CHAPTER 13: TOWN OF CHINCOTEAGUE

TOWN PROFILE

Chincoteague is a barrier island that is characterized by a series of ridges that run in a northeast-southwest direction that were formed approximately 2,000 to 4,000 years ago when the island was connected to the south end of Assateague Island. An inlet eventually formed at what is now the north end of the island separating Chincoteague and Assateague. A spit subsequently developed off the south end of Assateague, serving as a barrier that has sheltered Chincoteague Island from erosion. The Accomack County Soil Survey shows that there are nine types of soil on Chincoteague. Several landform types are present including tidal salt marshes, dunes, beaches, intermingled dunes and marshes, coastal upland or floodplain, and fill.

Figure 1: Chincoteague Context and Google Map

The Town's economy has always been closely tied to natural resources and scenic beauty. Prior to the mid to late 1800's, the inhabitants of the island primarily subsisted by farming and raising cattle and sheep. As the demand for oysters grew throughout the 1800's, the seafood industry became the Town's main source of income. The seafood industry expanded to include clams, crabs, and fish during the 1900's and Chincoteague became widely known as a seafood capital (*Town of Chincoteague Comprehensive Plan*, 2020).

When the causeway to the Island was constructed in 1922, the Town's primary economy began to shift from seafood to tourism. Chincoteague is now heavily dependent on the tourist industry. Many visitors come to enjoy Chincoteague National Wildlife Refuge and Assateague Island National Seashore, as well as the small coastal town atmosphere (*Town of Chincoteague Comprehensive Plan*, 2020). In the 1950's, the tourist accommodations included rooming houses and small hotels. The island now includes approximately 20 hotels and motels, four campgrounds, and various vacation/rental homes (Personal communications, Michael Tolbert, Town Manager, April 7, 2021) to support the tourism industry during the 21st century and contributes approximately 80% of Accomack County's tourist-related tax revenue (*Town of Chincoteague Comprehensive Plan*, 2020).

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 factors that relate 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

The Town has experienced a significant population growth over the last several decades as it has become an increasingly popular tourist destination. The first significant population gain occurred leading up to the 1990's and has continued into the 21st Century. The population grew 21% from 3,572 to 4,317 between 1990 and 2000 (U.S. Census, 2000). The 2010 Census indicated that the Town experienced a decrease in population from 2000 to 2010, but the Town has appealed this count and estimates 3,600 as the full year resident population, which will also affect the ACS estimates for subsequent years.

Since the 2000 Census, the Town's population has been on a slight decline, as shown in Table 1; however, there has been significant increases in transient populations with second homes or rental homes during the summer months (Personal communications, Bryan Rush, Director of Emergency Services; Michael Tolbert, Town Manager; and Mark Bowden, Building and Zoning Administrator, April 7, 2021). The population for 2019 according to ACS five-year estimates is likely too low and is more accurate to the 2014 estimates (Personal communications, Town Officials, April 7, 2021). The median age for residents in Chincoteague in 2019 was 56.5 years, 18.4 years above the national median age, indicating an older population with 37.4% over the age of 62. This population may require additional assistance during a hazard. The Town and Police Department are aware of residents that may require assistance in the case an evacuation is ordered for the Town. Table 1 also indicates a growing non-English speaking population, which is important to consider when providing information regarding an emergency.

Chincoteague is a gateway community providing a single point of access to the Chincoteague National Wildlife Refuge and Assateague Island National Seashore in Virginia. Chincoteague National Wildlife Refuge is one of the most visited refuges in the country, with over one million visitors each year. With tourism as the primary industry on the island, the Town experiences a peak population of over 15,000 seasonal residents and tourists during the summer months (*Town of Chincoteague Comprehensive Plan*, 2020). Planning for hazards with regards to such a significant seasonal population change is a challenge that Chincoteague has taken many steps to address. The Town utilized the Delmarva Evacuation Plan and the Virginia Hurricane Evacuation Study to determine evacuation timing during the summer months versus the off-season (Personal communications, Bryan Rush, Director of Emergency Services, April 7, 2021).

Table 1: Chincoteague Demographic Information

	2020	2014**	2013***	2010****	2000*****
Population	3,344	2,933	2,965	3,600 2,941 (US Census)	4,317
Median Age	56.5*	52.1	49.5	52.0	46.1
Disability	477*	156	191	NA	NA
Income					
Median Household Income	$52,848*	$45,430	$38,036	$33,109	$28,514
Poverty Level	9.7%*	11.4%	16.5%	18.9%	NA
Language					
Only English	91.9%*	96.6%	97.0%	93.0%	96.0%
Other	8.1%*	3.4%	3.0%	7.0%	4.0%
Spanish	3.7%*	1.5%	0.4%	4.2%	2.1%
Ind-Euro	2.8%*	2.0%	2.6%	2.8%	0.8%
Asian	0.4%*	0.0%	0.0%	0.0%	0.9%
Other	1.3%*	0.0%	0.0%	0.0%	0.0%

Source: U.S. Census 2020, *ACS, 2014-2019, **Annual Estimates of the Residential Population: 2010-2014, ***ACS, 2009-2013, ****U.S. Census 2010, *****U.S. Census 2000

WORKFORCE

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

Chincoteague shows a great deal of work force surrounding the tourism market in arts, recreation, food, and entertainment. The highest percentage of the Chincoteague workforce is employed in the education and health care industry. A large portion of the population is also employed in professional, scientific, and waste management industries, which reflects upon the location of NASA Wallops Flight Facility (WFF) as well as the Surface Combat Systems Center, both located on Wallops Island and just over 5 miles from Chincoteague Island. There is also a trend of new mobile businesses, primarily restaurants/food trucks, that are increasingly opening along the main commercial strip on Maddox Boulevard. These food trucks are able to evacuate their business, thus are able to bounce back much faster following a storm. Unlike these mobile businesses, many of the restaurants, hotels, and entertainment industries are much more susceptible to flooding and would take longer to recover following a storm.

Table 2: Chincoteague Local Workforce Industry

Civilian Employed Population										
Industry	**2019***		**2014****		**2012****		**2010*****		**2000******	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Agriculture, forestry, fishing/hunting, or mining	14	1.2%	58	4.3%	51	3.7%	72	5.3%	122	5.8%
Construction	39	3.3%	96	7.0%	87	6.3%	62	4.5%	285	13.6%
Manufacturing	133	11.4%	25	1.8%	20	1.5%	64	4.7%	103	4.9%
Wholesale trade	13	1.1%	14	1.0%	16	1.2%	30	2.2%	54	2.6%
Retail trade	139	11.9%	142	10.4%	87	6.3%	56	4.1%	333	15.9%
Transportation and warehousing, and utilities	125	10.7%	19	1.4%	0	0.0%	17	1.2%	56	2.7%
Information	23	2.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Finance, insurance, real estate, and rentals	21	1.8%	84	6.2%	77	5.6%	103	7.6%	116	5.5%
Professional, scientific, waste management	106	9.0%	226	16.6%	201	14.6%	187	13.7%	88	4.2%
Educational, health care, social services	246	21.1%	183	13.4%	296	21.5%	277	20.3%	210	10.0%
Arts, entertainment, recreation, food	162	13.9%	350	25.7%	339	24.6%	251	18.4%	431	20.6%
Public Administration	124	10.6%	99	7.3%	133	9.7%	173	12.7%	163	7.8%
Other	20	1.7%	66	4.8%	69	5.0%	71	5.2%	131	6.3%
TOTAL CIVILIAN EMPLOYED POPULATION	1,165	-	1,362	-	1,376	-	1,363	-	2,092	-

Source: *ACS, 2014-2019, **ACS, 2010-2014, ***U.S. Census 2010, ****U.S. Census 2000

BUSINESSES

Business data provides basic information used in projecting potential economic losses from business and employment disruption, along with wage losses to employees. It can also serve as an indicator of community recovery resources. Finally, it can help to prioritize restoration of utility and infrastructure functions following a high-intensity hazard.

Chincoteague supports a seafood industry that has been a vital component of the Town's economy for generations. The Town also supports a growing aquaculture industry. Both industries are vulnerable to economic losses as a result of coastal flooding. Storm events have historically had adverse impacts on the local seafood industry by damaging facilities and gear as well as damaging oyster and clam beds. There is a significant risk of economic losses to the tourist related businesses if a spring nor'easter caused a functional shut down of access to the beach during the summer tourist season. A late summer hurricane could also cause the tourist season to be shorter than usual and cause functional losses. Although the NASA facility is a large employer and the NASA launches at Wallops can be a tourist attraction, they also can influence tourism and fisheries by forcing beach and waterway closures at the time surrounding scheduled launches (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021).

The majority of businesses on Chincoteague consist of food and accommodation services as well as retail businesses. There are several restaurants, hotels, motels, rental and real estate agencies, souvenir shops, seafood stands, ice cream parlors, coffee shops, and even a large waterpark on the Island. The majority of these businesses are susceptible to coastal flooding and high-winds. The Town has currently issued over 1,000 business licenses and officials stated the total number of establishments is likely too low, particularly the number of food and accommodation establishments (Personal communications, Michael Tolbert, Town Manager, April 7, 2021).

Table 3: Chincoteague Business Establishment Types

Industry Code Description	Total Establishments			
	2019*	2013	2011	2009
Agriculture, Forestry, Fishing, and Hunting	-	-	-	-
Construction	-	11	17	15
Manufacturing	-	1	1	1
Wholesale Trade	-	0	1	3
Retail Trade	31	33	30	31
Transportation and Warehousing	-	1	1	1
Information	-	4	5	4
Finance and Leisure	-	3	3	3
Real Estate and Rental and Leasing	8	12	13	12
Professional, Scientific, and Technical Services	4	4	5	5
Administrative and Support and Waste Management and Remediation Services	4	3	3	1
Educational Services	-	-	-	-
Health Care and Social Assistance	7	7	7	6
Arts, Entertainment, and Recreation	5	4	5	6
Accommodation and Food Services	50	50	44	46
Other Services (Except Public Admin)	-	12	14	15
Total, All Establishments	-	145	149	152
Total Employees	757	707	701	747

Source: *ACS, 2019, Census Zip Code Business Patterns, 2009, 2011, 2013

BUILT INFRASTRUCTURE

§201.6(d)(3) 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 towards safety.

HOUSING UNITS

Though Chincoteague supports a substantial residential population, there is also a large portion of housing available as seasonal rentals for the warmer summer months. Table 4 shows over 65% of the housing units as vacant, which is indicative of the abundance of second homes and rental properties. These properties provide an important economic vitality to the community of Chincoteague and are typically well kept and do not create additional hazards typical of vacant, dilapidated structures. There are four campgrounds and many mobile homes or trailers that are coastal and prone to damages from storms, with 14.3% of occupied housing units being a mobile home or other type of housing (ACS, 2019). There are no campgrounds on Chincoteague that offer sites year-round; however, there are several transient residents that own lots with permanent campers during the months of March-November. These permanent campers and trailers are primarily along the coast and surrounded by pine trees, which could result in substantial damage to property during flooding and high-wind events.

Town officials state that there are five structures currently looking to be demolished, two of these structures being mobile homes (Personal communications, Town Officials, April 7, 2021). Since April, one of these structures has already been demolished and the lot cleared in order to begin new construction. The number of total housing units in 2019 estimated by the American Community Survey is likely too low and should be higher. There are approximately 18-24 new homes on Chincoteague each year (Personal communications, Town Officials, April 7, 2021).

Table 4: Chincoteague Housing

	2019*	2014**	2010***	2000****
Total Housing Units	4,444	4,371	4,517	3,970
Occupied	1,539	1,427	1,417	2,068
Vacant	2,905	2,944	3,100	1,902
Owner-Occupied	1,135	1,160	1,070	1,639
Renter-Occupied	405	267	347	429
Median Housing Value	$235,100	$244,000	NA	NA

Source: *ACS, 2014-2019, **ACS, 2010-2014, ***U.S. Census 2010, ****U.S. Census 2000

TRANSPORTATION

Vehicles available to households is one indicator of a household's ability to evacuate when necessary; however, the high count reflected in Table 5 is closer to 105-110 (Personal communications, Michael Tolbert, Town Manager, April 7, 2021) and is likely due to second homes for which the owner's vehicle is registered to their primary address. For those that do not have access to a vehicle, the Island Trolley provides regular, seasonal transportation around the Island for a fare of only $0.25. In the Town's Emergency Operations Plan, the Trolley would be used to evacuate those who required assistance from a selected point on the Island to Arcadia High School in Oak Hall, as there are no shelters located on the Island (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021). The Island Trolley and busses are often utilized during large spectator events, such as the Pony Swim and the Fireman's Carnival, to transport individuals from parking lots to viewing or event areas. Star Transit's Blue (North) and Silver (North Loop) routes connect the Island to the rest of the Eastern Shore of Virginia and will also assist in the event of an evacuation. Shore Ride and other individual drivers also provide services to residents in the region. Residents who live and work on the island often ride bicycles, walk, or rent/buy mopeds or golf carts.

Table 5: Chincoteague Vehicles Available per Household

Vehicles Available	2019*	2014**	2010***	2000****
None	160	141	112	177
One	576	405	482	721
Two	578	697	809	945
Three or more	225	184	190	225

Source: *ACS, 2014-2019, **ACS, 2010-2014, ***U.S. Census 2010, ****U.S. Census 2000

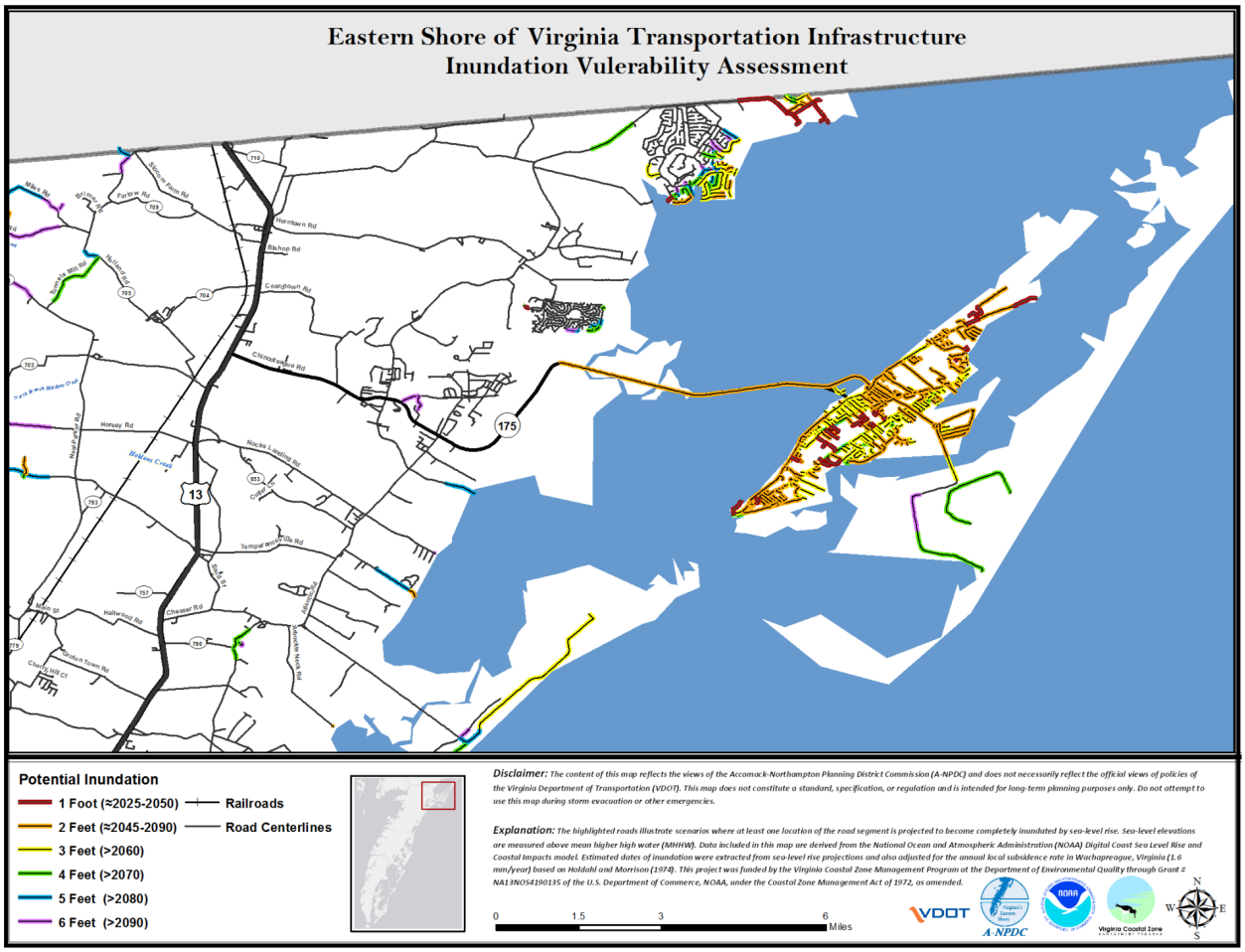
Chincoteague Island is served by paved public streets that include 21 miles of roadway. There is also another 21 miles of private roadway and access easements that are in various states of private owner maintenance. At the time of Hurricane Sandy, the majority of the roads were inundated, some under three feet of water (Personal communications, Bryan Rush, Emergency Management Coordinator, confirmed April 7, 2021). Flood waters were so high on the Town's main commercial strip, Maddox Boulevard, that a vehicle floated into Eel Creek, which is located next to the popular restaurant, AJ's on the Creek.

Originally built in 1922, the causeway was updated with a 3/4-mile-long Chincoteague Bridge built over Black Narrows and Lewis Creek Channel and a 729-foot long, low profile Connector Bridge to Marsh Island that were completed by VDOT in April 2010 at a cost of $68.7 million (*Town of Chincoteague Comprehensive Plan,* 2020). The Town is completely reliant on State Route 175, which includes approximately 5 miles of causeway over tidal marshland in addition to several bridges. Shown in Figure 2 from the *ESVA Transportation Infrastructure Inundation Vulnerability Assessment*, at least part of this causeway is subject to inundation with either 2 feet of sea level rise or with 2 feet of storm water flooding at mean high tide in 2015. This holds true for the majority of the roads on the Island, some of which are subject to flooding with only one foot

of water. In October of 2012, Hurricane Sandy left approximately 3,500 people trapped on the Island, as the causeway, as well as several other roads on the Island, were impassable. Causeway closures of the sort have occurred at least eight more times since Hurricane Sandy and have lasted anywhere from 1-5 hours.

The Chincoteague causeway is now being crossed by visitors and residents more frequently than ever before, as the area has become more and more popular for vacationers and second home buyers, and more residents are finding employment off the island at Wallops Flight Facility as well as other growing industries in the Region. The Town has concerns over the safety of the causeway and has been communicating with VDOT for potential improvements, such as additional signage, shoulders, reflectors, etc. In mid-May of 2021, a fatal vehicle accident closed the causeway for nearly 7 hours as both lanes were impassable. Many residents who live, work, or have children in school on the Island were trapped on either side of the causeway, forcing businesses and schools in the Town to close for the day.

Figure 2: Town of Chincoteague Transportation Infrastructure Inundation Vulnerability



COMMUNITY FACILITIES

Community facilities are facilities required to support the services provided by the Town government or in coordination with other public and private entities. These facilities enhance the overall quality of life for the Town and its citizens. It's important to note what facilities are available in case of a hazard, and it's important to make an inventory of facilities that could be affected by a hazard. Community facilities in Chincoteague include the Chincoteague Police Department, the Chincoteague Volunteer Fire Company, Chincoteague Combined and Chincoteague Elementary Schools, the Town Office, and several recreational entities. The Public Works Department manages the daily operations related to the Town's water, drainage and road systems, parks, and boating facilities.

PUBLIC SAFETY

Fire and emergency services are provided by the Chincoteague Volunteer Fire Company, a combination of paid EMS and volunteer firemen supported by the Town. The Company owns three pumper engines, a rescue truck, a ladder truck and several ambulances that are stored in the fire house (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021). The Fire Company has no shortage of volunteers and the Town has increased EMS personnel in order to reduce support needed from the County, as causeway traffic, delays, or closures can increase response times from Fire and EMS services not located on the Island. The Fire Company's new Fire House, shown in Figure 3, has six bays in the front, two in the back, and was completed in 2019.

Figure 3: The New Chincoteague Volunteer Fire Company Station. Photo by Ashley Mills

The Chincoteague Police Department is the Island's primary law enforcement agency and employs 10+ full-time officers as well as several full-time and part-time dispatchers, bicycle patrol officers, and traffic control officers. Personnel is increased during the summer months with part-time employees to assist with traffic, events, and other ordinances around the Town. Chincoteague Police and other EMS services often work with Federal Law Enforcement Officers at nearby Chincoteague National Wildlife Refuge and Assateague Island National Seashore. Chincoteague is the only accredited police department on the Eastern Shore of Virginia.

There is no shelter located on the Island. When the causeway floods and residents are unable to evacuate, as they were for a short time during Hurricane Sandy in 2012, they must shelter in place. The Chincoteague Volunteer Fire Company, EMS, and Police must be able to provide rescue services throughout the entire Town during storms and must remain on the Island during Town evacuations. Additional emergency vehicles able to tread through high waters are utilized for rescues during hazardous events, such as Hurricane Sandy.

MEDICAL SERVICES

The Chincoteague Community Health Center, run by Eastern Shore Rural Health, provides the primary health services for the Island. There is also the Island Chiropractic Center and two dentist offices serving the Island.

PARKS AND RECREATION

There are a variety of recreational facilities available on the Island. There are a number of boat landings maintained by the Town. The Robert N. Reed Downtown Waterfront Park serves approximately 1,500 visitors annually. The Park also contains 10 boat slips available for rent to transient boats. The Donald J. Leonard Park has over one acre of waterfront land left in its natural state with picnic tables to view the sunset. The Chincoteague Veteran's Memorial Park includes two age-appropriate playgrounds, a basketball court, a tennis court, a baseball field, a hiking/biking trail, a pavilion, grills, restroom facilities, boat ramps, fishing piers, and kayak launches. This area is heavily utilized throughout the year and the docks, ramps, and parking lots frequently flood, just from higher-than-average high tides. Located next to Curtis Merritt Harbor is the Waterman's Park and Chincoteague Island Waterman's Memorial that overlooks the inlet and features a walking pathway, benches, sunset views, and a large cross dedicated to those lost at sea, which can be seen from the water and up close on land. With help from the Town, businesses, and community groups on Chincoteague, funds are steadily being raised to put towards a new park located on Smith and School Streets and is to be named "The Brianna Kindness Park". The Park is expected to feature sensory playground equipment, multi-use sports fields, a pavilion, restroom facilities, an exercise trail, and additional parking.

Several hiking and biking trails exist on the Island. The Island Nature Trail is located between the Elementary School and the Combined School on Hallie Whealton Smith Drive. There is both a paved and unpaved trail available as well as two dog parks, separated by the size of the dogs. A new bike trail was completed in recent years allowing easier and safer access to main points located on and around Maddox Boulevard. The Town is in the process of creating safer multiuse paths around the Island.

The Chincoteague Center, located in the Chincoteague Municipal Complex across from the Town Office and Police Station, is used for special events such as graduations, fundraisers, school functions, weddings, etc. and meets most of the needs of the Island's civic and volunteer organizations. Located just past the Municipal Complex is the North Accomack Little League Complex with three lighted baseball and softball fields, concessions, and bleachers. The non-profit Island Community House hosts and rents out space for small events, meetings, etc. as well.

The Chincoteague Volunteer Fireman's Carnival is located off Main Street and Willow Street and is one of the largest sources of funds for the Volunteer Fire Company. The carnival boasts rides, games, food, bingo, live music, fireworks, and other fun activities that residents and visitors from all over come to attend each year. The carnival is also home to the famous Chincoteague Pony Auction and is the location the ponies are kept after the famous Annual Pony Swim, during health

checks, and any other instances deemed necessary (young foals, safety protocols, etc.). The location of the carnival grounds near the coast and the several large, tall pine trees in the area put the infrastructure at significant risk of damage and the Fire Company, as well as other businesses in the Town, at risk for immense financial losses. During the month of July, the carnival is open every Friday and Saturday night and the last week of the month. There is a high chance of a dangerous thunderstorm to occur while hundreds of visitors are in the carnival grounds with little to no shelter. Volunteers monitor weather and radar and announce closures due to impending storms; however, fast moving storms may still put hundreds of volunteers, visitors, and residents at risk.

CULTURAL RESOURCES

The Museum of Chincoteague Island provides cultural and historical resources and activities for the Island. The Chincoteague Island Library provides recreational, educational, and job research opportunities, as well as free public Wi-Fi. The Captain Timothy Hill House and the Captain Chandler Cemetery are just a couple of significant historical aspects in the Town that could face possible damage from flooding and high-wind events.

WATER SUPPLY AND WASTEWATER

Chincoteague Island residents are dependent on underground wells on the mainland for drinking water. Eight separate well fields, all located on land owned by the Town of Chincoteague or within a perpetual easement located on NASA property, serve the pumping station. There are currently 4 deep wells and 6 shallow wells for public water supply (Personal communications, Town Officials, April 7, 2021), with a total capacity of the working wells of approximately 1.5 million gallons per day (MGD). Depths vary from 63 feet to 256 feet. The GAC plant is located at Pumphouse Turn and is owned and operated by NASA (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021). This filtration system filters the water from the Mainland for the Town. While the danger of contamination is considered minimal, vigilant monitoring activities on land near the wells is critical. In 2017, NASA found toxic chemicals in Chincoteague's wells from the aqueous film-forming foam (AFFF) used to smother fires at Wallops Flight Facility. Although the Town immediately disconnected from the contaminated wells, it is important to test for contaminants regularly and provide water quality reports, which the Town does on an annual basis.

There are approximately 70 miles of Town-owned and maintained water mains on the Island. Pumped water is chlorinated at the well site and then pumped five miles to the Island via transmission lines. Proper maintenance of these transmission lines is vital to the success and safety of the Town. The water reaches the filtration system and then enters a 200,000-gallon elevated storage tank. It is then distributed to the Town's 3,582 water customers (Personal communications, Mike Tolbert, Town Manager, April 7, 2021). The town has considered installing an additional 1,000,000-gallon tank or two high-rise tanks to meet demand (*Town of Chincoteague Comprehensive Plan,* 2020; Personal communications, Town Officials, April 7, 2021).

In the 1980's, the Town updated the length of the transmission line to a larger capacity pipe, while maintaining the smaller pipe for use during peak demand and during maintenance to the newer line. Having two separate pipes capable of bringing fresh water to the Island is a positive step; however, both pipes are at risk to salt water contamination and/or damages which would jeopardize the water for all residents on the Island. Of additional concern is the limited storage capacity of water on the Island, which is about a one-day supply during peak tourism season (*Town of Chincoteague Comprehensive Plan,* 2020; Personal communications, Town Officials, April 7, 2021).

There is no central sewage collection and treatment on the Island. Wastewater is disposed of by discharge directly into seepage pits, cesspools, holding tanks/septic tanks and drain fields, or one of a few new engineered, residential sewer systems. The maintenance of these sewage systems is provided by periodic pumping by private firms (*Town of Chincoteague Comprehensive Plan*, 2020).

The Town has revisited the idea several times of a centralized wastewater treatment system, as health codes require expensive individual lot septic systems that were required to meet advanced technology standards (*Town of Chincoteague Comprehensive Plan*, 2020). There are currently plans for a "Phase 3" of the Hampton Roads Sanitation District (HRSD) project that would allow the Town to connect to a treatment system; however, this would likely not occur for several years.

SOLID WASTE

The Town provides weekly pick up of regular household waste through a private hauling company, a bulk trash service, and the County provides a recycling center. The Town public work trucks are used for this service. So long as the trucks are not damaged during a hazard event, then the Town will be able to serve their own community in the removal of debris. The Chincoteague Convenience Center is located on the Island off Deep Hole Road and is closed on Tuesdays. There are two other County Convenience Centers nearby as well located in the Horntown and Makemie Park areas. The Town typically contracts out for debris removal; however, Town trucks are utilized in the event removal of debris is needed immediately, e.g., debris blocking roadways or causing additional safety hazards.

POWER AND COMMUNICATIONS INFRASTRUCTURE

Power is brought to the Island in large lines suspended by concrete utility poles, then contained in the new bridge infrastructure to Marsh Island where they are submerged below the highly trafficked Chincoteague Channel. These lines were recently reinforced and new footers were installed for the poles. The five miles of lines and inability to access them during extreme flooding is a vulnerability for the Town. During Hurricane Irene, the combination of salt-accumulation and sustained winds in the 60-mph range, caused an island-wide power outage for eight hours. The lines had to be cleaned with fresh water prior to power being restored. Town officials stated that after much needed updates to this infrastructure, salt-accumulation is no longer an issue for the Town (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021). The Town of Chincoteague, as well as all incorporated towns in Accomack and Northampton Counties, are now able to access Virginia Broadband Authority. The Town has several other options for internet and communications as well.

DRAINAGE DITCHES

The Town maintains drainage ditches and storm drains on the Island (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021). Due to the fact that the majority of the development in the Town is within 3-7 feet of sea level, often times water must await lower tides to flow from the drainage ditches on the Island into the surrounding water.

SCHOOLS

Two public schools are located in the Town of Chincoteague: Chincoteague Elementary School and Chincoteague Combined School, which includes grades 6-12.

NATURAL ENVIRONMENT

Many believe that Chincoteague is an ancient barrier island that was formed approximately 4,000 years ago as wind and waves deposited sand parallel to the Eastern Shore mainland (*Town of Chincoteague Comprehensive Plan*, 2020). Due to erosion, the rising sea was able to break through barrier islands and flood the flatlands behind Chincoteague Island. These flats are now the marshes, channels, and bay between the Island and the mainland. Assateague Island joined the north end of Chincoteague Island around 2,000 to 4,000 years ago; however, an inlet formed which separated the two Islands and sand deposits cause a spit to build southward from the Assateague side of the Inlet, eventually forming a "south neck". This neck continues to provide protection to Chincoteague as a barrier island and has become Tom's Cove Hook. "The Hook" on Assateague Island is following a much similar pattern as the one that formed Chincoteague. How these interactions continue to occur will have an impact on Chincoteague's ability to prepare for hazards, especially in relation to coastal erosion and hurricanes.

Above the shoreline, the land is typically flat with elevations on the Island rarely exceeding 10 feet. The upland ridges of the island are composed of well-sorted sand particles, and as a result, are high in strength, low in compressibility, and highly permeable and porous (*Town of Chincoteague Comprehensive Plan*, 2020). This means that as long as these areas are protected from wind and waves, they can bear heavy rainfall and drain water quickly.

LAND USE LAND COVER

Most of Chincoteague Island's shorelines consists of tidal and non-tidal wetlands. There are also artificially stabilized shorelines made up of bulk heading and riprap along the commercial waterfronts and privately owned areas. In many of these places, the shoreline has been built or filled in and many piers extend out into the water. The marshlands surrounding Chincoteague have high value for wildlife and waterfowl and are closely associated with the fish spawning and nursery areas. They also help prevent erosion and help keep the shoreline stable. There is a large area of vacant land seen in the northern parts of Chincoteague, which serves to drain storm water. The Town includes about 37 square miles of total area, only about a quarter of which (9 square miles) is land.

GROUND WATER

Due to a high ground water table and storm water drainage limitations, the Town is susceptible to periodic flooding. The resulting standing water increases the risk of insect borne diseases, such as West Nile and Zika Virus. High ground water and saturated soil conditions increase the risk of downed trees, decrease the functionality of septic systems, and can move pathogens and excess nutrients hundreds of feet much more quickly than under normal conditions. In order to mitigate the risk of insect-borne diseases, the Town sprays for mosquitoes on a daily basis, generally through the months of April through September, but may begin earlier and continue later if the need persists. The Town also contracts a plane to spray for mosquitoes on an as-needed basis; however, this mitigation technique is extremely costly since the Town must purchase the chemicals and insurance (Personal communications, Mike Tolbert, Town Manager; Mark Bowden, Building and Zoning Administrator; and Bryan Rush, Emergency Management Coordinator, April 7, 2021).

HAZARD PREPAREDNESS & COMMUNITY CAPABILITIES

PREVIOUS HAZARD MITIGATION PLANS

§201.6(b)(3), §201.6(c)(3), §201.6(d)(3) Chincoteague has participated in the hazard mitigation planning process since 2006 and has just updated their comprehensive plan in 2020.

Table 6 : Town of Chincoteague Hazard Mitigation Resources

	Ordinances, Plans, & Publications															Resources, Committees			
Authority	Building Code	Chesapeake Bay Act	SWMP	Hazard Mitigation Plan	Comprehensive Plan (updated 2020)	Zoning (updated 2020) &/or Subdivision Ordinance	Storm Water Regulations	Transportation Infrastructure Inundation Vulnerability Report	All Hazards Preparedness Brochure	Emergency Operations Plans	Mutual Aid Agreements/Documents	Neighborhood Emergency Help Plan	Viginia Hurricane Evacuation Guide	Oil & HazMat Response Plan; HazMat Commodity Flow		Ground Water Committee	Navigable Waterways Committee	Climate Adaptation Working Group	ES Disaster Preparedness Coalition
Local	*			*	*	*				*	*								
County			*																
Regional				*				*	*	*	*			*		*	*	*	*
State		*					*						*						
Federal		*																	

NATIONAL FLOOD INSURANCE PROGRAM & HAZARD MITIGATION GRANT PROGRAM

NFIP

§201.6(c)(2)(ii), §201.6(c)(3)(ii), §201.6(d)(3) Chincoteague participates in the Community Rating System (CRS) of the Federal Emergency Management Agency's National Flood Insurance Program (NFIP). The NFIP provides participants protection against catastrophic damage of loss from flooding. Communities participate in the NFIP by adopting and enforcing local ordinances that reduce future flood losses by regulating new construction. These measures include the adoption of floodplain zoning provisions, designed to limit damage to structures in flood hazard areas, and the adoption of special building codes for affected areas. Homeowners, renters, and business owners living in communities that participate in the NFIP are eligible for federally backed flood insurance.

The Community Rating System rewards communities that voluntarily take steps beyond the minimum requirements of the Flood Insurance Program with discounts on flood insurance premiums. Eligible activities fall under one or more of the following categories: flood preparedness; flood damage reduction; mapping and regulations; and public awareness.

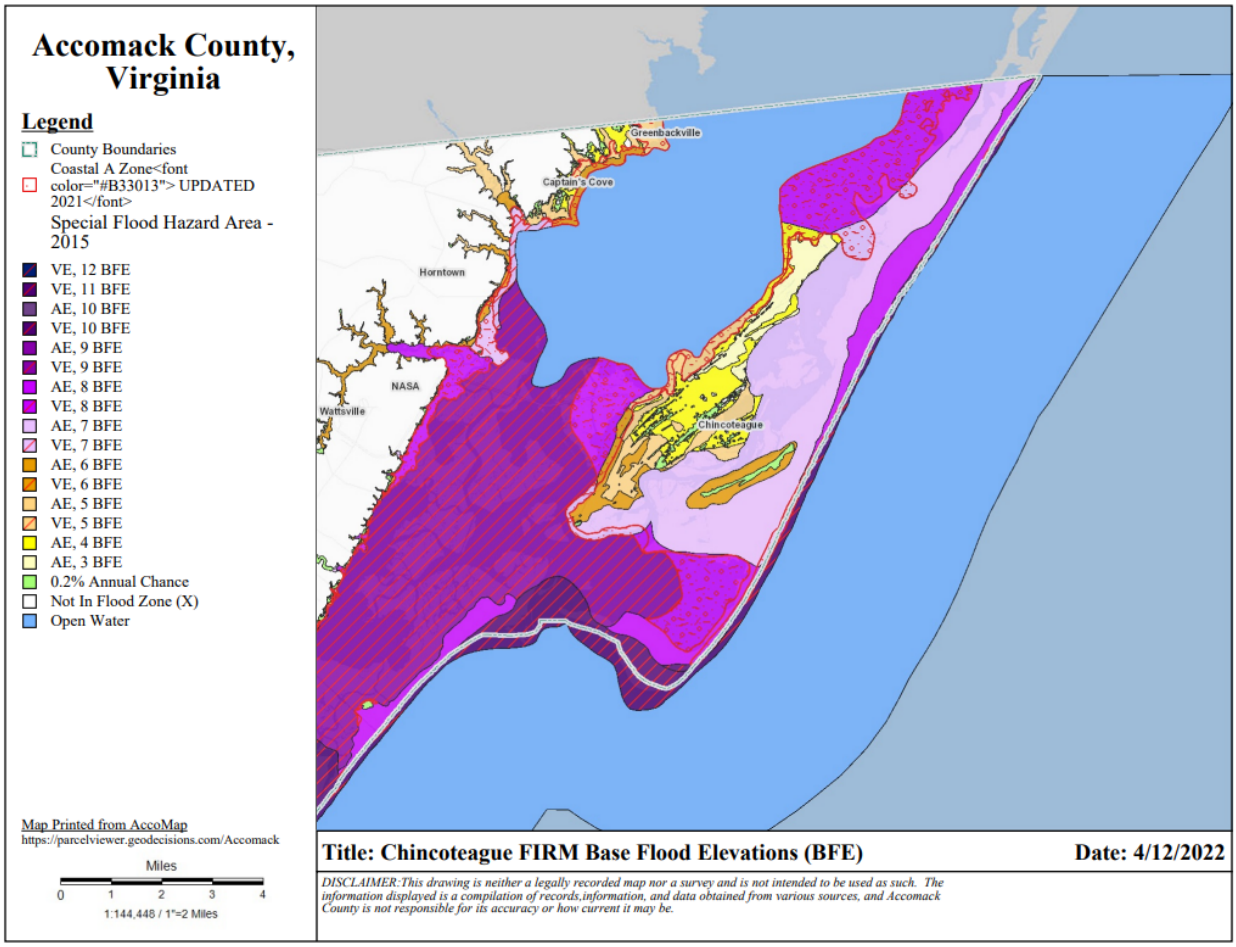
In 2003, Chincoteague improved its rating to Class 8, entitling the community to a 10% discount on flood insurance premiums. Chincoteague's current rating is still Class 8; however, the Town has been actively putting measures in place in hopes to lower the Class rating to 7 (Personal communications, Mike Tolbert, Town Manager and Bryan Rush, Emergency Management Coordinator, April 7, 2021). The Town currently has 1,710 policies according to the 2022 FEMA NFIP Data Report. Depending on the distribution of NFIP polices, these should provide a portion of the cost of repair. Purchasing NFIP contents insurance is not usually required unless the property is being used to secure a loan. In this case, NFIP building insurance is a requirement to receive a mortgage on the property. Most of the covered losses will be for repair of existing buildings and will not be for replacement of personal property. In 2003, there was approximately $46.3 million in properties that are uncovered for residential structural loss. This amount increased to approximately $89.5 million in 2011 for the Town. In 2003, private residential property owners would have suffered an estimated $107.9 million in structural and contents damage in the event of a 100-year flood. In 2011, this estimate increased to approximately $208.3 million (*Eastern Shore of Virginia Coastal Flood Vulnerability Assessment*, 2006 and 2011).

Chincoteague has three Flood Insurance Rate Maps (FIRMs) as of the most recent 2015 FIRM. The 1984 FIRM shows the old Town boundaries and the 1992 FIRM shows the rest of Chincoteague Island. In 1989, the Town of Chincoteague annexed the remainder of Chincoteague Island. As a result, both the 1984 FIRM and 1992 FIRM are incorrect in showing the Town's boundaries. An updated FIRM was provided to the Town by FEMA with an effective date of March 16, 2009.

The 2015 FIRM removed 0.6 square miles from the SFHA, which removed 1,167 buildings from the SFHA, such that they are no longer required to have insurance if they are under a mortgage. Couple this with the increase in rates, and the conditions for decreases in the number residents choosing to maintain insurance coverage. Previously all properties were at the Base Flood Elevation (BFE) of 7, 8 or 9 feet, but the new FIRM has the majority of the commercial and most densely populated area at 4 feet BFE, with the highest BFE now at 6 feet. Construction standards are focused around this FEMA value, and so, if an under estimate, buildings are typically not built high enough, and mitigation moneys to raise buildings would only cover costs to construct to BFE. This can decrease the ability of the residents and the community to rebound following a large flooding event that may vary from the FIRM reflected exposure risk. The new FIRM is represented in Figure 5. The FIRM does not take into account any changes in relative sea-level rise or increases in storm frequency.

More information on repetitive loss properties, NFIP policies and claims, and the CRS program can be found in Chapter 6: Coastal Flooding and Chapter 9: The Region.

Figure 4: Town of Chincoteague FIRM Base Flood Elevation (BFE)



DISASTER ASSISTANCE

In the past, floods that have covered the entire island, such as the 1933 hurricane and the Ash Wednesday Storm of 1962, have garnered federal assistance; however, there is no guarantee that the President would declare a disaster for a specific storm. If a federal disaster was declared, then some Federal Disaster Assistance would become available. The average housing assistance in medium sized states, such as Virginia, is $1,675 per home (Code of Federal Regulations, 2012). This housing assistance can include lodging reimbursement, rental assistance, home repair or home replacement. There were 2,068 households in Chincoteague in 2000 and 4,480 in 2009 (Census 2000; 2004-2009 American Community Survey 5-Year Estimate). If all of these households applied and received the average assistance, the total federal assistance that might be available for repair of the homes would be $3.5 million in 2003 and $7.5 million in 2009, far short of the funds needed in both years.

There is currently some limited Federal Disaster Assistance for personal property such as loss of clothing, household items, etc., and other necessary costs such as cleanup. For medium sized states, the average amount of this assistance is $2,106 (Code of Federal Regulations, 2012). If all the households received the average assistance the total assistance that might be available for contents replacement would be $4.4 million in 2003 and $9.4 million in 2009, far short of the funds needed in both years.

The 2000 Census showed that there were approximately 542 houses with a mortgage and these homes are valued at approximately $85,317,500. The July 2003 NFIP insurance report showed that there were 530 policies for $57,295,800 in 2003. In 2011, the number of policies in the Town had increased to 819 covering $159,316,400 (FEMA NFIP Insurance Report, May 2011) and the number of mortgages had risen to 635 in 2009 (2005-2009 American Community Survey 5-Year Estimate). It appears that most of the flood insurance policies are on mortgaged houses and that as mortgages are paid off, owners are dropping their flood insurance. It also appears that those policies are not covering all the losses that would occur in the 100-year flood.

In addition, it appears that few businesses have flood insurance and those that may have flood insurance likely only insure the structure and not the contents. Depending on depth of flooding, the displacement time for a one-story commercial structure could be anywhere from 62 days (flood 1-foot above floor) to 302 days (flood 8-feet above floor).

HMGP

The Town has participated in the HMGP through A-NPDC and the adoption of an approved Hazard Mitigation Plan for Chincoteague in 2006, 2011, 2016, and 2021. Within in the last few years, the Town and A-NPDC completed a project with FEMA and VDEM to reconstruct one severe repetitive loss property. There are Coastal Barrier Resource Areas located along Assateague Island and the northern tip of Chincoteague that would not be eligible for HMGP and Pre-Disaster Mitigation funding.

HAZARD PROFILE

§201.6(c)(2)(i), §201.6(c)(2)(ii), §201.6(d)(3) The primary hazard for Chincoteague has been coastal flooding associated with hurricanes and nor'easters, as identified in the *Flood Insurance Study* for Chincoteague.

PANDEMIC RESPONSE AND READINESS

The Town of Chincoteague responded to the COVID-19 pandemic in several ways. The Town purchased plexiglass, sanitizer, masks, touchless kits, and PPE to help mitigate the spread of COVID-19. Officials stated that streaming equipment and a new server were purchased in order for the Town to continue Council meetings and other operations as normal as possible. Remote display message boards were used to remind residents and visitors of mask mandates and social distancing guidelines. CARES Act funding was also used to backfill positions and to provide hazard pay to police officers, EMS, and public works employees (Personal communications, Town Officials, April 7, 2021). Public facilities were cleaned and sanitized every two hours and included Curtis Merritt Harbor, Memorial Park, and the Downtown area. The Town also added a Pandemic section to the Emergency Operations Plan in order to be prepared for any similar situations in the future (Personal communications, Bryan Rush, April 7, 2021).

Businesses were modified in order to adjust to new guidelines and regulations set forth by the State of Virginia. Several restaurants in the Town provided pick-up and delivery options and many were eventually able to create temporary outdoor seating where regulations allowed, as indoor seating was extremely limited. When the Town began to open in June/July, visitors began to pour in and were still able to enjoy a new way to vacation on Chincoteague Island. Chincoteague National Wildlife Refuge and Assateague Island National Seashore remained open throughout the pandemic, drawing in visitors from all over, and were free to visit until the first week of July; however, visitor centers remained closed to the public. As occupancy restrictions began to ease, restaurants and other businesses began to experience a lack of employees due travel restrictions and the loss of temporary worker visas that would normally be abundant during the summer season. Due to these circumstances, many businesses were forced to operate limited hours, which is still the case for the 2021 summer season. Between Chincoteague and Accomack County, 14 working waterman grants were provided around the Island (Personal communications, Town Officials, April 7, 2021).

The Chincoteague Volunteer Fireman's Carnival was canceled in 2020 and again in 2021, along with the traditional Chincoteague Annual Pony Swim and Auction, which had only been canceled under one other circumstance - WWII. Annual Fourth of July fireworks put on by the Fire Company were also canceled for both years. Although there was no in-person Pony Auction, the Fire Company held virtual auctions in 2020 and 2021. Profits from the Auction for the Chincoteague Volunteer Fire Company were record-breaking for both 2020 and 2021, despite adjustments and cancelations due to the COVID-19 Pandemic.

HIGH WIND

The American Society of Civil Engineers (ASCE) 7-98 defines the Wind-Borne Debris Hazard Area as within 1-mile of the coast where basic wind speed is equal to or greater than 110-mph (3-second gust). Chincoteague is within the 110-120 mph range. The coast of Assateague Island and Wallops Island generally are further than 1-mile from Chincoteague. The southern tip of Chincoteague is the only place that falls near or within this zone. There are two mobile home parks in this area, one of which is featured in Figure 6. There are approximately 180 units in the park most threatened, worth approximately $6.8 million in 2015. Assuming a 110-mph event, which is the 1%-annual-chance event in hurricane prone areas, Chincoteague could expect that many of these mobile homes would be a complete loss. It should be noted that the Floodplain Ordinance adopted by the Town in September 2006 requires elevation and anchoring for all new or substantially improved structures.

Figure 5: Mobile Home Park in Ocean Breeze, on the Southern Tip of Chincoteague Island; Photo Courtesy of Captain Bob's Marina.

The buildings in census blocks on the central eastern coast of the Island are anticipated to have the highest number of damages, as shown in Figure 7. In addition to man-made vulnerabilities, natural areas, particularly on Assateague Island, are substantial. Where the pine beetle has killed or weakened many of the pines, they are more susceptible to wind damage and do not form as substantial a wind barrier for the Town.

The total property damage losses were 14 million dollars, where 8% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 95% of the total loss.

The Hazus® model estimates that a total of 6,897 tons of debris will be generated. Of the total amount, 2,648 tons (38%) is Other Tree Debris. Of the remaining 4,249 tons, Brick/Wood comprises 28% of the total, Reinforced Concrete/Steel comprises 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 47 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane for a 1%-chance event. The number of Eligible Tree Debris truckloads will depend on how the 3,069 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

COASTAL EROSION

Currently, the Town itself is not experiencing a great deal of shoreline erosion. The Island, located in Chincoteague Bay behind Assateague Island, is not currently exposed to the harsher wave climate of the Atlantic Ocean, although this is changing as the shape and extent of Assateague Island shifts. Assateague Island serves as a barrier protecting Chincoteague from coastal erosion. Natural changes to Tom's Cove Hook have significantly increased the width of the Chincoteague Inlet in recent years, causing greater high tides and erosion of the marshland at the southern tip of the Island.

With the erosion of islands and marsh areas adjacent to the Town, there is subsequent siltation and filling of the surrounding waterways. For both the fishing and tourism industries, safely navigable waterways with sufficient depth are vital to the economy and the way of life.

In 1934, a jetty was constructed at the north end of Assateague Island to prevent shoaling at Ocean City Inlet. The jetty has successfully kept the Inlet to the north navigable, but has starved Assateague Island of sediment and greatly accelerated erosion and island transgression. These impacts make the Island vulnerable to inlet formation during storm events. Should an inlet breach Assateague, the Island of Chincoteague could be exposed to greater flood elevations, wave energy, and experience increased coastal erosion. Base flood elevations on Chincoteague are currently reduced by 4 to 5 feet due to the sheltering effect of Assateague Island (AccoMaps GIS).

A 50-year shoreline restoration project was completed for Wallops Island approximately 5 miles to the south of Chincoteague. The beach replenishment was almost negated by Hurricane Sandy in 2012; however, a follow-up renourishment project and the extension of a seawall protects significant federal property investments and may impact sand movement in the vicinity of the Chincoteague Inlet. The Town is working to secure funding regarding a proposed 3-year study of the Chincoteague Inlet by the U.S. Army Corps of Engineers (USACE) and is hoping for solutions (Personal communications, Town Officials, April 7, 2021; *Eastern Shore Post*, May 20, 2021).

Approximately 11.2% of the Island's shoreline is hardened with bulkheads or riprap, most of this is along commercial areas and privately owned land. Approximately 15 structures are located close to the shoreline with little buffer if erosion were to occur at that location. In several locations, critical infrastructure, such as the Route 175 Causeway and portions of South Main Street, come within several feet of the shoreline. A variety of shoreline management tools will be needed to promote a balance between perimeter marshland protection and meeting community needs for recreation, working waterfronts, and real estate value. The Town has submitted priority requests to VDOT to raise the Causeway from the bridge to pumphouse turn by NASA and to raise the area of Main Street where the bridge meets the intersection in an effort to mitigate flooding (Personal communications, Mike Tolbert, Town Manager, April 7, 2021).

COASTAL FLOODING

Almost the entire Town is located within the 100-year floodplain. Most areas are designated as an A zone, with only a slim edge of the southern shore of the Town located in a V zone. The *Flood Insurance Study* for Chincoteague includes a wave analysis. The Town's A-zones then are likely coastal A-zones where waves under 3-feet can be expected in the 1%-annual-chance flood. This poses additional risk above ordinary A-zones and is included in the adoption of Base Flood Elevations (BFE) by FEMA. The BFE ranges from three feet to six feet for the Town. See the National Flood Insurance Program & Hazard Mitigation Grant Program section for additional information about the FIRM and Town coverage.

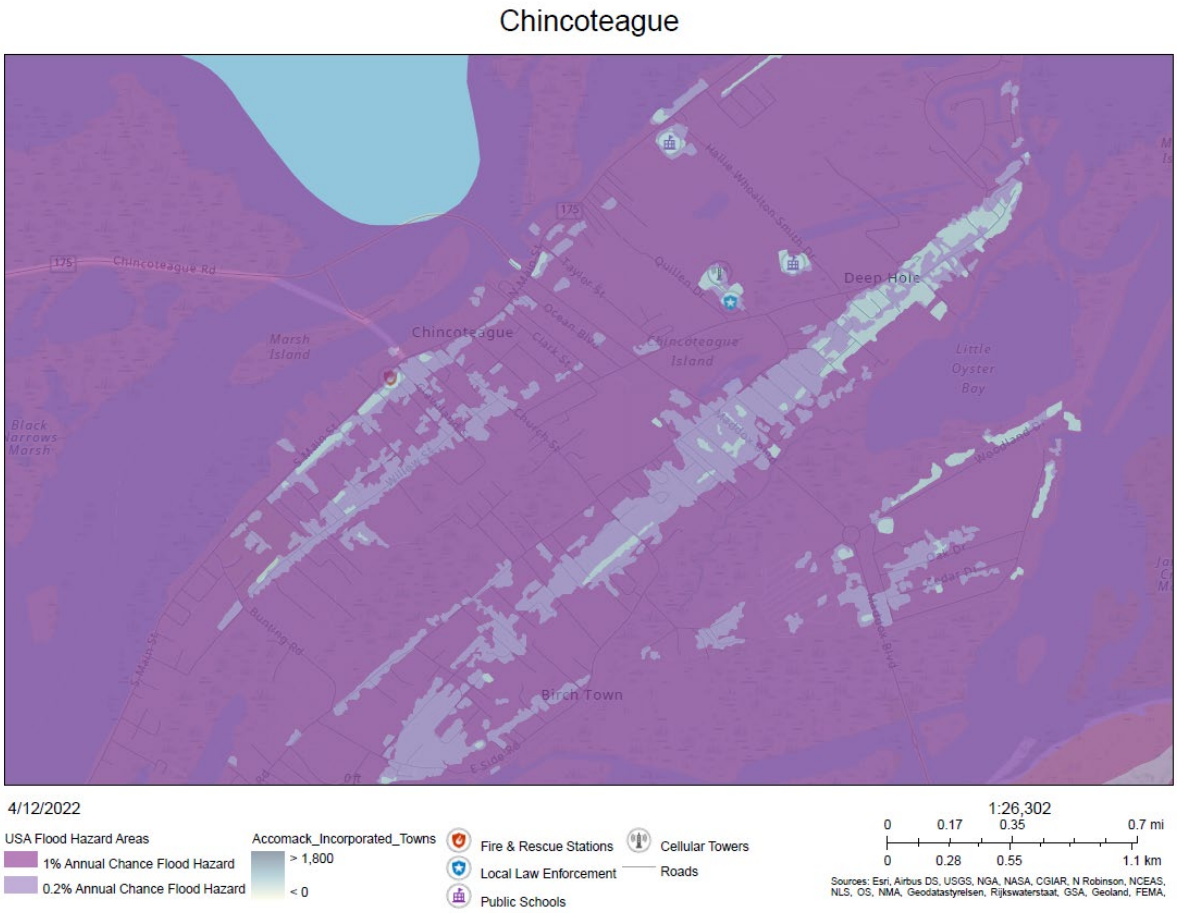
Representations of estimated flooding and damages are featured in Figures 8 and 9. Where Figure 8 shows the estimated damages in dollars, Figure 9 shows the percentage of the building anticipated to be destroyed, which is obvious in the high percent of damage to the buildings on the south end of the Island where there are two mobile home parks.

Although the Town has been proactive in improving for flood standards, the Town has a significant number of older homes not built to current building code standards for high winds and flooding conditions. All structures on the island are at high risk to coastal flooding. An estimate of residences built prior to the National Flood Insurance Program (pre-FIRM) is 2,016. There are approximately 609 additional residences built before the wave analysis. Some of these structures should be classified as pre-FIRM since they were built in the unincorporated areas of Accomack County prior to 1984 and annexed into the Town in 1989. Prior to 1984, structures were built to the Stillwater elevations. The Flood Insurance Supplemental Study shows that wave crest increases the Base Flood Elevation by 0.8 to 1.1 feet. All pre-FIRM and pre-wave analysis structures are at greater risk of flood damage than post-FIRM structures built after June 1984.

The Hazus® model estimates that over half of the properties in the Town would incur damages to the building and/or contents with an aggregate total replacement value of the general building stock value of $774 million.

Hazus® estimates the number of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made due to the different types of material handling equipment required to handle the debris. The model estimates that a total of 50,779 tons of debris will be generated. Of the total amount, Finishes comprises 45%, Structure comprises 25%, and Foundation comprises 31%. If the debris tonnage is converted into an estimated number of truckloads, it will require 2032 truckloads (@25 tons/truck) to remove the debris generated by the flood during a 1%-chance event.

Figure 6: Town of Chincoteague Flood Hazards to Infrastructure



For Hurricane Sandy, the Town's cumulative initial damage assessment found that there were $1.8M in losses to homes and businesses. Of these, 80% of single-family homes, 90% of multi-family homes, 80% of mobile homes, and 70% of businesses had flood insurance policies. In addition, public properties (including public buildings, utilities, and equipment) losses were estimated to total $267,000, the majority of which ($250,000) from debris removal. Considering Hurricane Sandy was not a direct hit, had worse effects on the Bayside of Accomack County, and was not even close to the magnitude of a 1%-annual-chance flooding event, these are substantial damages.

Two commercial districts are located on the island, along Maddox Boulevard and the original downtown area on Main Street. Both of these areas are located in the A Zone and for the most part lie below 5 feet in elevation. In April 2021, there were 1,240 business licenses within the Town. Many of these licenses are for home-based businesses and vacation rental homes since U.S. Census Zip Code Business Patterns data for Chincoteague indicated less business establishments employing 757 persons in 2019.

In addition to damages to typical building structures, intensive flooding can such saturate the ground that beyond impacting ability of a septic system to function, they can actually be extremely damaged. In May of 2016, Jon Richardson from the Virginia Department of Health on the Eastern Shore recalls his experience, "During Sandy, we actually had mounds that completely washed away along Main Street on Chincoteague and a few tanks floated out of the ground and had to be re-installed." This is not only a fiscal cost, but also a human health risk. All of the risks associated with coastal flooding, coastal erosion, and stormwater flooding can be anticipated to intensify with the increases in relative sea-level that have been observed and are estimated to continue.

STORM WATER FLOODING

Chincoteague produced a Storm Water Master Plan in 2011, which assessed locations in the Town vulnerable to storm water flooding and prioritized improvements for specific drainage issues. Many recommendations set forth in the Plan have already been implemented by the Town (*Town of Chincoteague Comprehensive Plan*, 2020). Recommendations regarding new development, open ditches over underground drainage pipes, controlling the filling in of the remaining drainage channels, and the filling of private parcels are listed in the Town's most recent Comprehensive Plan.

Like many coastal areas on the Eastern Shore, much of the localized flooding that occurs during rainfall events is the result of inadequate storm drainage systems and flat topography. In addition, the Island is subject to tidal flooding which can exacerbate flooding from a rain event, particularly if it coincides with a prolonged high tide even after the weather system has passed.

HAZARDS OF LOCAL SIGNIFICANCE

The Town's other hazards include, but are not limited to, the following:

OFF-SHORE SHIPPING

On February 28, 2004, a tanker carrying 3.5 million gallons of ethanol exploded and sunk off of the coast near Chincoteague. Although the ethanol evaporated and the fuel oil slick moved out into the ocean, oil tarballs began to wash up in Delaware and approximately 3 miles south of the Virginia and Maryland State line (Personal communications, Bryan Rush, Emergency Management Coordinator, April 7, 2021). An accident of this nature could have adverse impacts on the area's coastal environments and habitats. This is a significant concern for the Town with the adjacent shipping channel and so much of its economy reliant on the tourism and seafood industries and the major draw for the area, the National Seashore on Assateague Island. An event of this nature could affect the economy for years.

GROUNDWATER CONTAMINATION

In October 2007, there was a reported leak at the Chincoteague Delmarva Substation. Tank related leaks and spills are caused by mismanaged or poorly designed underground and aboveground (this Substation has both) and containers designed to hold a variety of potential polluters. They may pose a risk to human health and/or the environment.

In 2017, it was reported that three shallow wells were contaminated with PFOS and PFAS from Aqueous Film Forming Foam (AFFF) used as a fire suppressant agent at Wallops Flight Facility. Supply to these wells were immediately shut off and none of the deep wells were contaminated (Personal communications, Town Officials, April 7, 2021). NASA plans to establish a treatment system to filter water from these shallow wells.

In addition, drought conditions would increase the demand of water for irrigation, but decrease the amount of aquifer recharge, increasing the Town (and region) susceptibility to salt water intrusion contaminating the drinking water supply (*Water Supply Plan*, 2010).

There are three active Non-National Priorities List (NPL) and one archived superfund sites near the Town. The archived site is the Chincoteague Landfill, which was inspected and archived in the late 1980's, as it poses no threat and requires no clean up action. The other three sites, Nasa Wallops Island, Chincoteague Naval Auxiliary Air Station, and Naval Aviation Ordinance Test Station, are considered active non-NPL, which means that they may still pose some health risks to the surrounding community, but they are not considered the most hazardous waste sites by the Environmental Protection Agency (EPA).

LAUNCHES

The NASA Wallops Flight Facility Range Safety Officer establishes a safety performance envelope around the launch site as well as a circular hazard area in the event of a launch failure. This perimeter has been set in the past at 8,500 feet allowing for safe observation from Chincoteague.

On October 28, 2014, the Antares rocket exploded upon liftoff; however, no one was killed, there were few injuries, and no hazardous materials were found on Chincoteague Island. Despite the fact that this kind of incident could have had much more severe consequences, the program was stalled for almost two years, with the next Antares rocket launching successfully on October 17, 2016. It also brought attention to the hazards associated with the launches and the economic repercussions associated with a possible closure of the facility. A rocket lab with a large rocket lift that may eventually produce man and commercial flights may also produce additional hazards (Personal communications, Mike Tolbert, Town Manager, April 7, 2021). Economic and traffic impacts should also be noted during the larger Antares launches due to closures on Assateague Island and other areas around Chincoteague.

THUNDERSTORMS

Thunderstorms during warm weather months pose a significant threat to the Town. Lightning and high winds associated with thunderstorms are potentially hazardous, especially during the annual Pony Penning event held the last full week in July. This event attracts tens of thousands of people to the pony swim, pony auction, and Fireman's Carnival. During 2004, while thousands were attending the events, a thunderstorm passed through and caught many out in the open. Thunderstorms frequently bring heavy rain, strong winds, and excessive lightning to the area. Additionally, there storms may often produce damaging hail, tornadoes, and/or waterspouts.

WEATHER EXTREMES – SNOW/ICE & HEAT WAVES

Other significant hazards commonly experienced on the island include ice/snow storms and heat waves. Heat waves, unlike ice/snow storms, occur during the height of the tourist season when the population is at its greatest, putting a larger number of people at risk. Ice/snow storms regularly cause damages to trees and power lines and make access to and around the Town difficult.

TORNADOES

In August of 2011, there was a tornado that spawned from Irene, which downed trees and caused roof damage. In July of 2000, there were three waterspouts reported by on-duty Coast Guard just off-shore. In September of 2015 several beach-goers captured images of waterspouts and funnel clouds just off the Assateague Island beaches near Chincoteague (WMAR Baltimore, 2015). Tornado warnings were issued in July of 2016 after several waterspouts and funnels clouds were reported in the areas of Assateague Island and Chincoteague Bay (Delmarva Now, 2016). Having storm shelters in place and information regarding these is very important. Distribution of educational materials could mitigate potential life loss during such events, as well as signing up for the Town of Chincoteague's Code Red Alert System and other national alert systems from the National Weather Service (NWS) and the National Oceanic and Atmospheric Administration (NOAA).

CRITICAL FACILITIES

Town officials evaluated high priority hazards that may affect Chincoteague's critical facilities. All of the Town's critical facilities are located in hazard areas and are listed in Table 8 on the following page. In May of 2019, the Chincoteague Volunteer Fire Company moved into their newly built fire station located across the street from the Chincoteague Police Department, Town Offices, and Community Center on Chicken City Road. The old Fire House on Cropper Street stores Town vehicles and other equipment. The old Fire House on Main Street has been re-purposed for community use.

Table 7: Town of Chincoteague Critical Facilities

Facility	HMP 2006	HMP 2011	HMP 2016	HMP 2021	Hazards	No. of People Affected	Loss Potential	Relocation Potential	Retrofit Potential
Town-Owned Facilities									
Municipal Complex & Public Works	X	X	X	X	Wind, Storm Water Flooding, Fire	4,000+	Major Disruption	No	Yes
Re-purposed Chincoteague Fire House (Main St)	X	X	X	X	Wind, Erosion, Coastal Flooding	4,000+	Inconvenience	No	Yes
Old Fire House (Cropper St)	-	-	-	X	Wind, Flooding	4,000+	Minor Disruption	No	Yes
Chincoteague Police Dept.	X	X	X	X	Wind, Storm Water Flooding, Fire	16,000+	Devastating	No	Yes
Town Office	X	X	X	X	Wind, Storm Water Flooding, Fire	4,000+	Major Disruption	No	Yes
Curtis Merritt Harbor	X	X	X	X	Wind, Erosion, Coastal Flooding	45,000+	Devastating	No	Yes
Water Supply & Distribution	X	X	X	X	Wind, Erosion, Flooding, Power Loss	16,000+	Devastating	No	Yes
Town Docks	-	-	-	X	Erosion, Coastal Flooding	16,000+	Major Disruption	No	Yes
Other Facilities (Not Town-Owned)									
Medical Centers	X	X	X	X	Wind, Flooding	4,000+	Major Disruption	Yes	Yes
New Fire House	-	-	-	X	Wind, Storm Water Flooding	33,000+	Devastating	Yes	Yes
ANEC Substation	X	X	X	X	Wind, Erosion, Flooding	4,000+	Devastating	No	Yes
Banks	X	X	X	X	Wind, Storm Water Flooding	4,000+	Major Disruption	No	Yes
Hotels, Motels, Restaurants	X	X	X	X	Wind, Erosion, Flooding	33,000+	Devastating	No	Yes
Coast Guard Station	-	X	X	X	Wind, Erosion, Flooding, Fire	45,000+	Devastating	Yes	Yes
Route 175 Causeway	-	X	X	X	Wind, Erosion, Coastal Flooding	30,000+	Devastating	No	Yes
Collector Streets	-	X	X	X	Wind, Flooding	4,000+	Major Disruption	No	Yes
Communications Network	-	X	X	X	Wind, Flooding	4,000+	Major Disruption	Yes	Yes
Drainage System	-	X	X	X	Erosion, Flooding	4,000+	Devastating	No	Yes
Post Office	-	-	X	X	Wind, Flooding	4,000+	Inconvenience	Yes	Yes
Schools	-	-	X	X	Wind, Flooding, Fire	4,000+	Major Disruption	Yes	Yes
Gas Stations	-	-	X	X	Wind, Flooding, Fire	4,000+	Major Disruption	Yes	Yes

FINDINGS

1. The 2015 FIRM removed 1,167 buildings from the SFHA and lowered the BFE for the entire Island, which may lead to underinsured residents and businesses and a false sense of security in the Town regarding flooding vulnerability.

2. The 2015 FIRM lowers the BFE for many buildings. This may be an inaccurate assessment of flood water levels during a 1-percent-annual-chance storm event. The result is that homes obtaining assistance through HMGP may not be adequately improved to mitigate the true risk of flooding in the Town.

3. Post-FIRM buildings built with solid walls in A-zones that are affected by wave action could be damaged or destroyed though in compliance with the NFIP regulations.

4. Chincoteague is highly dependent on the tourist industry. A nor'easter or a hurricane, causing a 100-year flooding event, could be devastating for the Town's economy if the tourist industry was partially shut down through the summer season. Government funds helped to mitigate this issue during the height of the COVID-19 pandemic, when several tourism-based businesses were forced to close or limit operating hours and services.

5. The water distribution system is dependent on power on both the Island and the mainland. Without power, water cannot be pumped to the Island and fire suppression becomes a concern. There are no dry hydrants on the Island, as they do not work well in a saltwater environment. The Town is dependent on residual pressure in the water tanks and Mutual Aid from other fire companies to combat fire during power outages. Water mains located along the portion of Route 175 called the "Chincoteague Causeway" are critical infrastructure at risk from major storm events.

6. Potential damages are becoming more likely due to increased storm and tidal exposure from expansion of the Chincoteague Inlet. The Town is looking to secure funding for a 3-year study of the Inlet by the USACE.

7. The Storm Water Master Plan Phase 1 and 2 were completed in 2011 and 2013, respectively, and provide efficient flood mitigation plans for Town implementation.

8. The Town updated their Comprehensive Plan in 2020.