commonwealth in that three of its incorporated communities and several key economic drivers are located on islands in the Chesapeake Bay and Atlantic Ocean.


***Figure 1: Eastern Shore of Virginia Location Map***

## REGION PROFILE

On the seaside of the Eastern Shore are thousands of acres of pristine salt marshes, tidal mudflats, shallow lagoons, and navigable tidal channels that support thriving seafood and recreational tourism industries. These environments are bound on the east by a barrier island chain that is largely undeveloped and on the west by the mainland. The bayside, though more developed, also has near-shore islands (that are not the same as barrier islands), with its own salt marshes and brackish marshes.

Together, the area is an important stopover and wintering ground for migratory waterfowls. Coastal marshes provide food and nesting for birds, mammals, reptiles, and amphibians. Some of the very qualities that make the Eastern Shore more attractive for other animal species have long drawn humans to live and work, and later to recreate, on the peninsula's shores and in between.

First American populations tended to be mobile and in concert with nature's inconsistencies; however, with European systems of extracting wealth from natural resources and patterns of permanent settlement tending to be near water, naturally occurring phenomena became a threat to life and property and a risk to be managed and mitigated. Primary hazards are coastal flooding, coastal erosion, storm water flooding, and wind. Secondary hazards are groundwater/well contamination, snow and ice, drought, and sewage spills.

## SOCIO-ECONOMIC

Part of assessing hazards in relation to their risk is understanding the people affected. Not all people are affected equally. Some are affected by the factors relating to their ability to understand risks posed by hazards, and some by their ability to remove themselves from harm's way. Those factors include age, mobility, income, and the languages individuals speak and the languages in which individuals are able to access information.

### DEMOGRAPHICS

Population for the two-county region has seen a net decrease of about 1,600 since 1960; however, this does not paint a fair picture of how the population on the Eastern Shore has changed. As Figure 2 shows, population has shifted from Northampton to Accomack County, with Northampton seeing a net loss of approximately 4,714 residents in the 60-year period from 1960 to 2020, with another slight decline of 102 residents within the last decade. Accomack County, however, after experiencing a small initial decline in population between 1960 and 1970, saw its population grow to a high of 38,305 by 2000. The population fell again by 2010, but still netting an increase of more than 3,048 and a growth rate of 0.17% over the past 60 years (U.S. Census 2020). Population projections for 2030 and beyond have not been made available yet by the Cooper Center for Public Service as of December 2021.

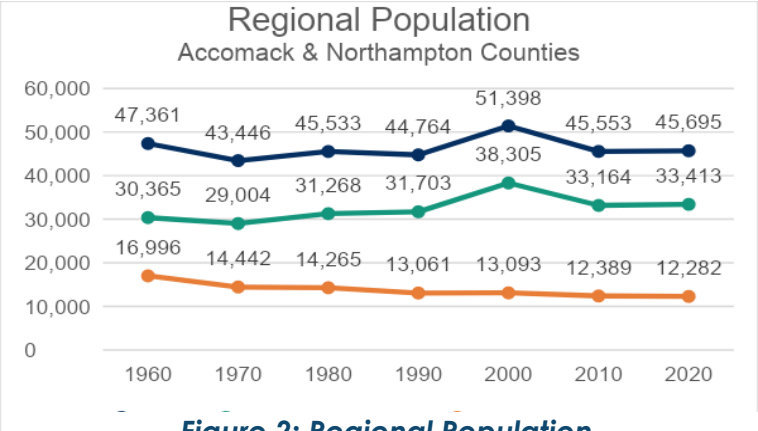



*Figure 2: Regional Population*

The 2020 U.S. Census shows both Counties have White/Caucasian alone as the largest race/ethnicity, which has grown by 0.8% since 2010. The Black/African American population has decreased throughout the region from 30.2% in 2010 to 27.2% in 2020, and the Hispanic/Latino population has increased from 8.2% to 9.8%, respectively.

Not only is the overall population not growing, it is aging in place. As reflected in Table 1 below, the median age for Accomack County residents has increased from 39.4 years old in 2000 to 45.9 in 2020, an increase of about 6 years. Similarly, Northampton County has also experienced an aging population, with the median age increasing from 42.4 in 2000 to 49 in 2020. In 2019, 89% of the region spoke only English at home, with 11.9% of the region's population speaking another language. Spanish was the most common second-language for both counties.

### *Table 1: Regional Demographic Data*

| | 2020 | | | 2010 | | | 2000 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Accomack | Northampton | Region | Accomack | Northampton | Region | Accomack | Northampton | Region |
| Population | 33,413 | 12,282 | 45,695 | 33,164 | 12,369 | 45,533 | 38,305 | 13,093 | 51,398 |
| Median Age | 45.9 | 49 | n/a | 44.7 | 47.8 | n/a | 39.4 | 42.4 | n/a |
| Median Household Income | $46,073 | $47,227 | n/a | $41,372 | $35,760 | n/a | $30,250 | $28,276 | n/a |
| Poverty | 6,141 | 2,079 | 8,220 | 5,258 | 2,311 | 7,569 | 6,788 | 2,633 | 9,421 |
| % In Poverty | 18.4% | 17.3% | 18.9% | 15.9% | 18.7% | 17.0% | 18.0% | 20.1% | 18.5% |
| Disability | 4545 | 1811 | 6356 | 4408 | n/a | n/a | n/a | n/a | n/a |
| % Disabled | 14.0% | 15.6% | 14.0% | 13.3% | n/a | n/a | n/a | n/a | n/a |

Sources: U.S. Census 2020, 2010, 2000; American Community Survey Five-Year Estimates 2019

Approximately 14% of residents in both counties identified having some sort of disability in 2020. That compares to about 12% nationally, and 12% for Virginia as a whole. There are a range of disabilities reflected in this statistic, and those disabilities can affect everything from a person's ability to receive and process information about hazards and actions to take to protect themselves and their property in the event of a hazard, to their physical ability to carry out such actions. The disability demographic does not include individuals living in group settings, such as nursing homes.

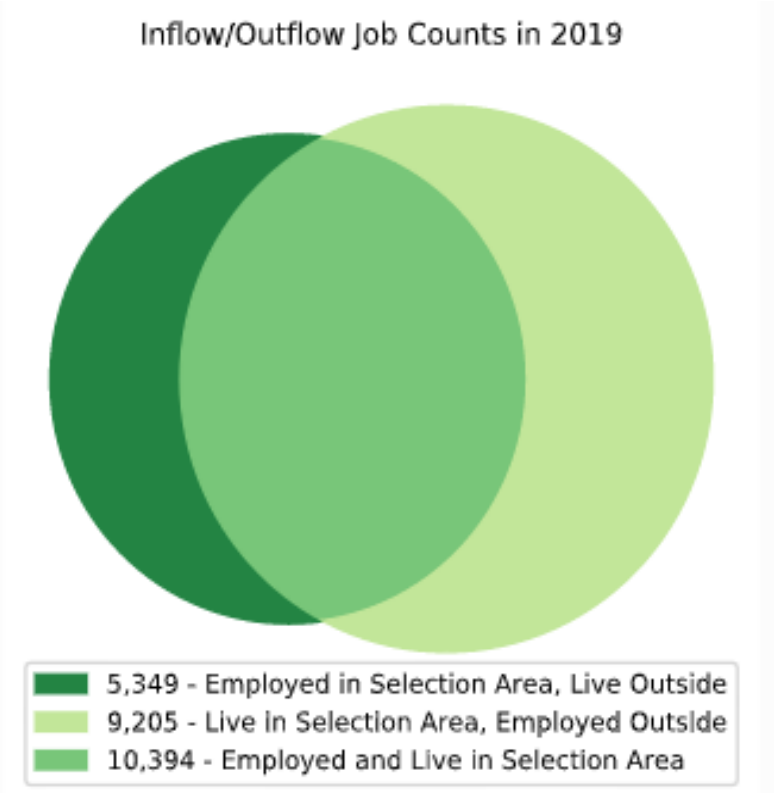
Poverty can be another factor that limits an individual's ability to receive or respond to information about hazards. For example, many hurricane preparedness campaigns presuppose availability of $50-$100 required to assemble the basic items recommended for an emergency kit for a family of two to four. Moreover, families struggling with food security are not likely to stash three days' worth of food when day-to-day meals are uncertain. The rate of poverty throughout the region has remained relatively the same since 2000, with 18.9% of residents in the region under the poverty threshold in 2020. Northampton County has seen a slight decrease of those under the poverty threshold by approximately 3%. Compared to the United States poverty average of 13.4% and Virginia at 10.6%, both counties and the region overall have higher rates of poverty.

## WORK FORCE

Employment patterns are important to examine for two reasons. They can help to identify concentrations of people for hazard information dissemination or hazard rescue and evacuation. They can also identify where disruptions in employment and income might occur in the aftermath of a disaster.

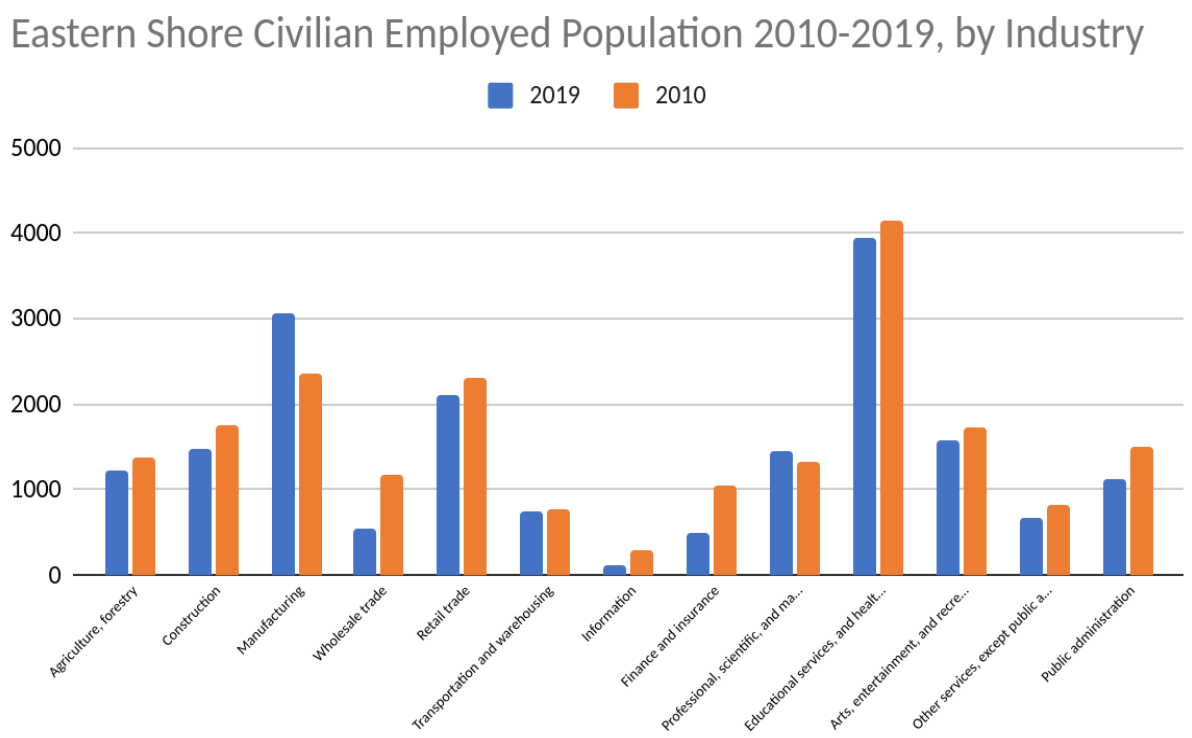
The size of the workforce in the two-county region has declined by approximately 0.4% from 2010 to 2019 according to estimates from the U.S. Census Bureau's American Community Survey. Two primary contributors to the dwindling workforce include the shrinking population and the population as a whole aging out of the workforce. On the whole, there is a net outflow of jobs, meaning the workforce is larger than the number of jobs available (Figure 3).

***Figure 3: Inflow/Outflow Job Counts in 2019***




Source: U.S. Census Bureau. 2019. OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/.

***Figure 4: Civilian Employed Population 2010-2019 (US Census 2010, ACS 2019)***




The category of educational and health care services dominates the work in which regional employees are engaged, followed by manufacturing, retail trade, and the employment grouping of arts, entertainment, recreation, and food services (Figure 4).

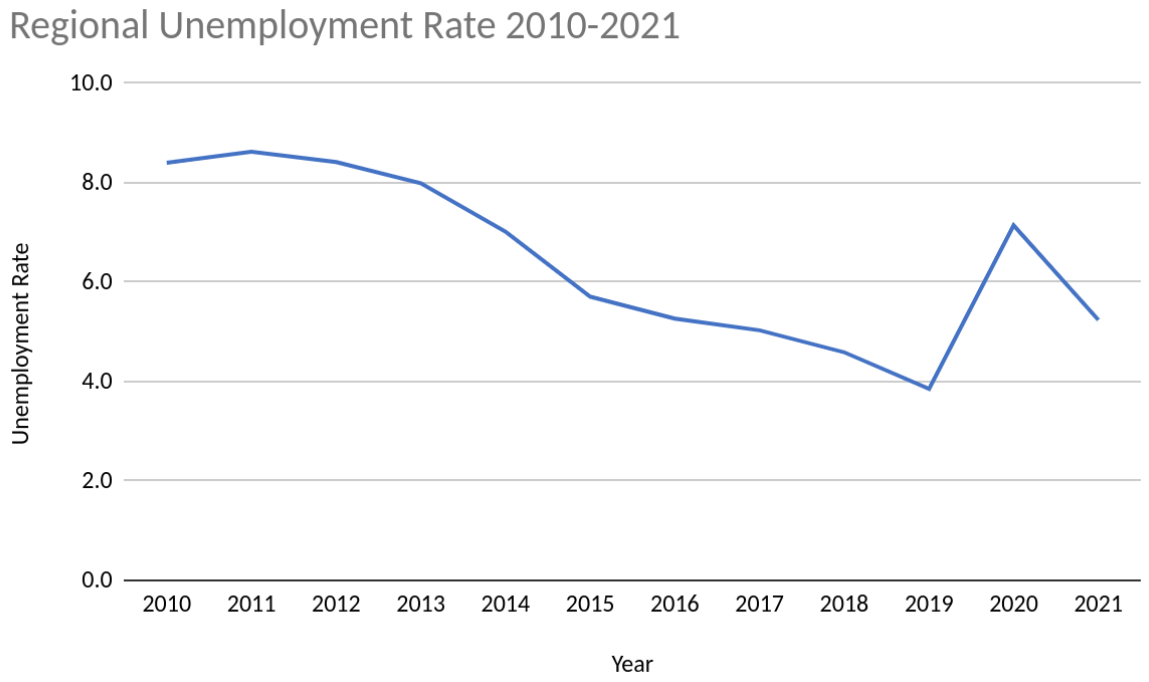
***Table 2: Regional Local Workforce Industry***

| Civilian Employed Population | | | | | |
|---|---|---|---|---|---|
| **Industry** | **2019** | | **2010*** | | **Regional Change** |
| | Count | Percent | Count | Percent | Percent Change |
| Agriculture, forestry, fishing/hunting, or mining | 1,215 | 6.5% | 1,367 | 6.4% | -1.2% |
| Construction | 1,476 | 8.0% | 1,756 | 9.0% | -1.8% |
| Manufacturing | 3,062 | 16.5% | 2,366 | 11.5% | 3.3% |
| Wholesale trade | 558 | 3.0% | 1,172 | 6.1% | -5.8% |
| Retail trade | 2,119 | 11.4% | 2,302 | 11.2% | -0.9% |
| Transportation and warehousing, and utilities | 748 | 4.2% | 770 | 3.7% | -0.3% |
| Information | 124 | 0.7% | 300 | 1.5% | -6.5% |
| Finance, insurance, real estate, and rentals | 502 | 2.7% | 1,047 | 5.1% | -5.8% |
| Professional, scientific, waste management | 1,446 | 7.9% | 1,323 | 6.4% | 1.0% |
| Educational, health care, social services | 3,960 | 20.1% | 4,149 | 20.2% | -0.5% |
| Arts, entertainment, recreation, food | 1,571 | 3.6% | 1,720 | 8.4% | -1.0% |
| Public Administration | 1,117 | 6.0% | 1,494 | 7.3% | -2.8% |
| Other | 674 | 3.6% | 819 | 4.0% | -2.0% |
| TOTAL CIVILIAN EMPLOYED POPULATION | 18,572 | - | 20,585 | - | -1.1% |

Source: ACS, 2019, *U.S. Census 2010

Because many of the major employment categories are tied to seasons, such as agriculture and tourism, there are observable seasonal employment patterns which are easily observed unemployment rates, as shown in Figure 5 below.

***Figure 5: Regional Average Unemployment Rate, Not Seasonally Adjusted, 2010-2021 (BLS Unemployment Statistics)***




There is also a migrant labor workforce that appears seasonally for agricultural work, typically under H-2A work visas. That workforce was once estimated to be near 13,000 (*Virginia Pilot*, 2006), but is now believed to hover closer to 1,000 or more (*New York Times*, 2020).

In addition to knowing the type of work in which people are engaged, it is helpful to examine commuting patterns at a regional level to ascertain the scales of hazards that may create large-scale unemployment based on where people work. Figure 6 shows the most common work locations of Eastern Shore residents. Outside of the two-county region, the City of Virginia Beach and Fairfax County are the top two places outside of the region where residents work. Only about half of the approximate 16,000 workers in the region are employed in one of the two counties. Approximately 5,000 of the region's workers commute at least 25 miles or more to work in the southwest direction (Figure 7). While there is no way to know how many telecommute, or how frequently, it is safe to assume that many cross the Chesapeake Bay Bridge Tunnel (CBBT). A hazard that disrupts travel on the CBBT could be economically challenging for the region.

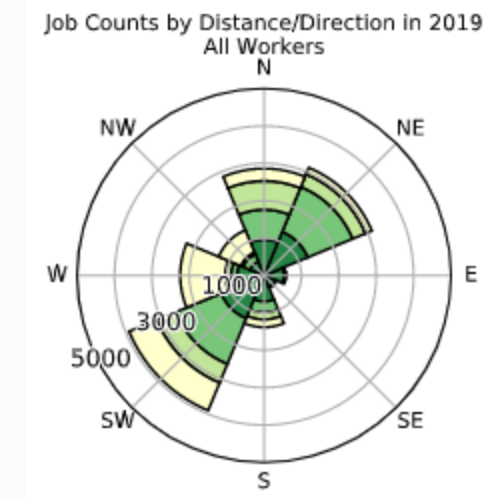
### *Figure 6: Job Counts by County: Where Eastern Shore Residents are Employed*

**Jobs Counts by Counties Where Workers are Employed - All Jobs**

| | 2019 Count | 2019 Share |
|---|---|---|
| All Counties | 19,599 | 100.0% |
| Accomack County, VA | 7,641 | 39.0% |
| Northampton County, VA | 2,753 | 14.0% |
| Virginia Beach city, VA | 619 | 3.2% |
| Fairfax County, VA | 547 | 2.8% |
| Worcester County, MD | 495 | 2.5% |
| Wicomico County, MD | 464 | 2.4% |
| Norfolk city, VA | 462 | 2.4% |
| Chesapeake city, VA | 423 | 2.2% |
| Newport News city, VA | 368 | 1.9% |
| Henrico County, VA | 342 | 1.7% |
| All Other Locations | 5,485 | 28.0% |

Source: U.S. Census Bureau. 2019. OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/

### *Figure 7: Distance and Direction for Eastern Shore Residents' Commute to Work*




**Jobs by Distance - Work Census Block to Home Census Block**

| | 2019 Count | 2019 Share |
|---|---|---|
| Total All Jobs | 15,743 | 100.0% |
| Less than 10 miles | 6,171 | 39.2% |
| 10 to 24 miles | 4,125 | 26.2% |
| 25 to 50 miles | 2,081 | 13.2% |
| Greater than 50 miles | 3,366 | 21.4% |

Source: U.S. Census Bureau. 2019 OnTheMap Application. Longitudinal-Employer Household Dynamics Program. http://onthemap.ces.census.gov/

## BUSINESSES

Business data provides basic information used in projecting potential capital, rent, and income losses for businesses, as well as lost wages for employees. An inventory of businesses can also serve as an indicator of community recovery resources. Finally, business data can help to prioritize restoration of utility and infrastructure functions following a high-intensity hazard.

The uniqueness of the Eastern Shore is not limited to its geography. Its business profile is anchored in traditional land and sea-based pursuits of commercial seafood and agriculture, but boosts high technology as well, with the NASA Wallops Complex, including the Virginia Space and Mid-Atlantic Regional Spaceport at Wallops Island, and related industries and employers supplying another component of the area's economy. Tourism is also a driving component of the economy on the Eastern Shore. Chincoteague Island, with its proximity to the Chincoteague National Wildlife Refuge and Assateague Island National Seashore, combined with the herd of wild ponies auctioned every July following the annual Pony Swim, has the largest share of the tourism market. Other towns in the region, such as Tangier, Cape Charles, Onancock, and Wachapreague, have found their followings as well.

Even the more traditional sectors have incorporated high technology, with aquaculture becoming an increasingly important and reliable means of seafood production, GPS systems that ensure straight lines in crop fields, and complete computerization of the poultry industry with everything from metered watering and feeding of chicks, to the separation of chicken parts on the processing line. All of these improvements, while improving production, also boost the potential capital losses from disasters.

According to County Business Patterns, the number of business establishments in the region has declined by 127 from 2009 to 2019 (Table 3). The number of people employed in those establishments has decreased during that time period as well, by 564 individuals. In 2019, 20.9% of all the establishments in the region belonged to the Retail Trade industry, which was the most prominent industry in both 2009 and 2019. Retail Trade was followed by Accommodation and Food Services at 13.3% and Construction at 9.8%. Other Services (except Public Administration) accounted for 12.7% of the region's industry in 2019.

### *Table 3: Region Business Types*

| Industry Code Description | Total Establishments | | | |
|---|---|---|---|---|
| | 2019 | | 2009 | |
| | Count | Percent | Count | Percent |
| Agriculture, Forestry, Fishing, and Hunting | 13 | 1.3% | 9 | 0.8% |
| Utilities | 5 | 0.5% | - | - |
| Construction | 101 | 9.8% | 138 | 11.9% |
| Manufacturing | 30 | 2.9% | 25 | 2.2% |
| Wholesale Trade | 36 | 3.5% | 46 | 4.0% |
| Retail Trade | 215 | 20.9% | 246 | 21.3% |
| Transportation and Warehousing | 16 | 1.6% | 27 | 2.3% |
| Finance and Insurance | 49 | 4.8% | 52 | 4.5% |
| Information | 18 | 1.8% | 18 | 1.6% |
| Real Estate and Rental and Leasing | 59 | 5.7% | 50 | 4.3% |
| Professional, Scientific, and Technical Services | 67 | 6.5% | 92 | 8.0% |
| Administrative, Support, and Waste Management | 36 | 3.5% | 35 | 3.0% |
| Education Services | 6 | 0.6% | - | - |
| Health Care and Social Assistance | 85 | 8.3% | 109 | 9.4% |
| Arts, Entertainment, and Recreation | 21 | 2.0% | 25 | 2.2% |
| Accommodation and Food Services | 137 | 13.3% | 140 | 12.1% |
| Other Services (Except Public Administration) | 131 | 12.7% | 144 | 12.5% |
| **Total, All Establishments** | 1,029 | - | 1,156 | - |
| **Total Employees** | 12,070 | 26.4% | 12,635 | 27.7%* |

Source: American Community Survey 5-Year Estimates 2009, 2019

*Calculated using the 2010 U.S. Census Population and ACS 2009 Industry Data

## CULTURAL RESOURCES

Long before the first European colonists arrived on the land now known as the Eastern Shore of Virginia, the Accawmacke, part of the larger Powhatan confederacy, lived there subsisting on diets based around food availability in five culturally defined seasons. European colonists arriving on the Eastern Shore were some of the earliest in North America. The courthouse records in Northampton County, the oldest continuous courthouse records in the Country dating back to 1632, document not only court proceedings, but many aspects of life throughout the time of recorded history of the Shore. The courthouse records in Accomack County date to 1663. In Northampton County, records are stored in a climate-controlled room to protect them from deterioration. Accomack County does not have this protection for their records.

The Virginia Department of Cultural Resources catalogs known historic sites. Some of that information is shared widely through public designations such as historic road markers, historic districts, and properties on the national register of historic places. Other sites are examined as a part of environmental clearance processes, and because they may be private properties, the sharing of information about those sites is more sensitive.

Working closely with the Virginia Coastal Zone Management Program (VCZMP), the Accomack-Northampton Planning District Commission was able to interview residents of the Eastern Shore and document their accounts of coastal changes over the last several decades and more recent years. These can be accessed on the VCZMP Coastal Gems website (www.coastalgems.org) in the “Coastal Land” data category.

# BUILT INFRASTRUCTURE

Housing units, community facilities, and transportation are all important factors when considering hazard resiliency. They provide the social services necessary during hazardous scenarios, safe cover for those wanting to stay, and a way to leave for those seeking safer conditions.

## HOUSING UNITS

Knowledge of a community's housing base contributes to hazard and vulnerability analysis by quantifying the exposure. According to the U.S. Census Bureau, the Region's housing stock has grown by 2,979 units from 2000 to 2020, with almost all of that occurring between 2000 and 2010 (Table 4).

### *Table 4: Housing in the Region*

| | **2020** | **2020** | | **2010** | **2000** |
|---|---|---|---|---|---|
| | **Region** | Accomack | Northampton | **Region** | **Region** |
| **Total Housing Units** | 29,076 | 21,703 | 7,373 | 28,303 | 26,097 |
| Occupied | 19,759 | 14,302 | 5,457 | 19,121 | 20,620 |
| *%* | *68%* | *66%* | *74%* | *67.6%* | *79%* |
| Vacant | 9,317 | 7,401 | 1,916 | 9,182 | 5,377 |
| *%* | *32%* | *34%* | *26%* | *32.4%* | *21%* |
| | | | | | |
| | **2019**** | **2019**** | | **2010** | **2000** |
| | **Region** | Accomack | Northampton | **Region** | **Region** |
| **Owner-Occupied** | 12,333 | 8,977 | 3,356 | 13,516 | 14,131 |
| *%* | *62.4%** | *62.8%** | *61.5%** | *70.7%** | *68.5%** |
| **Renter-Occupied** | 6,253 | 4,461 | 1,792 | 5,605 | 5,489 |
| *%* | *31.6%** | *31.2%** | *32.8%** | *29.3%** | *26.6%** |
| | | | | | |
| | **2019**** | | **2010** | | **2000** |
| | Accomack | Northampton | Accomack | Northampton | Accomack | Northampton |
| **Median Housing Value** | $171,800 | $176,800 | $149,800 | $199,600 | $79,300 | $78,700 |

Source: U.S. Census 2000, 2010, 2020; **American Community Survey 2019

*Percentage calculated using ACS 2019 owner/renter-occupied data and U.S. Census 2020 total occupied units

The region has been experiencing an increase of renter-occupied units and a decrease of owner-occupied units over the past two decades. The amount of occupied housing units has decreased by 11% since 2000, paralleling the 11% increase of vacant units. This is likely due to an influx of individuals purchasing second homes near popular tourist destinations on the Eastern Shore, such as Cape Charles in Northampton County and Chincoteague in Accomack County. The unit is considered vacant if it is not the owner's primary residence. Vacant structures often lack year-round maintenance, therefore increasing the potential for loose, hazardous debris during high-wind events. According to American Community Survey five-year estimates, the median housing value in 2019 was relatively similar in both counties and has increased roughly $100k since 2000. This amount is likely to increase even more due to a recent surge in the housing market. According to the Eastern Shore Association of REALTORS® Home Sales Report, the median sales price in the region was $243,000 in the first quarter of 2021, up 35% from the previous year. Northampton County saw a 54% increase in median sales prices, while Accomack County observed a 29% spike (ESAR 2021-Q1 Housing Market Report).

## TRANSPORTATION

Transportation availability before a disaster is a major determinant of the ability of individuals to remove themselves from harm's way and to get aid and support into an area following a hazardous event.

### AUTOMOBILE

The primary form of transportation for most Eastern Shore residents is a personal automobile. Approximately 90% of households have at least one automobile available for use (Table 5). Rates of automobile availability have stayed relatively stable from 2000-2019, with three or more automobiles available growing the most in the 19-year period.

***Table 5: Vehicles Available per Household in the Region***

| Vehicles Available | 2019** | | | 2010 | 2000 |
|---|---|---|---|---|---|
| | **Region** | Accomack | Northampton | **Region** | **Region** |
| None | 1,771 | 1,222 | 549 | 1,850 | 2,119 |
| *%* | *9%** | *8.5%** | *10.1%** | *9.7%* | *10.3%* |
| One | 5,870 | 4,142 | 1,728 | 6,283 | 7,558 |
| *%* | *29.7%** | *29%** | *31.7%** | *32.9%* | *36.7%* |
| Two | 6,678 | 4,916 | 1,762 | 7,357 | 7,584 |
| *%* | *33.8%** | *34.4%** | *32.3%** | *38.5%* | *36.8%* |
| Three or more | 4,267 | 3,158 | 1,109 | 3,683 | 3,359 |
| *%* | *21.6%** | *22.1%** | *20.3%** | *19.3%* | *16.3%* |

Source: U.S. Census 2000, 2010, 2020; **American Community Survey 2019

*Percentage calculated using ACS 2019 vehicles available data and U.S. Census 2020 total occupied units

The roadway system consists of 464 miles of public highways. U.S. Route 13 is a four-lane divided highway that runs down the peninsula's spine and is the primary north-south route. It serves as the region's designated hurricane evacuation route. This evacuation route is northbound only due to the fact that the 17.6-mile-long Chesapeake Bay Bridge Tunnel (CBBT), which connects the Eastern Shore peninsula to the Hampton Roads area, is not acceptable for use in the event of a hurricane or other hazard evacuation and is frequently forced to restrict travel due to high winds as well as other hazardous conditions. Further attesting to its importance in the highway system, Route 13 is also part of the Department of Defense Strategic Highway Network (STRAHNET), the Federal Highway Administration (FHWA) National Highway System, and is designated by the Virginia Department of Transportation (VDOT) as a Corridor of Regional Significance.

Tourists and residents alike rely on two major bridges and two causeways, including the CBBT, the Chincoteague Causeway and Draw Bridge, and, to a lesser extent in regional context, the Saxis Causeway. The CBBT opened to traffic in 1965 as a two-lane facility, which was later expanded into two lanes in each direction in 1999 – except where traffic merges into a single lane in both directions while passing through the two tunnels. Capacity plays a factor in the CBBT not being a designated evacuation route; however, as previously mentioned, wind restrictions stand as the primary cause. These restrictions operate on six different levels: (CBBT: Travel and Weather).

- Level 1: Wind speeds of 40 mph – Restricts campers, trailers, anything being towed, exterior cargo, etc.
- Level 2: Wind speeds of 47 mph – Restricts motorcycles, empty tractor trailers, moving vans, school buses, etc.
- Level 3: Wind speeds of 55 mph – The only vehicles allowed to cross are cars and pick-up trucks without exterior cargo, mini vans, SUVs, tractor trailers without trailers, empty flatbed trailers, commercial buses, and heavily-laden tractor trailers and tankers.

- Level 4: Wind speeds of 60 mph – Only cars, pick-up trucks, SUVs, and mini vans are allowed to cross at a maximum speed of 45 mph.
- Level 5: Wind speeds of 65 mph – Only cars without exterior cargo at 45 mph can cross.
- Level 6: Unforeseen weather conditions or other safety concerns – Closed to all traffic.

Furthermore, the CBBT faces the risk of closure as a result of other hazardous conditions, such as vessels and large trucks striking the facility. In the late 1960's and early 70's, three ship accidents forced extensive closures. In December of 1967, a coal barge struck the bridge's roadbed, prompting a two-week closure. Just over two years later, the CBBT shut down for 42 days after the Yancey, a Navy attack cargo ship, rammed into the bridge while dragging anchor in a gale. Two more years later, the facility faced another two-week closure when a runaway barge shattered a section of the bridge (Washington Post, 1984). In more recent years, the bridge-tunnel was shut down on more than one occasion after a tractor trailer drove off the side of the bridge and plunged into the Chesapeake Bay. In 2018, an oversized work truck struck the ceiling of a tunnel, leading to a 17-hour closure and traffic nightmare. Lastly, a three-vehicle head-on crash inside one tunnel caused northbound and southbound lanes to close for just over one hour in the summer of 2021.

The Chincoteague Causeway and Draw Bridge, part of Virginia State Route 175, is the only route to and from Chincoteague Island. It has been subject to closure from several different storms and has been forced to close on multiple occasions, primarily due to flooding and extreme high tides; however, car crashes have also forced lengthy closures. In May of 2021, the Causeway was forced to close for nearly 7 hours as a result of a fatal head-on collision. What is likely a result of COVID-19, a recent increase in tourism and travel to more remote destinations, such as Chincoteague, has again sparked conversations regarding the safety of the Causeway leading to the resort island. The small bridge allowing vehicular traffic across the Assateague channel connects Chincoteague to Assateague Island, home of the famous wild ponies as well as the Chincoteague National Wildlife Refuge and Assateague Island National Seashore; thus, it is vital to the economy for the Town of Chincoteague in addition to Accomack County and the region as a whole. The Saxis Causeway is also the only route to and from the Town of Saxis. Although it is less exposed to open water than the Chincoteague Causeway, it has closed at least twice since 2000 as a result of flooding from storms. Another major causeway and bridge that is not as well known, though also extremely important to the region's economy, is the Wallops Island Causeway leading to NASA's only owned and operated launch range, the Wallops Flight Facility (WFF), as well as the Mid-Atlantic Spaceport and Navy Combat Systems Center. The WFF is at the core of an industry that supports over 5,800 jobs and impacts the U.S. economy by an estimated $829.3 million (NASA Wallops Flight Facility).

### PASSENGER TRANSIT

STAR Transit provides public transit service for approximately 86,000 (Accomack Northampton Transportation District Commission (ANTDC) Minutes) passengers annually; however, an evident decrease in ridership was prompted by the COVID-19 pandemic in early 2020. Operations typically span from roughly 6:00 AM to 6:00 PM Monday through Friday and extend from the Town of Cape Charles in Northampton County up to the Town of Chincoteague in Accomack County with a transfer point connecting northern and southern routes in the Town of Onley. Passengers are responsible for a $0.50 ride fare and an additional charge for on-demand services and deviations from routes. STAR Transit would generally be available to assist in the event of an evacuation prior to an approaching hazard, though services would cease upon the arrival of dangerous conditions. Shore Ride, the Eastern Shore's only currently available ride sharing service, is also available for residents and visitors; nonetheless, this private service lacks the capacity needed for evacuations or high-demand service.

### RAIL

Prior to 2018, Bay Coast Railroad operated 68 miles of track running along the elevated central spine of the Eastern Shore, paralleling U.S. Route 13 for approximately 41 miles. In 2018, however, 49.1 miles of the line, extending from

the Town of Hallwood south to the Town of Cape Charles, was abandoned under the approval of the Surface Transportation Board (STB). Subsequently, this portion of the corridor has been preserved via railbanking, a method approved by the National Trails Act. Operated by Delmarva Central Railroad as of 2018, the line north of Hallwood remains active, often serving NASA and the Wallops Flight Facility in Northern Accomack County. The remaining 49.1-mile stretch of rail has been sold and is currently being removed from the corridor in preparation for construction and development of the prospective Eastern Shore of Virginia Rail Trail. Provided funds are awarded or allocated for construction and other costs, the Eastern Shore Rail Trail would supply opportunities for economic development throughout the region in addition to providing safe access to outdoor recreation and exercise, towns up and down the Eastern Shore, local services, businesses, schools, churches, and more. The overall improvement of health for residents on the Eastern Shore is anticipated subsequent of trail development. Additionally, long-term maintenance of the trail is likely to encourage continuous maintenance of nearby drainage ditches, which could, in-turn, potentially alleviate impacts that often result from storm water flooding along portions of U.S. Route 13.

### AVIATION

Although the closest scheduled air passenger services are located in Salisbury, MD to the north of the region and Norfolk, VA to the south, a number of other airports are located on the Eastern Shore. Most of these are small, private general aviation airports with turf runways. Airports open to the public with paved runways include the Accomack County Airport and the Tangier Island Airport. Additionally, the privately owned Campbell Field's two turf runways are located in Northampton County and open to the public.

The Accomack County Airport is located 0.7 mile east of the Town of Melfa and is accessible by vehicle from U.S. Route 13 through the Accomack County Industrial Park. According to the Accomack County Website, the public airport is home to 25 based aircraft and two businesses that lease space from the Airport in addition to the 5,000 x 100-foot asphalt runway, automated weather observation, open lobby, pilot lounge, conference room, weather and flight briefing room, and a terminal area with a modern terminal building, self-serve and 100LL fuel service, Jet-A-Fuel services, 18 T-hangars and T-hangar taxiway, a partial parallel taxiway, wireless internet access, an aircraft parking apron, and an automobile parking lot. Navigational aids include runway lights, rotating beacon, lighted windsock, an automated weather observation system (AWOS), localizer approach, and GPS. Current planned and ongoing projects for the Accomack County Airport include runway rehabilitation, apron expansion, and obstruction removal.

The public Tangier Island Airport has a 2,426 x 75-foot asphalt runway with AWOS and no lights for navigation aid. Tie-downs are available, but there are no hangars or fuel sales. Although there is no terminal building, there are restrooms available for use in an on-site trailer (Personal communications, Renee Tyler, Town Manager (former), April 1, 2016; confirmed January 19, 2022, AIR NAV).

Wallops Flight Facility (WFF) is a secure facility owned and operated by NASA. Landings there are for businesses with the federal government at NASA or related facilities and by permission only. A control tower operates 10 hours daily, Monday through Friday. Wallops boasts two crosswind runways, both exceeding 8,000 x 150 feet. Both have precision approach path indicators (PAPI), high intensity runway edge lights, runway end identifier lights (REILS), rotating beacon, AWOS, and GPS approaches. A third 4,808 x 150-foot concrete/asphalt runway intersects the other two runways and has the same navigational features as well as Jet A fuel availability (www.aopa.org). While Wallops is not open to the general public, its governmental ownership, large runways, and hangar space make it an ideal location for receiving cargo planes and supplies in the aftermath of a disaster. Airport officials have made space available in the past to Coast Guard officials for storing boats and other assets when hurricanes have threatened the Coast Guard Station on Chincoteague (Personal communications, Ed Sudendorf, WFF Airport Manager, April 8, 2016).

## COMMERCIAL AREAS

Commercial areas can be assets in times of disasters, but can also be areas of high economic vulnerability due to the higher investment, relative to residential areas. This is especially true in waterfront areas on the Eastern Shore. Large commercial parking areas can be useful for emergency response – some designated as points of distribution following disasters. Additional parking areas could be designated points of distribution as well, should the usual points be unavailable or unusable.

Many of the commercial areas are clustered in the region's nineteen incorporated towns, ten of which are along the Route 13 corridor and six waterfront communities. Other non-incorporated places dot the landscape, where churches, post offices, and remaining commercial enterprises hint at their once-bustling pasts. These unincorporated areas are well-known to the region's residents and include Atlantic, New Church, Willis Wharf, Quinby, Oyster, Pungoteague, Mappsville, and Tasley, to name a few.

## REGIONAL SERVICES AND FACILITIES

Regional facilities are required to support the services and functions on a regional level, whether by government alone or in cooperation with other public and private entities. These facilities enhance the overall quality of life for the area and its citizens. It is important to note the facilities that are available in the event of a hazard, and to make an inventory of facilities that could be affected by a hazard. Regional facilities include such assets as public safety offices, public water and sewer systems, regional parks, and recreational facilities.

### PUBLIC SAFETY

Accomack County, Northampton County, the Town of Chincoteague, and Wallops Island all have departments of public safety with lead responsibility for coordination of public safety and emergency planning and response in conjunction with the numerous public safety entities across the two-county region. They also may open emergency operations centers that are activated at different levels contingent upon the seriousness of the situation and in accord with the Emergency Operations Plan (EOP) of each entity. Available EOP's can be accessed through the following links:

- Accomack County
- Northampton County
- Town of Chincoteague
- Wallops Island

#### LAW ENFORCEMENT

According to the FBI's Crime Data Explorer, there are an estimated 163 police officers for the region employed by Accomack County Sheriff's Department, Northampton County Sheriff's Department, Cape Charles, Chincoteague, Eastville, Exmore, Onancock, Onley, and Parksley Police Departments; however, this number is not entirely inclusive of the region. Though the number of police officers not included is low, the following agencies and departments were not reported to the Uniform Crime Reporting (UCR) Program or included in FBI crime data: U.S. Fish and Wildlife, National Park Service, U.S. Navy, U.S. Coast Guard, NASA, State Police, Virginia Marine Resource Officers (VMRC), Game Wardens, Chesapeake Bay Bridge-Tunnel Police, and Eastern Shore Community College Police. In addition, the Bloxom and Hallwood Police Departments each have one full-time police officer not included in the previously stated figure.

Saxis and Tangier Police Departments are currently without any officers. The incorporated towns of Accomac, Belle Haven, Cheriton, Keller, Melfa, Nassawadox, Painter, and Wachapreague do not have their own police force and instead rely on the local Sheriff's Departments and Virginia State Police (VSP) for police protection. Many of these

towns, like Keller and Nassawadox, contract an officer from VSP or their respective County for additional traffic enforcement. The Town of Tangier currently relies on a VMRC officer that lives on the Island. Bloxom, Cape Charles, Chincoteague, Eastville, Exmore, Hallwood, Onancock, Onley, and Parksley all maintain a police force, though the size of the force varies from one to ten or more officers.

The Chincoteague Police Department is the only agency in the region with State Accreditation through the Virginia Law Enforcement Professional Standards Commission (VLEPSC), and the only town agency with a dispatch center. In 2017, Chincoteague's communication officers responded to approximately 6,000 calls, while ten sworn officers made nearly 200 arrests and issued over 1,000 uniform summonses (Chincoteague Police Department). Between July 2020 and September 2021, officers conducted 953 stops (Virginia Data Open Portal).

Accomack County Sheriff's Department in the Town of Accomac and Northampton County Sheriff's Department in Eastville provide general law enforcement services for the two counties. With an estimated total of 75 personnel, Accomack responded to more than 9,600 calls and conducted 1,104 stops/arrests in 2020 (Personal communications, Accomack County Sheriff's Department, July 27, 2021). The department's communication officers monitor exterior security for the Accomack County Jail, a maximum-security jail with an average daily population of 95 inmates, in addition to receiving and dispatching calls. Northampton's Department consists of an estimated 85 employees, 53 of which are employed at the Eastern Shore Regional Jail, a 248-bed facility housing both male and female minimum and maximum offenders. Virginia State Police (VSP) provide traffic enforcement, crash response, drug task force initiatives, drug education, and crime prevention activities from Post 31 in the Town of Melfa. Additionally, they provide disaster response resources following extreme hazards, such as the deadly 2014 tornado that hit Cherrystone Campground. The Eastern Shore of Virginia 9-1-1 Communications Center serves both Accomack and Northampton Counties and receives all 9-1-1 calls. Police calls are transferred to Accomack County Sheriff's Department, Northampton County Sheriff's Department, Chincoteague Police Department, or Virginia State Police. Fire and EMS calls are dispatched directly to the appropriate fire and EMS agency.

No police facilities are located within a Special Flood Hazard Zone (SFHA).

### FIRE, RESCUE, AND EMS

When the alarms are sounded, career employees and hundreds of volunteers at 23 different stations are available to answer the call, from New Church in Northern Accomack County to Cape Charles in Southern Northampton County. Some stations provide a full-range of response – Fire, Rescue, and Emergency Medical Services (EMS) – while others are not fully arrayed. Mutual aid, a system of reciprocal assistance with neighboring departments, is imperative and allows all stations to provide the best coverage and life-saving services. Table 6 below provides a summary the capabilities of all Fire, Rescue, and EMS services on the Shore.

### *Table 6: Regional Fire Company Capabilities*

| Station Number | Agency Name | Fire | Rescue | EMS |
|---|---|---|---|---|
| **1** | New Church Volunteer Fire & Rescue | X | X | |
| **2** | Greenbackville Volunteer Fire Co. | X | X | X |
| **3** | Chincoteague Volunteer Fire Co. | X | X | X |
| **4** | Atlantic Volunteer Fire & Rescue Co. | X | X | |
| **5** | Saxis Volunteer Fire Co. | X | X | X |
| **6** | Bloxom Volunteer Fire Co. | X | X | X |
| **7** | Parksley Volunteer Fire Co. | X | X | X |
| **8** | Tasley Volunteer Fire Co. | X | X | |
| **9** | Onancock Volunteer Fire Department | X | X | X |
| **10** | Melfa Volunteer Fire & Rescue Co. | X | X | X |
| **11** | Wachapreague Volunteer Fire Co. | X | X | |
| **12** | Painter Volunteer Fire Co. | X | X | X |
| **13** | (Exmore) Community Fire Co. | X | X | X |
| **14** | Cheriton Volunteer Fire Co. | X | X | |
| **15** | Cape Charles Volunteer Fire Co. | X | X | |
| **16** | Northampton Volunteer Fire & Rescue | X | X | |
| **17** | Eastville Volunteer Fire Co. | X | X | |
| **19** | Cape Charles Rescue Service | | | X |
| **20** | Oak Hall Rescue | | | X |
| **21** | Tangier Volunteer Fire Co. | X | X | X |
| **25** | NASA WFF Fire (Main Base) | X | X | X |
| **26** | NASA WFF Fire (Wallops Island) | X | X | X |
| **31** | Northampton County EMS | | | X |

Source: Eastern Shore of Virginia 911 Communications Center

When requested, the Virginia Department of Forestry responds to assist in fighting wildfires, bringing its bulldozers equipped with specially designed plows to make a fire line and two pick-up trucks equipped for firefighting.

Through the Eastern Shore Regional Fire Training Facility in Melfa, firefighters can receive training locally. A plan to upgrade and expand the facility to EMT accreditation standards is under review. This would allow EMT trainees to complete the entire process locally.

The majority of the Shore's Fire and EMS stations are located outside of special flood hazard areas (SFHA), with the exceptions of the Tangier, Chincoteague, Saxis, Wachapreague, and NASA WFF (Island) stations. None of the stations in a SFHA are mutual aid to each other. Although Tangier may seem more vulnerable due to its isolated location preventing mutual aid, Chincoteague and Saxis share its vulnerability during major storms. As flooding frequently causes both causeways to become impassable, Chincoteague and Saxis are left isolated without mutual aid as well.

Street flood patterns must be considered for all Fire and EMS stations. For example, using The Nature Conservancy's Coastal Resilience Mapping Tool to look at hypothetical storm scenarios shows that although the Greenbackville Fire Station remains elevated out of the flood zone during a moderate hurricane, the streets surrounding the station

could be covered under 4 to 8 feet of water. In such an instance, pre-storm evacuation of equipment would be needed in order to assist in post-storm recovery operations. A similar concern exists for Wachapeague, where the model shows that every route in and out of town would be inundated, even with a low-intensity hurricane. Chincoteague has plans with Wallops Island to evacuate equipment to the mainland in the face of a major storm.

### WATER SUPPLY

The one thing all residents and businesses of the Eastern Shore have in common is that they rely on ground water for their drinking water – and much of their other water needs. In order to protect the water so many rely upon, both counties have adopted water supply plans and jointly manage a Regional Ground Water Resource Protection and Preservation Plan.

There are four major aquifers present in both counties. In order of the increasing depth below ground surface, the four major aquifers present in both counties are the Columbia (unconfined), and the Upper, Middle, and Lower Yorktown-Eastover (confined) aquifers. Aquifers deeper than the lower Yorktown-Eastover contain brackish and salt water, effectively limiting their use without additional treatment, and are not currently used as a source of drinking water. The entire two-county region, and therefore its aquifers, is located within the Eastern Shore Groundwater Management Area (ESGWMA) as defined by the Virginia Ground Water Management Act of 1992, which requires a permit from the Department of Environmental Quality (DEQ) for any person or entity wishing to withdraw in excess of 300,000 gallons per month from a declared Groundwater Management Area.

The majority of drinking water needs in the region are met through withdrawals from wells screened in the confined Yorktown-Eastover aquifers, while the rest is met through withdrawals from wells screen in the surficial Columbia aquifer. Ground water availability in the Columbia aquifer is characterized by relatively large recharge rates, lower aquifer storage, and a higher susceptibility to contamination; conversely, ground water availability in the Yorktown-Eastover aquifer is characterized by relatively low recharge rates, higher aquifer storage, and a lower susceptibility to contamination.

The Virginia Department of Health (VDH) records 135 public water systems on the Eastern Shore that use groundwater as their source of potable water. These systems include 68 transient non-community water systems (TNCWS), 46 non-transient non-community water systems (NTNCWS), and 21 community water systems (CWS). The TNCWS are principally small commercial systems such as gas stations, restaurants, fast-food services, campgrounds, and small agricultural systems. The NTNCWS are larger and include commercial office buildings, shopping malls, and industrial sites (Personal communications, Britt McMillan, Hydrogeologist Consultant, Eastern Shore Ground Water Committee, January 25, 2022). These systems may also serve vulnerable populations, such as schools, nursing homes, hospitals, and other health care facilities.

CWS provide water to permanent residents and include mobile home parks, subdivisions, and towns. Of the 21 CWS, 7 are municipal water systems serving a total population of 8,716 (U.S. Census 2020) in the towns of Cape Charles, Eastville, and Exmore in Northampton County and Chincoteague, Onancock, Parksley, and Tangier in Accomack County. Other community systems are privately operated and may serve areas such as Captain's Cove in Northern Accomack County with a population of 1,544 (U.S. Census 2020).

Despite the number of public wells, most residential dwellings in both counties are not connected to those public supplies and rely on private, individual wells for well water – many of which are within the SFHA and subject to periodic flooding. Wells permitted for public use are required to be tested regularly and after hazardous events to determine if the water is safe for public use. Thousands of private wells, however, are the responsibility of the owner; therefore, they may not be aware of the need to test or unable to afford the necessary sampling.

## SOLID WASTE DISPOSAL

Solid waste pick-up is determined by each individual town. For a fee, some private providers will provide service to areas outside of towns where the population is sufficiently concentrated to make it economically feasible. In other areas, it is the responsibility of the resident to take their household refuse and recycling to a convenience center for collection. There are 13 convenience centers in the region as well as a transfer station is each county.

## PARKS AND RECREATION

There are several public parks and recreation areas located in the region. In addition to the information provided below, more details can be found in each locality's section, Chapters 10-29.

### BOAT LAUNCHES

Access to both the Chesapeake Bay and the Atlantic Ocean is one of the greatest assets of life on the Eastern Shore. With 36 public launch sites, many with multiple slips, there are endless recreational opportunities afforded by the waters around the peninsula and its creeks.

Unfortunately, these launch sites and other working waterfront infrastructure frequently experience flooding of grounds and dryland facilities, wave damage to docks or difficulty using docks due to recurrent flooding, flood impacts to buildings and equipment, and shoreline erosion with scouring and backwashing of bulkheads as a result of hazardous storms, particularly hurricanes and nor'easters. Snow and ice storms have also caused damage to working waterfront infrastructure, though it is not a significant concern for most facilities.

### NATURE PRESERVES

The Eastern Shore has many ecologically sensitive locations that have been set aside in public and private nature preserves and easements. Many are located along the seaside and bayside coastlines and benefit hazard mitigation through their ability to buffer the effects of coastal flooding and erosion.

The Department of Conservation and Recreation (DCR) manages five Eastern Shore natural preserves totaling almost 2,000 acres. Magothy Bay, 516 acres, and Mutton Hunk, 286 acres, are located on the seaside, while Cape Charles, Savage Neck Dunes, and Parkers Marsh are located on the bayside and encompass 29 acres, 298 acres, and 759 acres, respectively. In addition, The Nature Conservancy (TNC) owns 12 barrier islands and portions of two others that comprise its Virginia Coast reserve and form the longest expanse of coastal wilderness remaining on the eastern seaboard. Through this initiative, TNC protects some 40,000 acres of barrier islands, marshlands, and uplands (The Nature Conservancy).

## DRAINAGE DITCHES

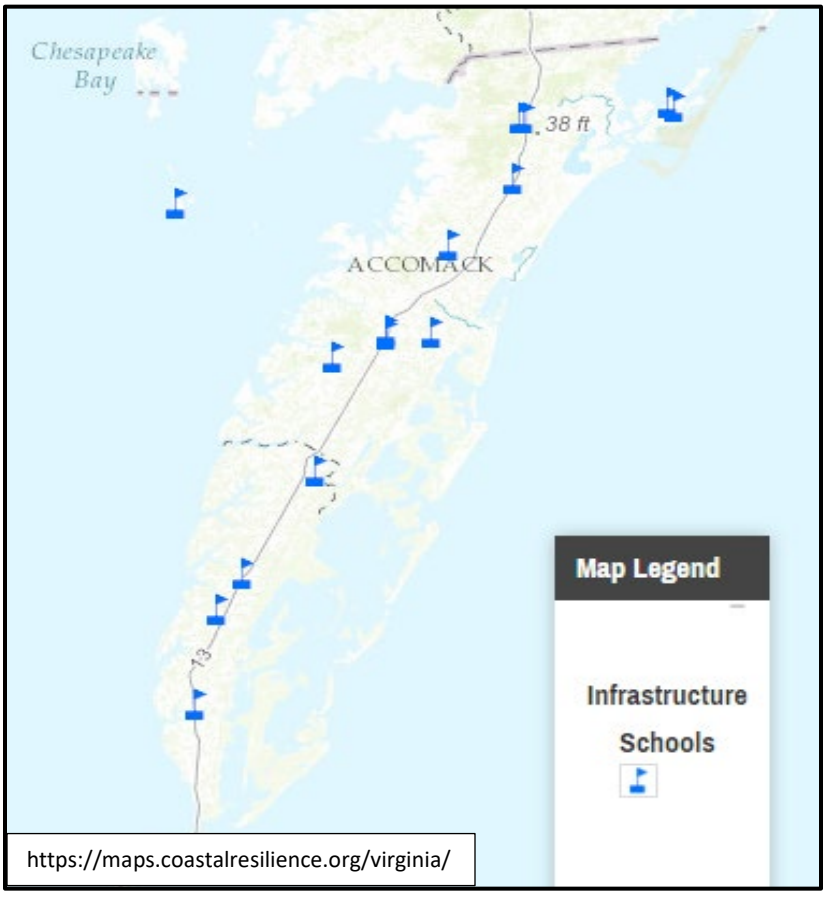
Drainage ditches are a component of infrastructure that often goes unnoticed by the public when functioning properly. There is no single regional body to manage storm water drainage; as a result, maintenance of drainage ditches and storm drains is a shared responsibility among VDOT, Accomack and Northampton Counties, and the incorporated towns.

In Accomack County, there are county funds for drainage projects with prioritization sometimes described as "complaint driven". Once problems are identified, easements must be obtained from property owners. If one property owner is not inclined to cooperate, it can be to the detriment of multiple other residents in the area. Northampton County does not have a county drainage system. Unless there is a connection with some other policy objective, such as the Chesapeake Bay Act, relief is rare.

### SCHOOLS

Northampton and Accomack County together house 15 public schools, as shown in Figure 8. A total of seven elementary schools are located in the region and include Chincoteague, Kegotank, Metompkin, Accawmacke, Pungoteague, Occohannock, and Kiptopeke. There are two middle schools, two high schools, and three combined schools: Arcadia Middle, Arcadia High, Nandua Middle, Nandua High, Northampton Combined (6-12), Chincoteague Combined (6-12), and Tangier Combined (K-12). The entirety of Tangier Combined School is located in the SFHA as well as a portion of Chincoteague Combined School. There are several private schools in the region including Cape Charles Christian School, Shore Christian Academy in Exmore, Central Baptist Academy in Onley, Broadwater Academy in Exmore, and the Montessori Children's House in Franktown. Additionally, both counties operate Head Start programs. Pre-schools and day care programs in the region have dwindled in recent years, causing issues for many parents. Unsurprisingly, this has only gotten worse with the onset of COVID-19 and the protective measures that followed.

***Figure 8: Public Schools in the Region***




High school graduates who wish to continue their education have the option to enroll at the Eastern Shore Community College (ESCC) in the Town of Melfa. Many students pick a focus of study in the fields of Applied Science, Technology, and Nursing, while others may enter dual enrollment programs, transfer programs, or career programs. Other nearby colleges include Norfolk State and Old Dominion University, located across the Chesapeake Bay Bridge Tunnel (CBBT), and University of Maryland Eastern Shore in Princess Anne and Salisbury University – both out of state universities located on the Eastern Shore of Maryland.

If students choose to commute, most would likely head north into Maryland to attend classes; however, those that choose to commute south may face delays in the event of wind restrictions and/or closures to the CBBT. As previously mentioned under "Transportation", the CBBT is at risk from additional hazards as well.

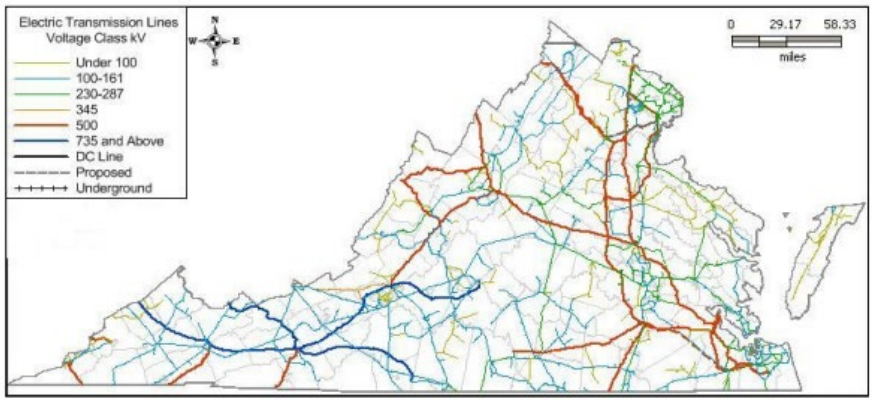
The University of Virginia and William and Mary operate coastal research facilities in the region. Each has approximately a dozen member universities and has been educating students of all ages for nearly 50 years. The University of Virginia's Anheuser-Busch Coastal Research Center in Oyster supports research activities in coastal bays, salt marshes, and barrier islands. Furthermore, the center carries a permanent field staff, laboratories, classrooms, and a dormitory capable of housing up to 30 individuals. William and Mary's Virginia Institute of Marine Science (VIMS) Eastern Shore Laboratory is located in the Town of Wachapreague and supports field research in coastal ecology and aquaculture. This facility has a permanent field staff, dry and saltwater labs, classrooms, and dormitory space capable of housing 42 individuals. Due to the saltwater lab's location in a VE (velocity) flood zone, special flood proofing standards were applied. The building was constructed with an elevated foundation that brings the flood to 9 feet above mean sea level and a waterproof envelop that provides flood protection up to 14 feet above mean sea level.

## ELECTRICAL DISTRIBUTION

Electricity is provided by A&N Electrical Cooperative (ANEC), a member-owned cooperative that serves the entire Eastern Shore. As shown in Figure 9, all Eastern Shore transmission lines are less than 100 kilovolts, except a small stretch extending from the "peaker plant" in the northern part of Accomack County.

The peaker plant is a diesel-powered plant with 350-megawatt capacity that kicks in during periods of peak demand. It is the largest electrical producer on the Shore, but several smaller generators are placed throughout both counties. Old Dominion Electric Cooperative (ODEC) owns six sites in Accomack County, each with two 4-megawatt generators that run on ultra-low sulfur diesel fuel stored on-site. According to the ODEC Website, these generators are utilized in the event of electrical transmission problems. Other locations with generating capacity include Tasley, Bayview, Tangier, and Accomack County.

### *Figure 9: Electrical Transmission Lines in Virginia*



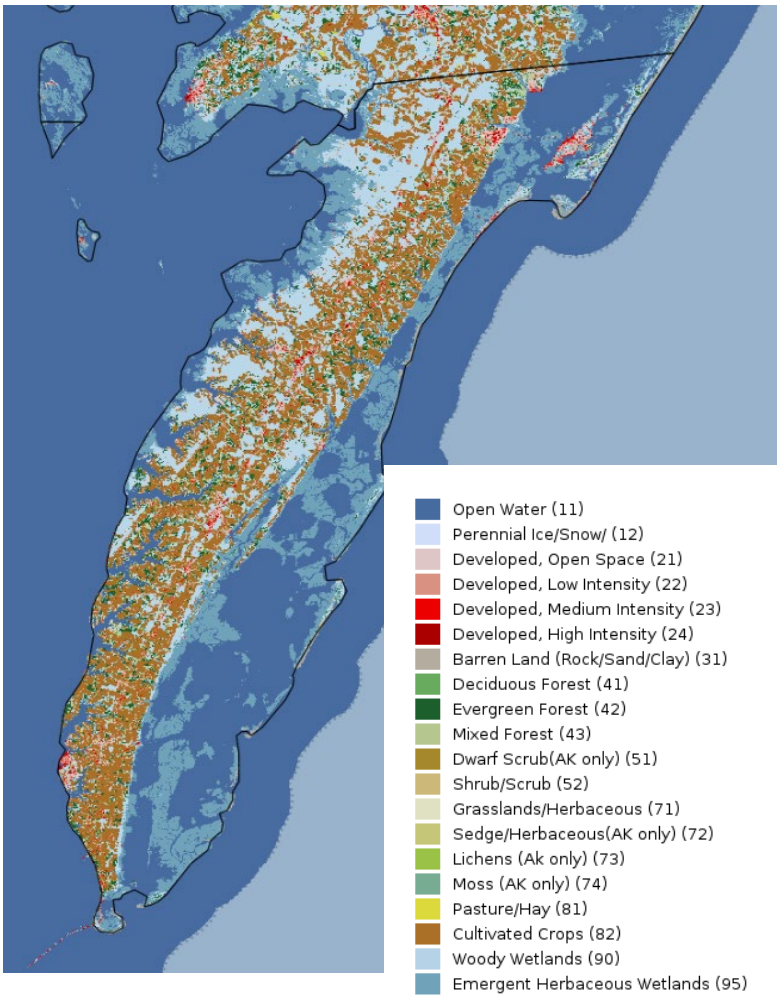

Source: Virginia Department of Mines, Minerals, and Energy. "Energy Assurance Plan", 2012

# NATURAL ENVIRONMENT

Below is a description of the region's natural environment. A detailed discussion and break down of geology and soils on the Eastern Shore of Virginia can be found in Chapter 7: Storm Water.

## LAND COVER

As shown in the Figure 10 land cover map with associated acreage, the two categories of wetlands account for nearly half of the region's land cover. The animal and aquatic habitat, recreational, and economic resources in the region's largely unspoiled wetlands are of the highest order and central to the lives and livelihoods of the Eastern Shore's residents and businesses. Additionally, wetlands provide great coastal resilience benefits and help to blunt the effects of storm surge by absorbing wave energy, storing storm water, and slowing erosion. All developed land uses account for 8.1% of the total land cover on the Eastern Shore.




| Land Cover | Acres | Percent |
|---|---|---|
| Barren Land | 41,812 | 1.89% |
| Cultivated Crops | 472,787 | 21.38% |
| Deciduous Forest | 42,486 | 1.92% |
| Developed, High Intensity | 2,793 | 0.13% |
| Developed, Medium Intensity | 11,301 | 0.51% |
| Developed, Low Intensity | 34,275 | 1.55% |
| Developed, Open Space | 130,562 | 5.91% |
| Emergent Herbaceous Wetland | 587,339 | 26.56% |
| Evergreen Forest | 109,082 | 4.93% |
| Hay/Pasture | 189,483 | 8.57% |
| Herbaceous | 9,049 | 0.41% |
| Mixed Forest | 44,361 | 2.01% |
| Shrub/Scrub | 50,010 | 2.26% |
| Woody Wetland | 485,687 | 21.97% |
| Totals | 2,211,027 | 100.00% |

***Figure 10: Land Use Land Cover Map with Associated Acreage****

Source: National Land Cover Data Set, 2019.
*Associated Acreage 2011 data

### GROUNDWATER

The Eastern Shore of Virginia depends entirely on ground water for potable water supplies as well as most non-potable water supplies, such as irrigation water. Because the peninsula is surrounded by large bodies of saltwater, ground water becomes brackish at relatively shallow depths, generally less than 350 feet, in most areas, and the total available ground water supply is more limited than on the mainland. The Eastern Shore of Virginia is one of six EPA-designated sole source aquifers in the Mid-Atlantic region.

Threats to ground water in the region may be placed into three general categories:

- Saltwater Intrusion
- Hydraulic Head Depression
- Contamination

Intrusion of saltwater into fresh ground water aquifers can be cause by wells that are screened too close to the fresh water/saltwater interface, are too close to the shoreline, and/or pump at an excessive rate. Depression of the hydraulic head occurs around every pumping well, but if pumping rates are too high or if wells are too close to one another, water levels in wells can drop so low that well yields are reduced. In extreme cases the head may fall so low that the aquifer is partially dewatered, potentially resulting in consolidation and a permanent loss of transmissivity – which will also reduce well yield (Eastern Shore of Virginia Ground Water Resource Protection and Preservation Plan, 2013).

The State Water Control Board included the Eastern Shore of Virginia in the consolidated Eastern Virginia Ground Water Management Area after observing declining levels of ground water and interference between wells in two areas of Accomack County as well as contamination in the confined water table aquifer and the possibility of over-withdrawal if not monitored closely. This designation allows the Virginia Department of Environmental Quality (VDEQ) to regulate ground water withdrawals that equal or exceed 300,000 gallons per month.

Recognizing the importance of protecting the vital resource, the Accomack County Board of Supervisors and the Northampton County Board of Supervisors formed the Ground Water Committee in 1990. The Committee includes elected officials, citizens, and local government to help promote understanding, awareness, and responsible management practices and prepare all necessary ground water studies and plans. Ground water withdrawal applications submitted to VDEQ are also reviewed by the Ground Water Committee.

# HAZARD PREPAREDNESS & COMMUNITY CAPABILITIES

## PREVIOUS HAZARD MITIGATION PLANS

The Eastern Shore of Virginia has participated in the hazard mitigation process since 2006. The region's primary risks identified by the Hazard Mitigation Steering Committee include coastal flooding, coastal erosion, high-wind, and storm water flooding. A list of additional risks identified by the Steering Committee can be found in Chapter 3: Risk Assessment. The locality sections of the Plan, Chapters 10-29, also provide details on how specific secondary hazards have, or could potentially, affect their local community and the region as a whole.

## *Table 7: Regional Hazard Mitigation Resources*

| Resource | Participating Agencies & Members | Mission | Updated |
|---|---|---|---|
| Eastern Shore of Virginia Hazard Mitigation Plan | A-NPDC, FEMA, VDEM; Accomack & Northampton Counties, 18 incorporated towns; federal, state, & local representatives of emergency management, health, & disaster preparedness | Provides details on hazard mitigation analysis and preparedness | 2021 |
| Virginia Hurricane Evacuation Guide | VDEM | Provides education & guidance on hurricane preparation and evacuation zones & routes; Provides recovery resources & emergency information | 2019 |
| All Hazards Emergency Preparedness Z-Card | Northampton County | Provides information & resources on preparing for disasters | 2016 |
| All Hazards Preparedness Guide Brochure | Eastern Shore Disaster Preparedness Coalition (ESDPC) | Focuses on All Hazards; Provides information & resources on emergency planning, emergency supply kits, shelters, evacuation routes, & returning safely | 2017 |
| Transportation Infrastructure Inundation Vulnerability Assessment | A-NPDC, VDOT | Identifies various scenarios of inundated roadways from storm surge, tides, and SLR | 2015 |
| Emergency Operations Plan | Accomack County; Northampton County; Town of Chincoteague; Wallops Flight Facility | Provides a comprehensive review of actions for large scale emergencies; Details lines of responsibility, procedures, & response time | AC - 2018<br>NC - 2012<br>CH - 2021 |
| Mutual Aid Agreements & Documents | Accomack County; Northampton County; Town of Chincoteague; Wallops Flight Facility; Accomack-Northampton Firemen's Association; Worcester County, MD | Ensures that resources are available when another EMS company's resources are insufficient for an incident or rendered unable to respond | Varies |
| Eastern Shore Oil and HazMat Response Plan | Departments of Public Safety, Eastern Shore Hazardous Materials Response Team, responding fire departments | Details steps for hazmat emergencies | 2014; Reviewed annually |
| Eastern Shore of Virginia Hazardous Material Commodity Flow | Accomack County Department of Public Safety | Identifies the types of hazardous materials to ensure the proper response to hazmat incidents | 2014 |
| Eastern Shore Health District Pandemic Influenza Plan | VDH, Eastern Shore Health District | Ensures the continuation of public health services while providing for emergency needs during a pandemic | 2009 |
| FEMA Coastal Construction Manual | FEMA | Provides a comprehensive approach to planning, siting, designing, constructing, and maintaining homes located in a coastal environment | 2011 |
| Virginia Coastal Resilience Master Plan | Department of Conservation and Recreation; Local government, state agencies, federal partners, regional PDC's, Secure & Resilient Commonwealth Panel, VIMS, partner universities in Virginia Sea Grant Program, Commonwealth Center for Recurrent Flooding | Builds on 2020 Framework; Addresses concerns of flood exposure, vulnerability, & associated risks tied to socioeconomical, historical, & physical context; A call to action for the Commonwealth | Phase 1 Completed Dec. 2021 |

## *Table 8: Regional Hazard Mitigation Resource Committees & Programs*

| Committees & Programs | Participating Agencies & Members | Mission | Established |
|---|---|---|---|
| Eastern Shore Disaster Preparedness Coalition | Accomack & Northampton Counties; VDEM, FEMA, VDH – Ranges from emergency services organizations, health departments, and schools to church-based disaster relief groups, mayors, and volunteer amateur radio operators | To form local & regional partnerships; Promote regional planning & coordination | 2003 |
| Climate Adaptation Working Group | Lead agency: A-NPDC<br>Local, state, and federal representatives of government, aquaculture, agriculture, and community organizations | To better plan & mitigate risks associated with climate change & SLR; Provide educational outreach & develop planning tools | 2012 |
| Eastern Shore Ground Water Committee | Accomack & Northampton County Board of Supervisors, A-NPDC | To assist local governments and residents in understanding, protecting, and managing ground water resources; Maintain plans & studies; Serve as an educational resource | 1990 |
| Eastern Shore Navigable Waterways Committee | Accomack & Northampton County Board of Supervisors, A-NPDC, USACE | To study & advise respective Boards on condition & status of navigable waterways; List & prioritize navigation needs; Provide possible solutions | 2015 |
| Eastern Shore Health District (ESHD) | Accomack County Health Department, Northampton County Health Department | To prevent illness & disease, protect the environment, & promote optimal health and emergency preparedness | - |
| Eastern Shore Health District Emergency Preparedness & Response Program | State, regional, and local emergency response partners, local health care providers, volunteer groups; CDC, NACCHO | To effectively respond to any emergency impacting public health through preparation, collaboration, education, and rapid intervention | - |
| Eastern Shore Community Emergency Response Team (CERT) Program | Regional and local volunteers; Currently 250 members | To educate the public and distribute emergency preparedness public education materials to citizens and visitors, participate in training exercises, and to assist ESHD and LE to quickly distribute prophylactic medication to the entire region during a public health emergency | 2004 |
| Eastern Shore Medical Reserve Corps (MRC) | Volunteer medical and non-medical health care professionals, trained staff | To respond and assist local emergency responders and public health professionals | 2004 |

# NATIONAL FLOOD INSURANCE PROGRAM & HAZARD MITIGATION GRANT PROGRAM

## NFIP

Table 9 below displays each jurisdiction's participation in the hazard mitigation planning process, the National Flood Insurance Program (NFIP), and the Community Rating System (CRS). Within the region, 18 jurisdictions including both counties have joined the NFIP, with the Town of Cheriton the most recent to join in 2020. Accomack County and the Towns of Chincoteague, Wachapreague, and Cape Charles are the only four jurisdictions in the CRS.

### *Table 9: Program Participation by Jurisdiction*

| Jurisdiction | HMP Participation | NFIP Participation | CRS Participation |
|---|---|---|---|
| Accomack County | 2006 | 06/01/1984 | 10/01/1992 |
| Town of Accomac | 2021 | 08/23/2017 | NO |
| Town of Belle Haven | NO | 02/08/2001 | NO |
| Town of Bloxom | 2011 | 10/16/2012 | NO |
| Town of Chincoteague | 2006 | 03/01/1977 | 10/01/2000 |
| Town of Hallwood | 2011 | 05/01/2000 | NO |
| Town of Keller | 2011 | NO | NO |
| Town of Melfa | 2016 | NO | NO |
| Town of Onancock | 2006 | 12/15/1981 | NO |
| Town of Onley | 2011 | 02/01/2012 | NO |
| Town of Painter | 2021 | NO | NO |
| Town of Parksley | 2011 | 12/22/2008 | NO |
| Town of Saxis | 2006 | 11/17/1982 | NO |
| Town of Tangier | 2006 | 10/15/1982 | NO |
| Town of Wachapreague | 2006 | 09/02/1982 | 10/01/1996 |
| Northampton County | 2006 | 08/11/1976 | NO |
| Town of Cape Charles | 2006 | 02/02/1983 | 05/01/2010 |
| Town of Cheriton | 2016 | 07/08/2020 | NO |
| Town of Eastville | 2011 | 05/08/2007 | NO |
| Town of Exmore | 2011 | 09/04/2008 | NO |
| Town of Nassawadox | 2016 | 05/08/2007 | NO |

Source: FEMA Community Status Book Report, 2021

The Town of Belle Haven is the only jurisdiction that has not yet participated in the hazard mitigation plan; however, they did join the NFIP in 2001 and currently have two active policies in place. Table 10 summarizes each participating locality's active NFIP policies, total losses/claims, total premiums, and the total amount paid as of February 2022. Even though both counties have joined the NFIP, citizens residing in incorporating towns are not eligible to purchase flood insurance under the program unless the town in which they reside has joined. The Towns of Keller, Melfa, and Painter in Accomack County have not joined the NFIP.

### *Table 10: Summary of the Region's NFIP Participation*

| Jurisdiction | NFIP Participant | Active Policies | Total Losses | Total Premium | Total Paid | RL | SRL | Level of NFIP Regulations Required* |
|---|---|---|---|---|---|---|---|---|
| Accomack County | Y | 1,230 | 778 | $923,105 | $9,168,322.97 | - | 1 | 60.3(e) |
| Town of Accomac | Y | 2 | 0 | $1,038 | $0 | - | 0 | 60.3(a) |
| Town of Belle Haven | Y | 2 | 0 | $908 | $0 | - | 0 | 60.3(c) |
| Town of Bloxom | Y | 0 | 1 | $0 | $0 | - | 0 | 60.3(a) |
| Town of Chincoteague | Y | 1,710 | 141 | $1,299,222 | $959,295.19 | - | 2 | 60.3(e) |
| Town of Hallwood | Y | 0 | 1 | $0 | $4,922.75 | - | 0 | 60.3(a) |
| Town of Keller | NO | - | - | - | - | - | 0 | 60.3(a) |
| Town of Melfa | NO | - | - | - | - | - | 0 | 60.3(a) |
| Town of Onancock | Y | 30 | 3 | $18,645 | $16,423.82 | - | 4 | 60.3(c) |
| Town of Onley | Y | 1 | 0 | $415 | $0 | - | 0 | 60.3(a) |
| Town of Painter | NO | - | - | - | - | - | 0 | 60.3(a) |
| Town of Parksley | Y | 2 | 0 | $1,004 | $0 | - | 3 | 60.3(a) |
| Town of Saxis | Y | 38 | 37 | $39,231 | $572,258.50 | - | 0 | 60.3(e) |
| Town of Tangier | Y | 49 | 107 | $50,468 | $1,218,918.29 | - | 2 | 60.3(e) |
| Town of Wachapreague | Y | 72 | 29 | $56,723 | $430,385.37 | - | 2 | 60.3(e) |
| *ACCOMACK TOTAL* | - | *3,136* | *1,097* | *$2,390,759* | *$12,370,526.89* | *92* | *14* | - |
| Northampton County | Y | 222 | 78 | $177,672 | $949,284.61 | - | 0 | 60.3(e) |
| Town of Cape Charles | Y | 170 | 14 | $92,992 | $95,059.05 | - | 0 | 60.3(e) |
| Town of Cheriton | Y | - | - | - | - | - | 0 | 60.3(c) |
| Town of Eastville | Y | - | - | - | - | - | 1 | 60.3(a) |
| Town of Exmore | Y | 6 | 6 | $2,836 | $82,677.52 | - | 0 | 60.3(a) |
| Town of Nassawadox | Y | 2 | 1 | $905 | $4,214.26 | - | 0 | 60.3(a) |
| *NORTHAMPTON TOTAL* | - | *400* | *99* | *$274,405* | *$1,131,235.44* | *11* | *1* | - |
| **REGION TOTAL** | **-** | **3,536** | **1,196** | **$2,665,164** | **$13,501,762.33** | **103** | **15** | **-** |

Source: FEMA NFIP Data Report, 2022

*60.3(a)-FEMA has not defined SFHAs within community; 60.3(c)-FEMA has provided FIRM with BFEs; 60.3(e)-FEMA has provided FIRM showing coastal high-hazard areas

The NFIP tracks a category of high-risk structures called repetitive loss (RL) properties. These properties are defined as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP more than ten days apart, within any rolling 10-year period since 1978[1]. Repetitive loss structures account for approximately 1% of NFIP policies, but 25-35% of flood insurance claims. Throughout the region, 103 repetitive loss properties have seen 304 losses with payments from the NFIP totaling over $5.5 million for both structures and contents (FEMA NFIP Data Report, February 2022). A further classification is for severe repetitive loss (SRL) properties. These properties have incurred four or more separate flood-related claim payments exceeding $5,000 for buildings and contents under flood insurance coverage or cumulative amounts exceeding $20,000, OR for which the total of at least two separate building loss claim payments exceed the market value of the insured property. As of 2022, there are 15 total SRL properties in the region, with all but one located in Accomack County.

[1] Note that FEMA's Flood Mitigation Assistance Program defines repetitive loss differently: A structure that has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the time of each flood event, and at the time of the second incidence the contract has increased cost of compliance coverage. See FEMA Flood Insurance Manual for details. http://www.fema.gov/media-library/assets/documents/115549

## HMGP

The region's participation in the Hazard Mitigation Grant Program (HMGP) dates back to 1999 and the major disaster declaration following Hurricane Floyd. Accomack County received funds for a project to elevate 29 homes, while Northampton County received funds for utility proofing in addition to the elevation of 3 homes.

To date, a total of 24 homes in Northampton County and nearly 100 in Accomack County have been elevated out of the floodplain. No houses have been razed or relocated under the programs. The Accomack-Northampton Planning District Commission (A-NPDC) manages the HMGP for the Eastern Shore and intends to submit an application for another round of funding to elevate a number of additional homes, particularly on Tangier Island.

# HAZARDS PROFILE

The top four hazards identified by the Hazard Mitigation Steering Committee were high wind, coastal erosion, coastal flooding, and storm water flooding. Additionally, the Committee included pandemic as a new hazard for the 2021 Plan, which was also ranked as a high-priority hazard. Medium-priority hazards include well contamination and biological hazards, as well as the three newly identified hazards, storm surge, non-coastal flooding, and road and highway. Substance use and overdose, communications failure, active threat, electrical energy failure, and tornado were all new hazards and ranked as low-priority. Further details can be found in Chapter 3: Risk Assessment.

It is important to note that these are region-wide rankings. Rankings decided upon by each individual locality vary according to the risk assessments performed for that locality. Information on these hazards can be found in each locality's respective chapter.

## HIGH WIND

High-winds on the Eastern Shore of Virginia primarily stem from hurricanes and tropical storms, off-shore low pressure systems like nor'easters, rotating cells in thunderstorms that produce tornadoes and waterspouts, and straight-line winds associated with fast-moving thunderstorms.

Large storms, such as hurricanes and nor'easters, typically affect the entire region; however, localized events often carry regional impacts as well. Damage or destruction to one localized area could impact the economy of the entire Eastern Shore as well as hinder available emergency response resources. When a deadly tornado struck Cherrystone Campground in 2014, units from across the region were called on to respond and were not available to the rest of the region for several hours.

Additional details on historic wind events in the region, the causes of high-winds, regional exposure, and attempts to manage loss, see Chapter 4: High Wind.

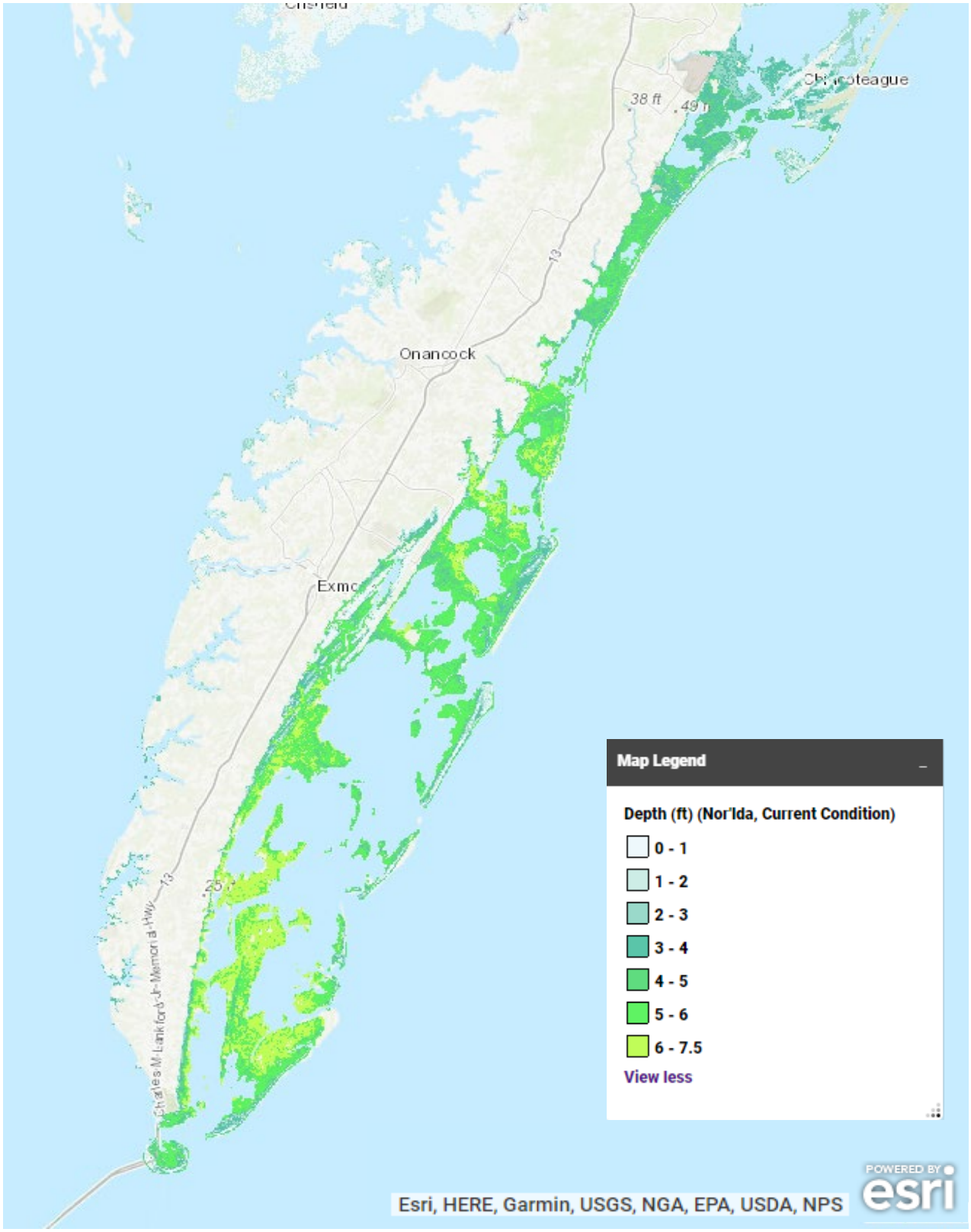
## COASTAL EROSION

All areas of the Eastern Shore are susceptible to coastal erosion, whether from water, wind, or waves. The barrier island ecosystem on the seaside, with its expanses of tidal marshes, mudflats, and lagoons, buffer the mainland from the worst of storm impacts, dissipating wave energy and mitigating floods. Natural low banks and marshes on the bayside are subject to direct wave action erosion from wind, storms, and motorized watercraft. Mitigating erosion of the barrier islands and marshlands surrounding the Eastern Shore is critical to the region's well-being as we know it.

Figures 11, 12, and 13 were created using The Nature Conservancy's (TNC) Coastal Resilience Mapping Tool. Figure 11 demonstrates the storm surge that occurred from Nor'Ida in November of 2009, while Figure 12 shows the potential storm surge from a high-intensity storm, which would be completely devastating for the region as the shoreline continues to experience a great deal of erosion, therefore increasing the region's vulnerability to coastal storms. In fact, as shown in Figure 13, 82% of the Eastern Shore's coastline is currently eroding (TNC Coastal Resilience Mapping Tool, 2021).

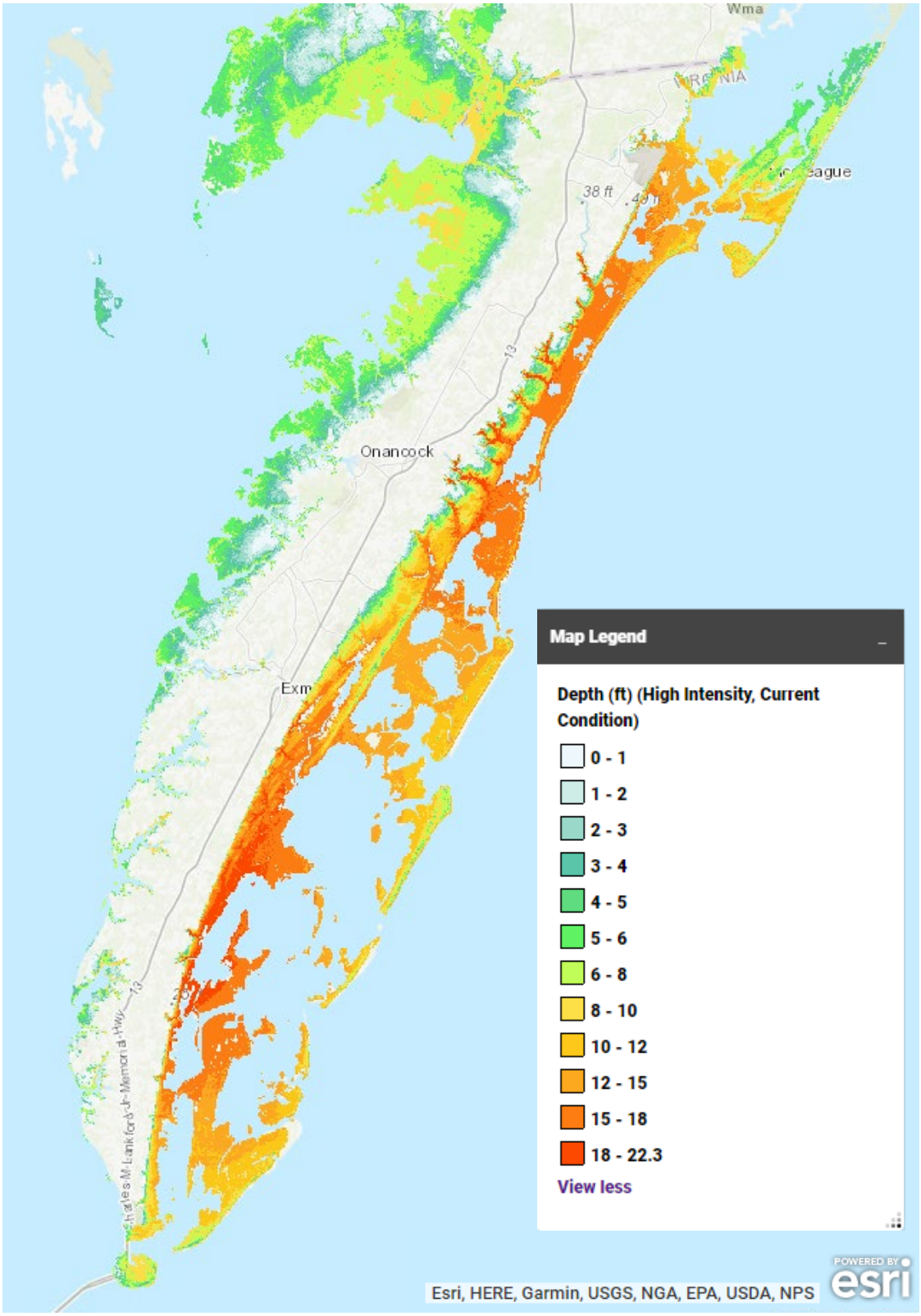
For a more detailed look into the causes of erosion for the bayside and seaside, see Chapter 5: Coastal Erosion.

***Figure 11: Nor'Ida Storm Surge on the Eastern Shore of Virginia***




Source: Coastal Resilience Mapping Tool by The Nature Conservancy, 2021

***Figure 12: High-Intensity Storm Surge***




Source: Coastal Resilience Mapping Tool by The Nature Conservancy, 2021

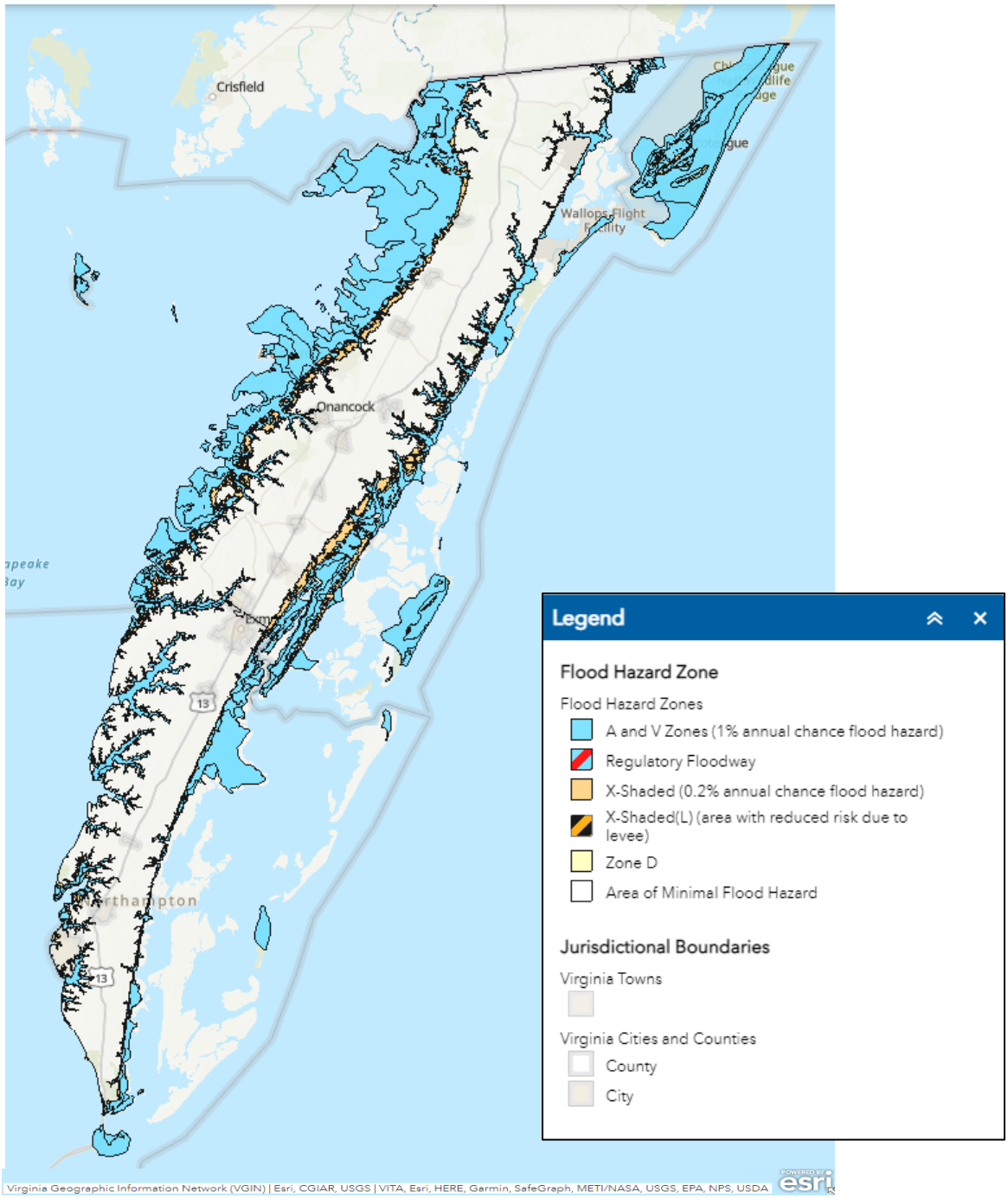
***Figure 13: Eastern Shore of Virginia Coastline Change Rate***


Source: Coastal Resilience Mapping Tool by The Nature Conservancy, 2021

## COASTAL FLOODING

As detailed in Chapter 6: Coastal Flooding, hurricanes and nor'easters have dominated the Eastern Shore severe weather headlines for centuries, bringing with them floods from torrential rainfall, wind-driven high tides, and storm surge. Further information on these storm events can be found in Chapter 1: Hazards on the Shore.

***Figure 14: Eastern Shore of Virginia Flood Hazard Zones***




Source: Virginia Flood Risk Information System (VFRIS), 2021

***Figure 15: Accomack & Northampton County, 2040 Conditions***

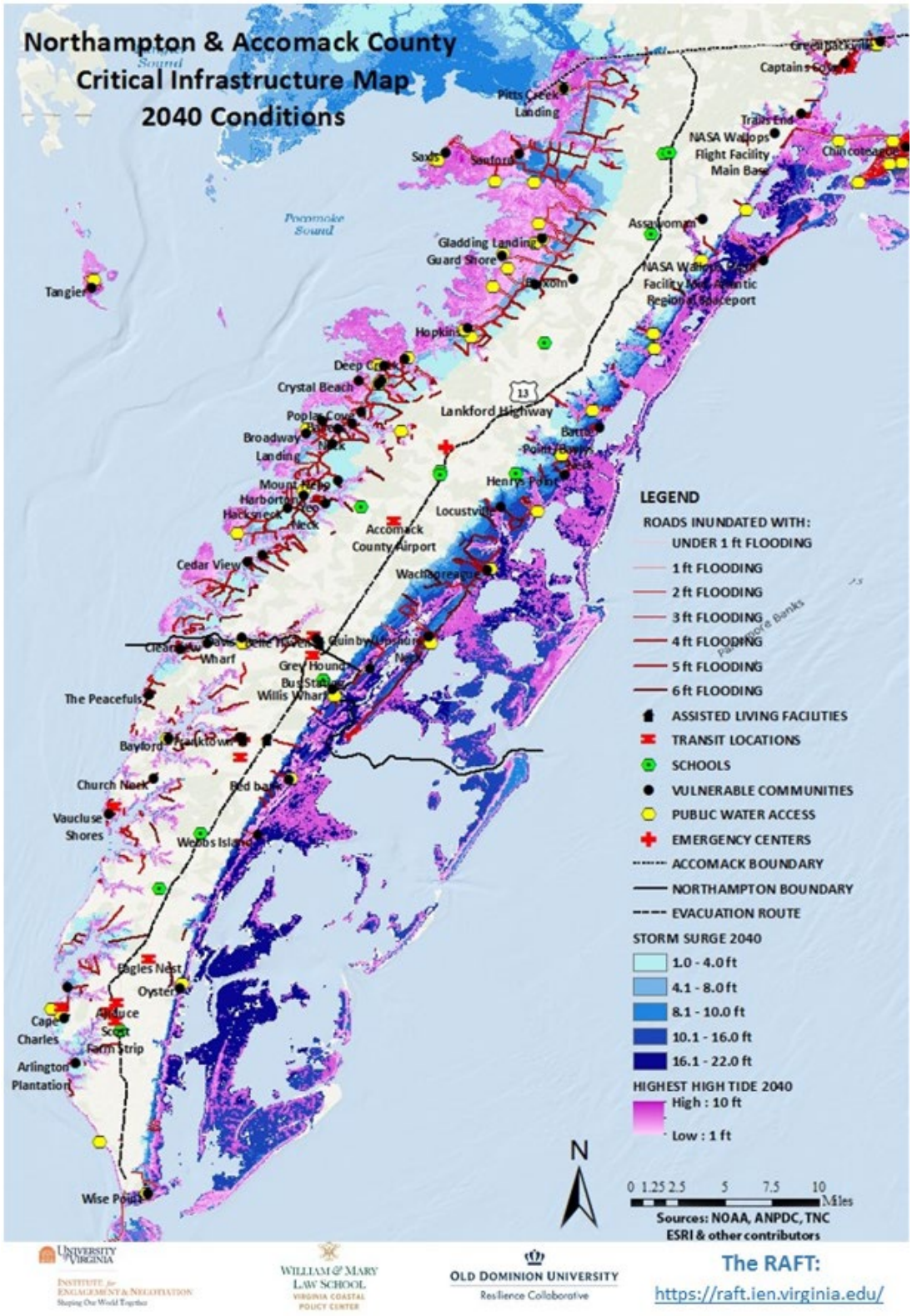
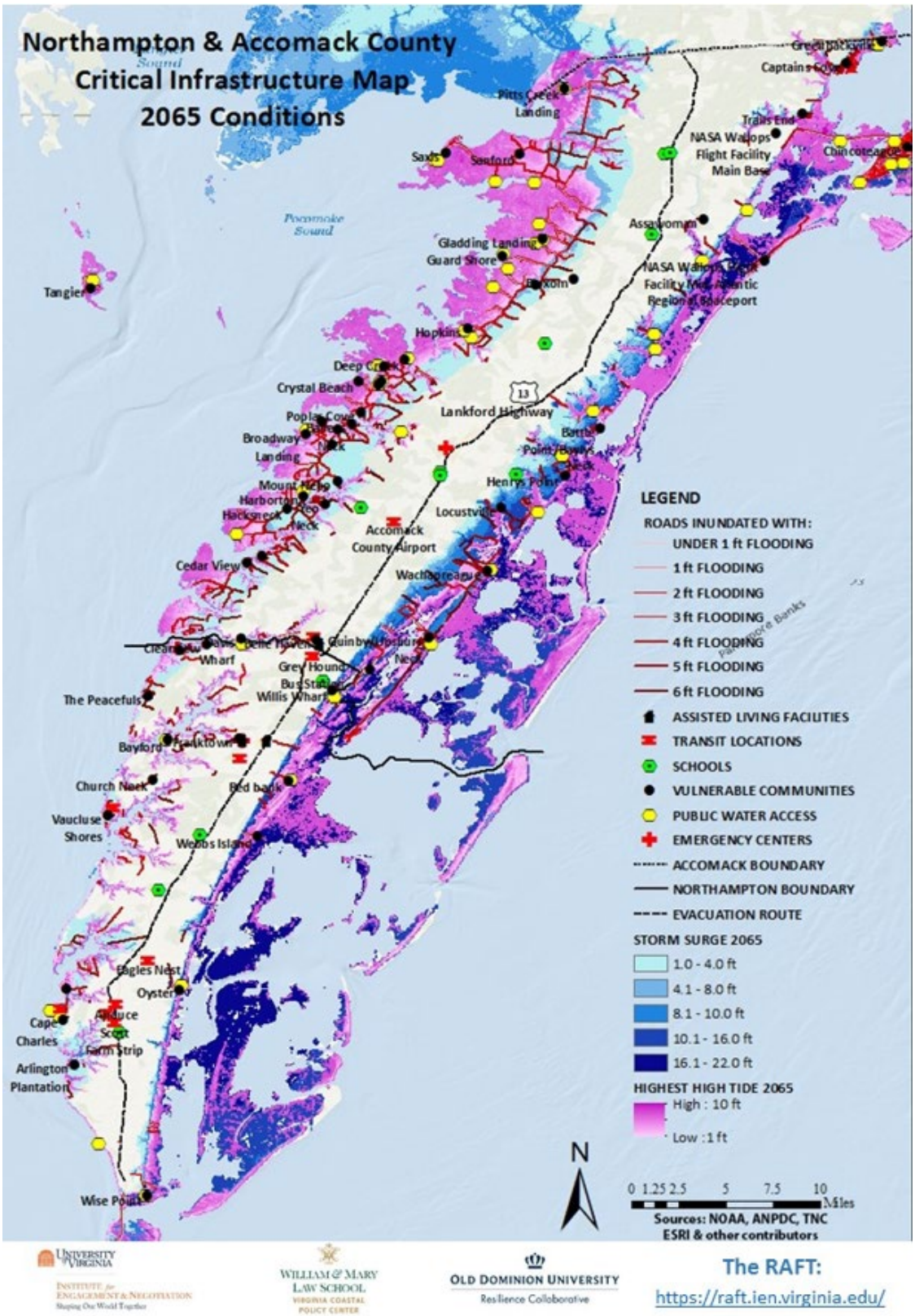


***Figure 16: Accomack & Northampton County, 2065 Conditions***



## STORM WATER FLOODING

Storm water flooding has frequent impacts on the region and can affect the entire region at once, as with a tropical cyclone or nor'easter. This type of flooding can be very localized and intense as well, as with thunderstorms that frequently occur on the Shore, particularly during the warmer months.

Several inland towns reported persistent storm water flooding problems that threaten not only motorist safety, but personal property as well. Many towns have frequent drainage issues that are mostly contributed to the lack of proper maintenance of drainage ditches by the responsible party. This responsibility generally falls on Virginia Department of Transportation, one of the two counties, or the town in which the drainage ditch is located. Drains clogged with debris and the Eastern Shore's flat topography combined with poorly drained soils also play a large contributor to storm water flooding issues.

More information regarding storm water flooding events as well as the cause, exposure, recurring flood locations, and attempts to manage loss can be found in Chapter 7: Storm Water.

## HAZARDS OF LOCAL SIGNIFICANCE

Other hazards identified by the Hazard Mitigation Steering Committee, but ranked below high priority, are included in Table 11 below. More information on identified hazards can be found in Chapter 3: Risk Assessment and each localities respective chapter.

***Table 11: Regionally Identified Hazards***

| Hazard | 2006 | 2011 | 2016 | 2021 |
|---|---|---|---|---|
| *Well Contamination* | Medium | Unranked | Medium | Medium |
| *Ice and Snow* | Medium | Medium | Medium | Unranked |
| *Biological Hazards* | Medium | Unranked | Medium | Medium |
| *Drought* | Medium | Medium | Medium | Unranked |
| *Sewage Spills* | Medium | Medium | Medium | Unranked |
| *Storm Surge** | - | - | - | Medium |
| *Non-Coastal Flooding** | - | - | - | Medium |
| *Road and Highway** | - | - | - | Medium |
| *Wildfire* | Low | Medium | Low | Unranked |
| *Hazardous Material Incidents* | Low | Low | Low | Unranked |
| *Heatwaves* | Low | Low | Low | Unranked |
| *Fish Kills* | Low | Unranked | Low | Unranked |
| *Invasive Environmental Disease* | Low | Unranked | Low | Unranked |
| *Earthquakes* | Low | Unranked | Low | Unranked |
| *Substance Use and Overdose** | - | - | - | Low |
| *Communications Failure** | - | - | - | Low |
| *Active Threat** | - | - | - | Low |
| *Electrical Energy Failure** | - | - | - | Low |
| *Tornadoes** | - | - | - | Low |

*New priority identified for 2021

## CRITICAL FACILITIES

The following table lists the critical facilities and their relative importance to the region.

### *Table 12: Regional Critical Facilities*

| Facility | HMP 2006* | HMP 2011* | HMP 2016 | HMP 2021 | Hazards | People Affected | Loss Potential | Relocation Potential | Retrofit Potential |
|---|---|---|---|---|---|---|---|---|---|
| U.S. Route 13 | - | - | X | X | Wind, Erosion, Storm Water Flooding, Ice/Snow, HazMat | 20,000+ per day | Devastating | No | No |
| Chesapeake Bay Bridge Tunnel | - | - | X | X | Wind, Erosion, Coastal Flooding, Storm Water Flooding, Ice/Snow, HazMat | 9,000+ per day | Devastating | No | No |
| Chincoteague Causeway | - | - | X | X | Wind, Erosion, Coastal Flooding, Storm Water Flooding, Ice/Snow, HazMat | 7,000+ per day | Devastating | No | Yes |
| Saxis Causeway | - | - | X | X | Wind, Erosion, Coastal Flooding, Storm Water Flooding, Ice/Snow | 900+ per day | Major Disruption | No | Yes |
| Wallops Island Causeway/Bridge | - | - | X | X | Wind, Erosion, Coastal Flooding, Ice/Snow, HazMat | 45,000+ | Devastating | No | Yes |
| Emergency Shelters | - | - | X | X | Wind, Ice/Snow, Pandemic, Infectious Disease, Biological Hazards | 45,000+ | Major Disruption | Yes | Yes |
| Emergency Communications | - | - | X | X | Wind, Ice/Snow, Fire | 45,000+ | Devastating | No | Yes |
| U.S. Coast Guard Stations | - | - | X | X | Wind, Erosion, Coastal Flooding, Fire, Infectious Diseases | 45,000+ | Devastating | Yes | Yes |
| 911 Communications Center | - | - | X | X | Wind, Ice/Snow, Fire | 45,000+ | Devastating | Yes | Yes |
| ANEC Power Stations | - | - | X | X | Wind, Ice/Snow, Fire | 45,000+ | Devastating | Yes | Yes |
| Riverside Shore Memorial Hospital | - | - | X | X | Wind, Pandemic, Ice/Snow, Infectious Diseases, Biological Hazards | 45,000+ | Devastating | Yes | Yes |
| Health Centers | - | - | X | X | Wind, Storm Water Flooding, Pandemic, Ice/Snow, Infectious Diseases, Biological Hazards | 45,000+ | Major Disruption | Yes | Yes |
| Fire and EMS Companies | - | - | X | X | Wind, Storm Water Flooding, Pandemic, Infectious Diseases, Biological Hazards | 45,000+ | Devastating | Yes | Yes |
| Public Schools | - | - | X | X | Wind, Coastal Flooding, Storm Water Flooding, Pandemic, Infectious Diseases | 45,000+ | Major Disruption | Yes | Yes |
| Eastern Shore Community College | - | - | X | X | Wind, Pandemic, Ice/Snow, Infectious Diseases, | 45,000+ | Major Disruption | Yes | Yes |
| Regional Fire Training Facility | - | - | X | X | Wind, Pandemic, Snow/Ice, Fire | 45,000+ | Minor Disruption | Yes | Yes |