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 Aerial

The Town's economy has always been closely tied to natural resources and scenic beauty. Prior to the mid to late 1800s, the inhabitants of the island primarily subsisted by farming and raising cattle and sheep. As the demand for oysters grew throughout the 1800s, the seafood industry became the Town's main source of income. The seafood industry expanded to include clams, crabs, and fish during the 1900s and Chincoteague became widely known as a seafood capital (*Town of Chincoteague Comprehensive Plan*, 2015).

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 Assateague Island National Seashore and the small coastal town atmosphere (*Town of Chincoteague Comprehensive Plan*, 2015). In the 1950s, the tourist accommodations included rooming houses and small hotels. The island now includes over 21 hotels or motels, as well as four campgrounds and various vacation/rental homes 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*, 2015).

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. The following sections are intended to provide insight in the make-up and characteristics of the community and how it relates to hazard vulnerability.

DEMOGRAPHICS

The Town has experienced a significant population growth as it has become an increasingly popular tourist destination. The first significant population gain occurred leading up to the 1990s 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. The median age for residents in Chincoteague in 2014 was 52.1 years, indicating a population older than the national average. The Police Department and Emergency Services track individuals that are oxygen dependent and/or bedridden in order to provide special attention during emergency events, however indicate that there are less than 10 persons on this list (Bryan Rush, Emergency Management Coordinator, personal communication, January 21, 2016).

Chincoteague is a gateway community providing a single point of access to the National Wildlife Refuge and Seashore in Virginia with an estimated 1.5 million visitors per 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*, 2015). Planning for hazards with regards to such a significant seasonal population change is a challenge that Chincoteague has taken many steps to address.

Table 1: Chincoteague Demographic Information

	2014***	2013**	2010*	2000****
Population	2,933	2,965	~~2,941~~ 3,600	4,317
Median Age	52.1	49.5	52.0	46.1
Disability	156	191	NA	NA

Income				
Median Household Income	$45,430	$38,036	$33,109	$28,514
Poverty Level	11.4%	16.5%	18.9%	NA
Language				
Only English	96.6%	97.0%	93.0%	96.0%
Other	3.4%	3.0%	7.0%	4.0%
Spanish	1.5%	0.4%	4.2%	2.1%
Ind-Euro	2.0%	2.6%	2.8%	0.8%
Asian				0.9%

* U.S. Census 2010, ** American Community Survey 2009 – 2013, *** Annual Estimates of the Residential Population: 2010 – 2014, **** 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. There is also a lot of people working in professional, scientific, and waste management which reflects upon the location of Wallops Island nearby with NASA employees. There is also a trend of new mobile businesses, primarily restaurants. These mobile business are able to evacuate their business and thus can be much faster to bounce back following a storm. Unlike these mobile businesses, many of the restaurants, hotels, and entertainment businesses are susceptible to flooding and would take longer to recover following a storm.

Table 2: Chincoteague Local Workforce

Civilian Employed Population								
Industry	2014*		2012*		2010*		2000**	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Agriculture, forestry, fishing/hunting, or mining	58	4.3%	51	3.7%	72	5.3%	122	5.8%
Construction	96	7.0%	87	6.3%	62	4.5%	285	13.6%
Manufacturing	25	1.8%	20	1.5%	64	4.7%	103	4.9%
Wholesale trade	14	1.0%	16	1.2%	30	2.2%	54	2.6%
Retail trade	142	10.4%	87	6.3%	56	4.1%	333	15.9%
Transportation and warehousing, and utilities	19	1.4%	0	0.0%	17	1.2%	56	2.7%

Information	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Finance, insurance, real estate, and rentals	84	6.2%	77	5.6%	103	7.6%	116	5.5%
Professional, scientific, waste management	226	16.6%	201	14.6%	187	13.7%	88	4.2%
Educational, health care, social services	183	13.4%	296	21.5%	277	20.3%	210	10.0%
Arts, entertainment, recreation, food	350	25.7%	339	24.6%	251	18.4%	431	20.6%
Public Administration	99	7.3%	133	9.7%	173	12.7%	163	7.8%
Other	66	4.8%	69	5.0%	71	5.2%	131	6.3%
TOTAL CIVILIAN EMPLOYED POPULATION	1,362	-	1,376	-	1,363	-	2,092	-

Source: *American Community Survey, 2010 – 2014, ** 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 had adverse impacts on the local seafood industry in the past 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 northeaster 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. (Bryan Rush, Emergency Management Coordinator, personal communication, January 21, 2016)

Table 3: Chincoteague Business Types

Industry Code Description	Total Establishments		
	2013	2011	2009
Construction	11	17	15
Manufacturing	1	1	1
Wholesale Trade	0	1	3
Retail Trade	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	12	13	12
Professional, Scientific, and Technical Services	4	5	5
Administrative and Support and Waste Management and Remediation Services	3	3	1
Health Care and Social Assistance	7	7	6
Arts, Entertainment, and Recreation	4	5	6
Accommodation and Food Services	50	44	46
Other Services (Except Public Admin)	12	14	15
Total, All Establishments	145	149	152
Total Employees	707	701	747

Source: Census Zip Code Business Patterns, 2009, 2011, 2013

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 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 half of the housing units as vacant, which is indicative of these second homes and rental properties. These properties provide an important economic vitality to the community of Chincoteague and are typically well kept and so do not create additional hazards of vacant, dilapidated structures. There are four campgrounds and many mobile homes or trailers that are coastal and prone to damages from storms.

Table 4: Chincoteague Housing

	2014*	**2010****	**2000*****
Total Housing Units	4,371	4,517	3,970
Occupied	1,427	1,417	2,068
Vacant	2,944	3,100	1,902
Owner-Occupied	1,160	1,070	1,639
Renter-Occupied	267	347	429

Median Housing Value	$244,000	NA	NA

* American Community Survey, 2010 – 2014, ** U.S. Census 2010, ***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 could be 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 transportation around the Island for a fare of only $0.25. Star Transit's orange route connects the Island to the rest of the Eastern Shore of Virginia.

Table 5: Chincoteague Resident Vehicles

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

* American Community Survey, 2010 – 2014, **2000

Chincoteague Island is served by paved public streets that includes 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, during an interview with the Daily Press, Bryan Rush, the Emergency Management Coordinator said that most of the roads on the Island were inundated, some under three feet of water.

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,* 2015). The Town is completely reliant on State Route 175 which includes approximately 5 miles of causeway over tidal marshland in addition to these 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 water under current conditions. 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 fall of 2012, Hurricane Sandy left approximately 3,500 people trapped on the Island, as the causeway was not passable (Daily Press, Steve Szkotak).

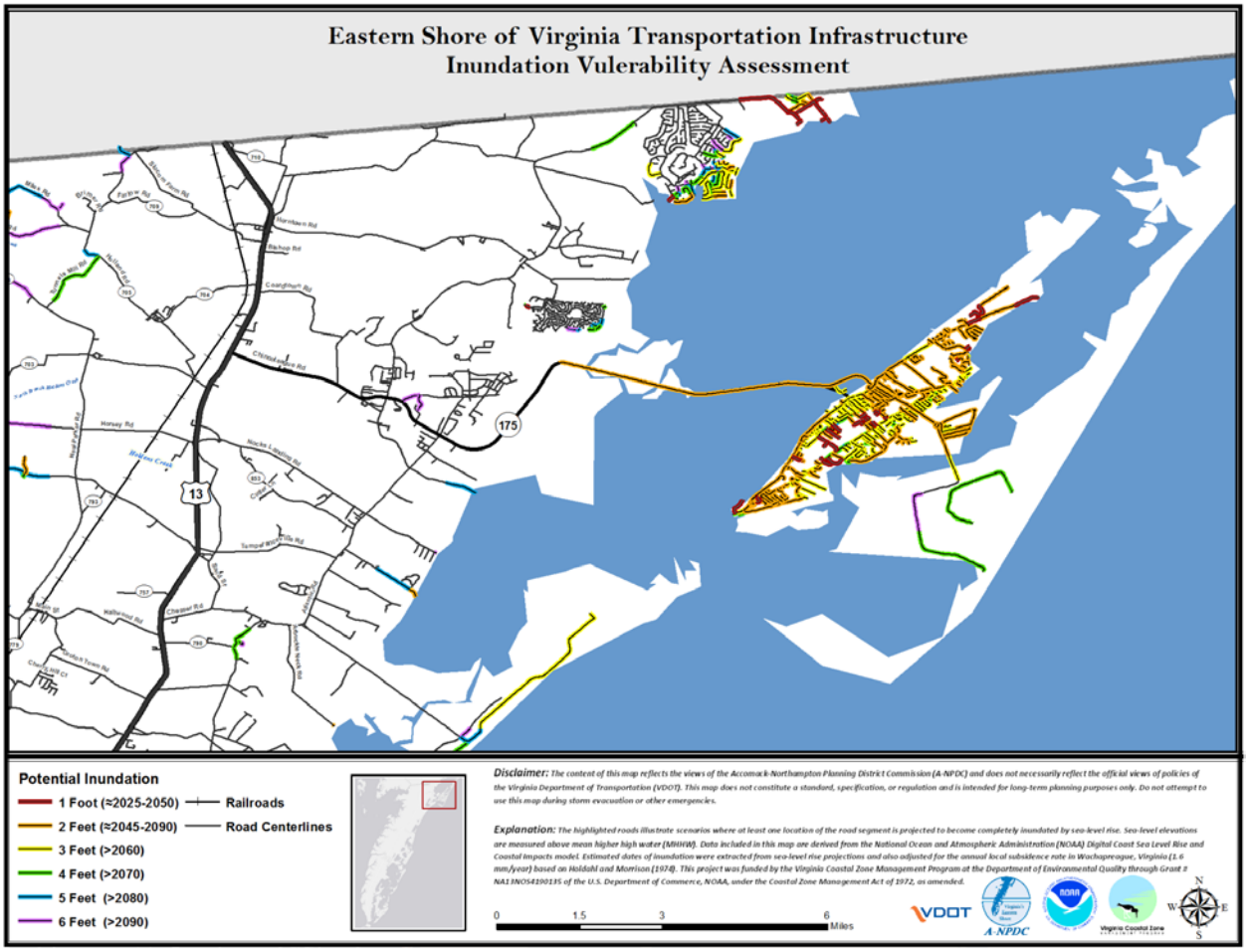

Figure 2: Town of Chincoteague Transportation Infrastructure Inundation Vulnerability

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 includes the Chincoteague Police Department, the Chincoteague Volunteer Fire Company, 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 and volunteer fireman supported by the Town and Accomack County. The Department owns four pumper/engines, a 75-foot ladder truck, a rescue squad, and two Advanced Life Support ambulances. The Chincoteague Police Department is the Island's primary law enforcement agency and employs 10 full time officers (*Town of Chincoteague Comprehensive Plan*, 2015).

There is no shelter located on the island, and so if the causeway floods and residents are unable to evacuate, as they were for a short time during Hurricane Sandy in 2012, they must stay in location (at home or with neighbors/friends).

MEDICAL SERVICES

There is the Chincoteague Community Health Center, run by Eastern Shore Rural Health, and the Island Family Medical, a health center affiliated with the Peninsula Regional Medical Center, that provide the primary health services for the Island (*Town of Chincoteague Comprehensive Plan*, 2015).

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. There is a new waterfront park, the Robert N. Reed Downtown Waterfront Park that serves 1,500 visitors annually. The park also contains 10 boat slips available for rent to transient boats. There is also the Donald J. Leonard Park that has over one acre of waterfront land left in its natural state and the Chincoteague Veteran's Memorial Park. The Chincoteague Recreation Convention Center is used for special events, like graduations and meets most of the needs of the Island's civic and volunteer organizations. The Chincoteague Island Library provides recreational, educational, and job research opportunities.

CULTURAL RESOURCES

There are two museums in Chincoteague: Museum of Chincoteague Island (previously known as the Oyster and Maritime Museum) and the Refuge Waterfowl Museum (*Town of Chincoteague Comprehensive Plan*, 2015).

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 5 shallow wells for public water supply, 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. While the danger of contamination is considered minimal, vigilant monitoring activities on land near the wells is critical (*Town of Chincoteague Comprehensive Plan*, 2015).

There are around 70 miles of Town-owned and maintained water mains on the island. Pumped water is chlorinated at the well site and then pumped 5 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 Town's water works, where it is filtered and then enters a 200,000 gallon elevated storage tank. It is then distributed to the Town's 3,550 water customers. 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,* 2015).

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 brining freshwater 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,* 2015).

There is no central sewerage 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 sewerage systems. The maintenance of these sewage systems is provided by periodic pumping by private firms (*Town of Chincoteague Comprehensive Plan*, 2015).

In 2012 the Chincoteague Wastewater Advisory Committee revisited the idea of a centralized wastewater treatment system. This was spurred by the changes to the Health Code which required expensive individual lot septic systems that were required to meet advanced technology standards. (*Town of Chincoteague Comprehensive Plan*, 2015) Although there

is still no central sewage collection and treatment system, with the County's aid, the Town continues to look into grant opportunities to move in this direction and completed a Wastewater Management Plan in June 2013.

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. There are two County Convenience Centers nearby as well, in the Horntown and Makemie Park areas.

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 then 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 Irene the combination of salt-accumulation and sustained winds of about mph caused an island-wide power outage for eight hours. The lines had to be cleaned with fresh water prior to power being reinstated. (Bryan Rush, Emergency Management Coordinator, personal communication, January 21, 2016).

DRAINAGE DITCHES

Maintenance of drainage ditches and storm drains in Town is the responsibility of VDOT. Because the majority of the development in the Town is within 3-7 feet of sea level, often water must await lower tides to flow from the drainage ditches on the Island into the surrounding water (*Town of Chincoteague Comprehensive Plan*, 2015).

SCHOOLS

Two public schools are located in the Town of Chincoteague: Chincoteague Elementary School and Chincoteague Combined Middle/High School.

NATURAL ENVIRONMENT

Chincoteague Island is commonly believed to be an ancient barrier island. It was formed around 4,000 years ago, as the forces of wind, waves, and ocean deposited sand parallel to the Eastern Shore mainland. Erosion formed breaks in these barrier islands and allowed the rising sea to flood the flatlands behind the island. The flats are now the marshes, channels, and bays between Chincoteague and the mainland. Assateague Island joined the north end of Chincoteague Island around 2,000 to 4,000 years ago. Tom's Cove Hook is following a much similar pattern as the one that formed Chincoteague (*Town of Chincoteague Comprehensive Plan*, 2015). 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*, 2015). 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, as shown in Figure 3 below. 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 wildfowl and are closely associated with the fish

spawning and nursery areas. They also help prevent erosion and help keep the shoreline stable (*Town of Chincoteague Comprehensive Plan*, 2015). There is a large area of vacant land seen in the northern parts of Chincoteague, these serve 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.

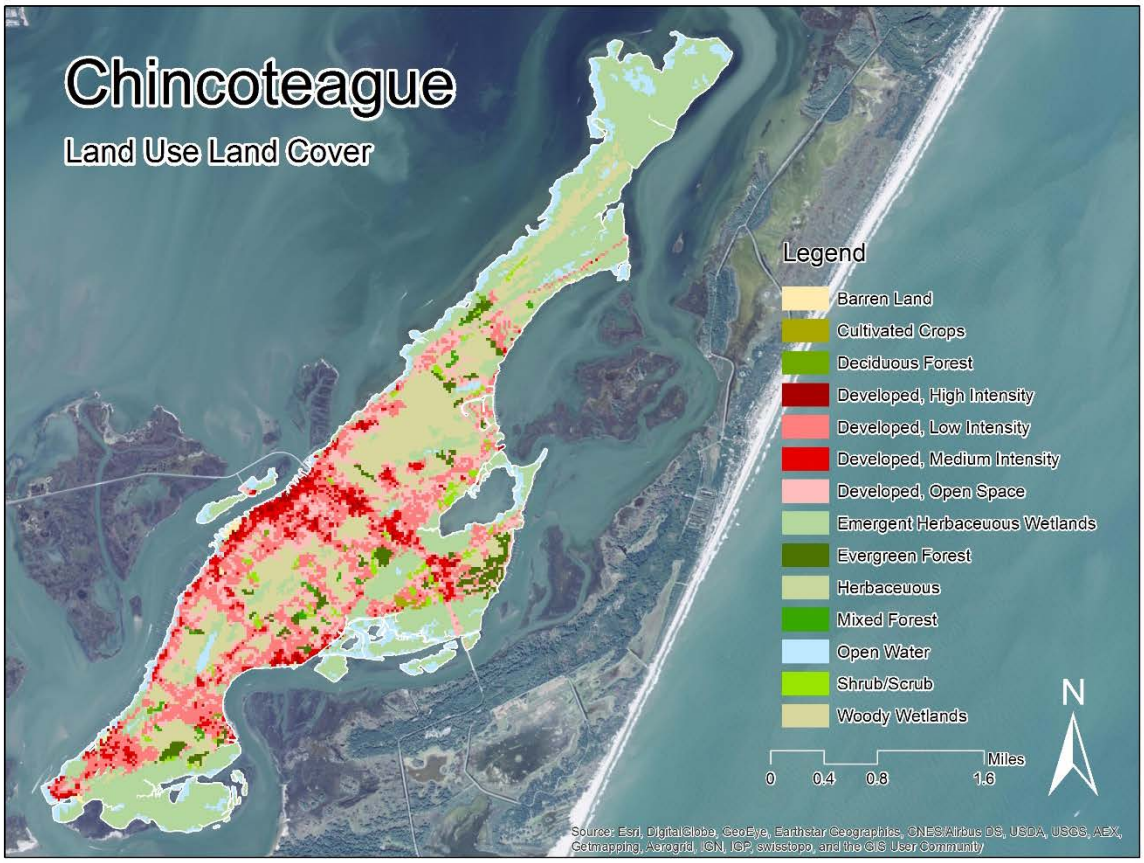

Figure 3: Chincoteague Land Use Land Cover (NLCD 2011)

Aside from natural wetland areas, low and medium developed areas dominate the Town, as shown in Figure 4 below. Developed areas are characterized by 30% or greater of constructed materials (e.g. asphalt, concrete, buildings, etc.).

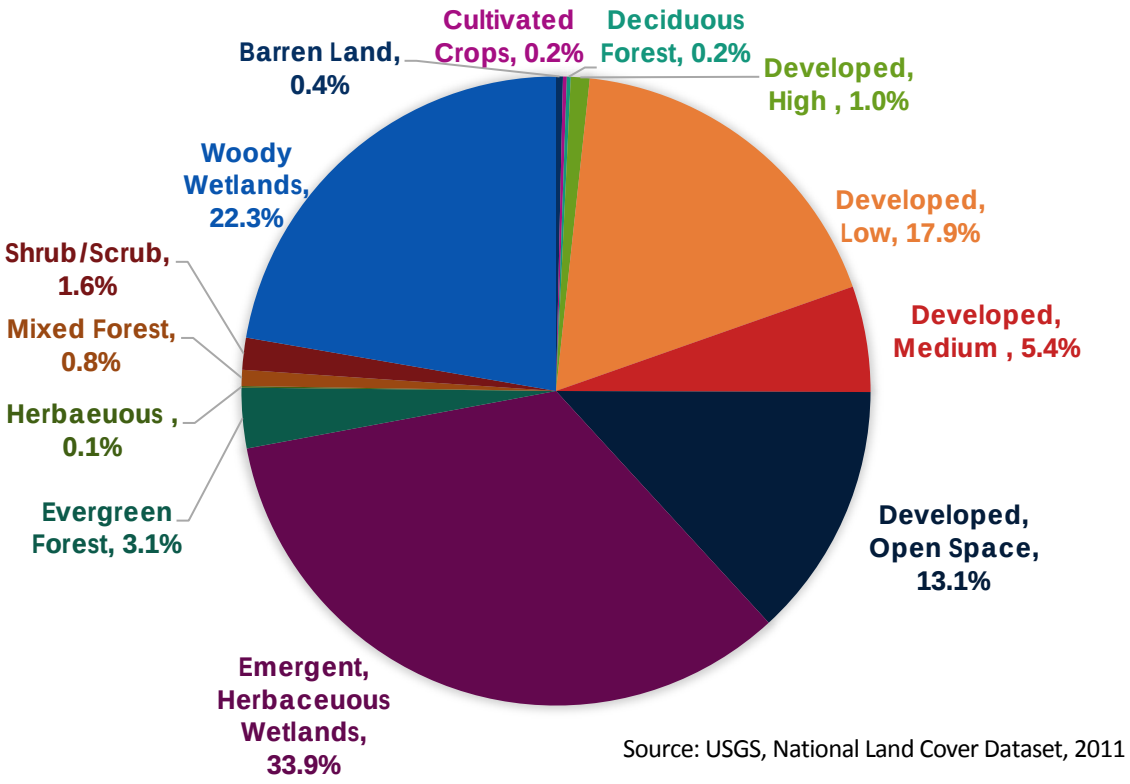

Figure 4: Chincoteague Land Use Land Cover Percentages

GROUND WATER

Due to a high ground water table and storm water drainage limitations, the Town is susceptible to periodic flooding (*Town of Chincoteague Comprehensive Plan*, 2015). The resulting standing water increases the risk of insect borne diseases. High ground water and saturated soil conditions increase the risk of tree downs, decrease the functionality of septic systems, and can move pathogens and excess nutrients hundreds of feet much more quickly than under normal conditions.

HAZARD PREPAREDNESS & COMMUNITY CAPABILITIES

PREVIOUS HAZARD MITIGATION PLANS

Chincoteague has participated in the hazard mitigation planning process since 2006.

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	Zoning (updated 1992) &/or Subdivision Ordinance	Storm Water Regulations	Transportation Infrastructure Inundation Vulnerability Report	All Hazards Preparedness	Emergency Operations Plans	Mutual Aid Agreements/Documents	Neighborhood Emergency Help	Viginia Hurricane Evacuation	Oil & HazMat Response Plan; HazMat Commodity Flow		Ground Water Committee	Navigable Waterways Committee	Climage Adaptation Working Group	ES Disaster Preparedness Coalition
Local	*	*		*	*	*													
County			*																
Regional				*				*	*	*	*			*		*	*	*	*
State		*					*						*						
Federal		*																	

NATIONAL FLOOD INSURANCE PROGRAM & HAZARD MITIGATION GRANT PROGRAM

NFIP

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. Measures also include 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 Class 8. The town had 530 NFIP policies in 2003 and 819 in 2011 that reduce the risk of financial loss experienced following a hazard event (FEMA NFIP Insurance Report, July 2003 and May 2011). 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 rose 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 has risen to approximately $208.3 million (Eastern Shore of Virginia Coastal Flood Vulnerability Assessment, 2006 and 2011).

The Town joined the NFIP on March 1, 1977. Wave height analysis wasn't included for the Town until June, 1984. Accomack County also joined the NFIP at this time. Approximately, twenty-five percent of the existing Town has had floodplain regulation from 1977 while the remainder of the Town was administered by Accomack County from 1984 to 1989.

Chincoteague had three Flood Insurance Rate Maps (FIRMs) prior to 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 and 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 BFE. 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.

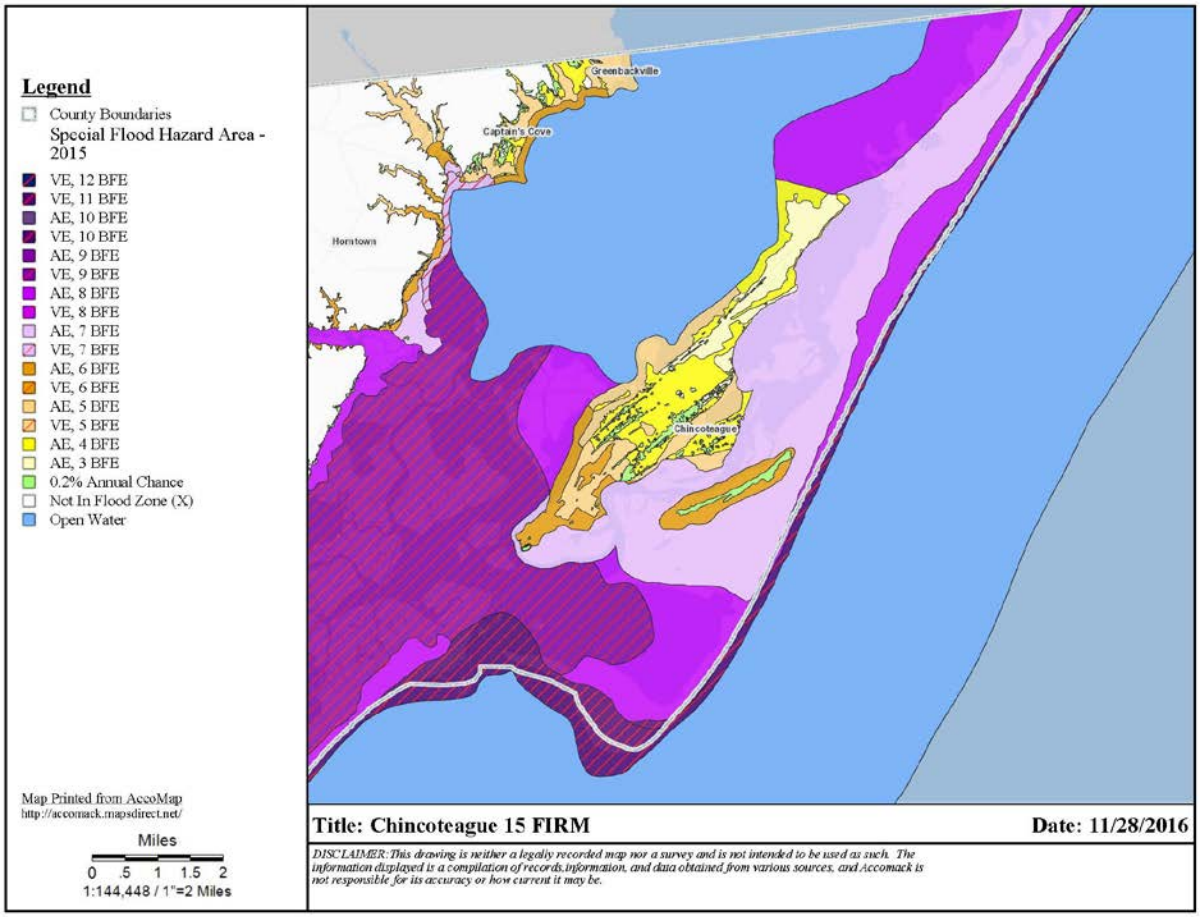

Figure 5: Map Showing FIRM Base Flood Elevations Within the Vicinity of Chincoteague; Map Courtesy of Accomack County's Accomap Mapping Service.

The number of claims has been increasing over the last decade, as indicated in Table 7.

Table 7: Federal Emergency Management Act NFIP Insurance Report

	Town of Chincoteague			Accomack County	Accomack County Total
	2003	2011	2015		
Total Premium	-	$787,740	$1,116,627	$2,044,239	$3,371,381
V-Zone	-	-	0	59	61
A-Zone	-	-	982	2,001	3,162
No. Policies	530	819	1,050	2,306	3,600
Total Coverage	$57,295,800	$159,316,400	$228,216,700	$508,113,600	$783,148,000

Total Claims Since 1978	21	42	74	833	1,062
Total Paid Since 1978	$60,438	$265,372	$531,240	$9,578,778	$11,906,426

Source: FEMA NFIP Insurance Report, 2003, 2011, 2015

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 (CFR-Emergency Management and Assistance, 2002). 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; 2005-2009 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, et cetera and other necessary costs such as cleanup. For medium sized states, the average amount of this assistance is $2,106 (CFR-Emergency Management and Assistance, 2002). 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 September 2006 and December of 2011. The Town and A-NPDC are currently working on 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

The primary hazard for Chincoteague has been coastal flooding associated with hurricanes and northeasters, as identified in the *Flood Insurance Study* for Chincoteague.

WIND

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 sec 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. Assuming, a 110 mph (3 sec gust) 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 6: Mobile Home Park on the Southern Tip of Chincoteague Island; Photo Courtesy of Capt'n Bob's Marina.

According to the Hazus model, 2,080 buildings are estimated to incur a total of $63,170,460 in damages during a 1%-annual-chance event. As shown in Figure 7, the buildings in census blocks on the central eastern coast of the island are anticipated to have the highest amount of damages. 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.

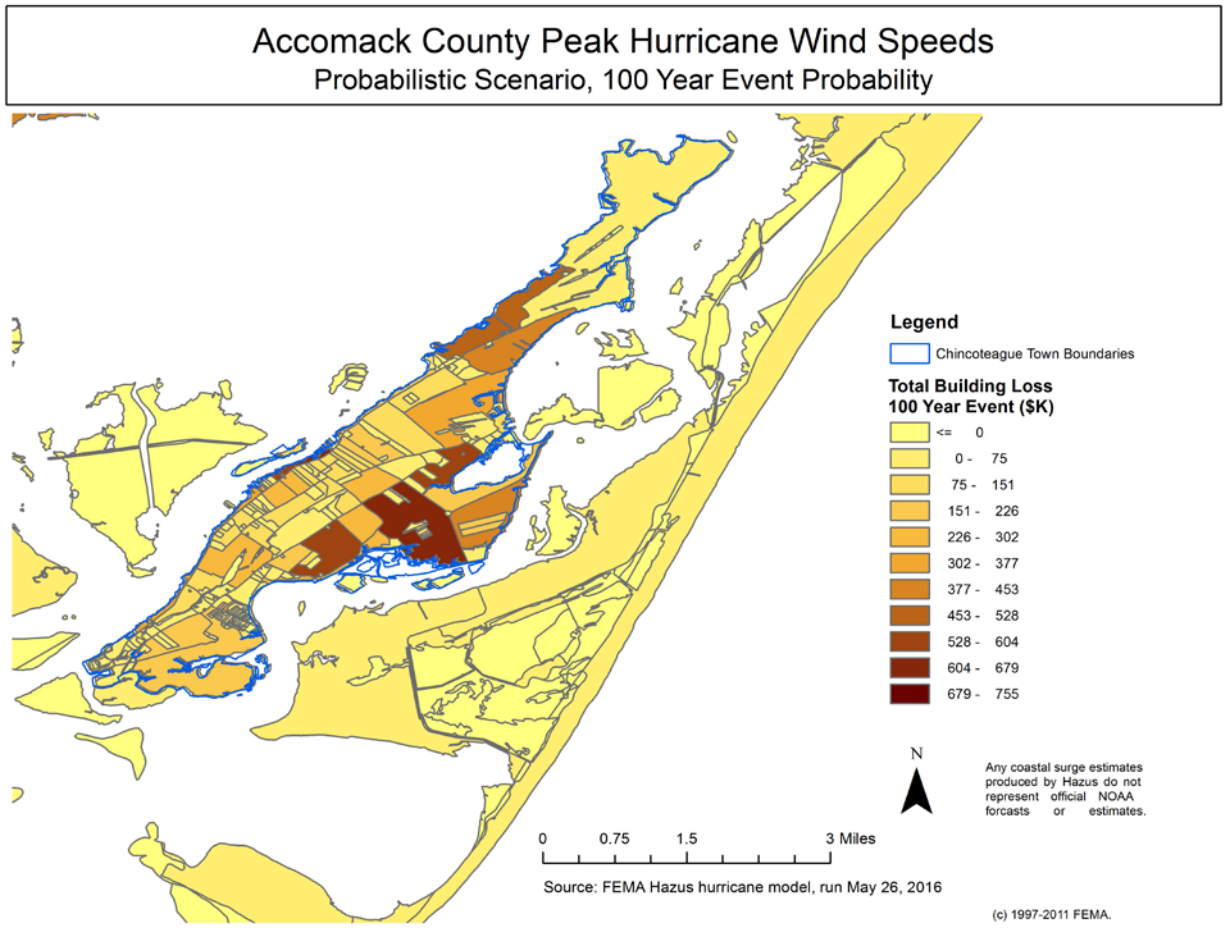

Figure 7 : Chincoteague Wind Damages by Census Block

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 the 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 south end of Chincoteague.

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 the extension of a seawall protect significant federal property investments and may impact sand movement in the vicinity of Chincoteague inlet.

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.

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 3 feet to six feet for the Town. See the National Flood Insurance Program & Hazard Mitigation Grant Program section for additional information about the new 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.

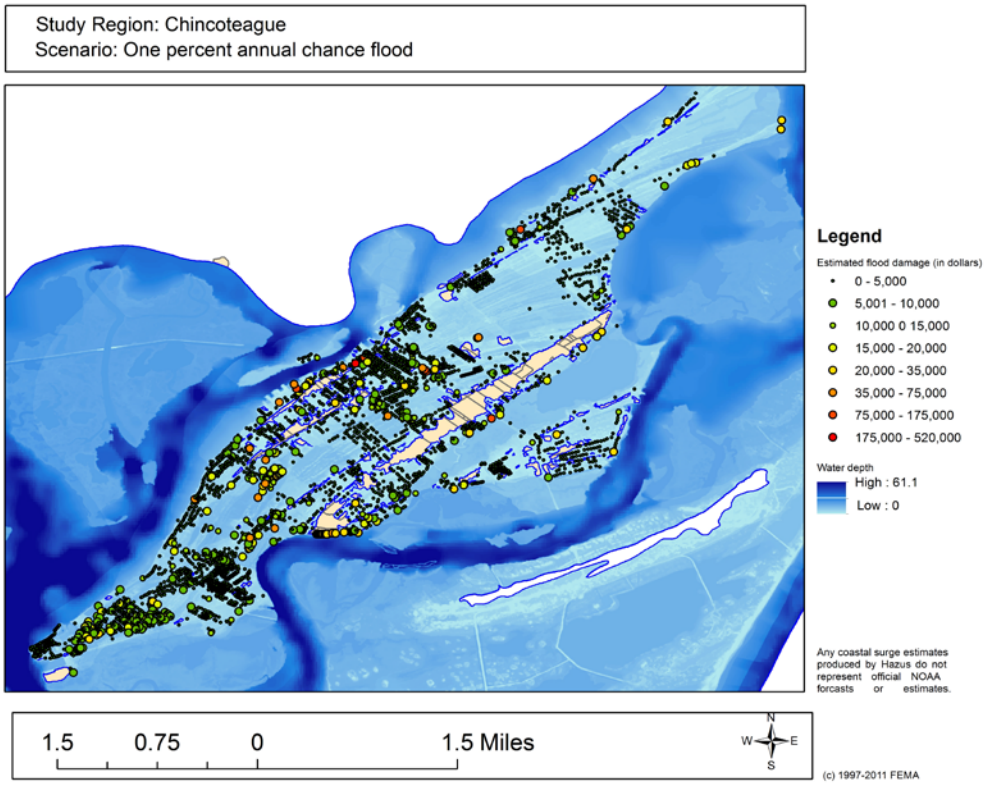

Figure 8: Chincoteague Hazus Estimated Flood Damages

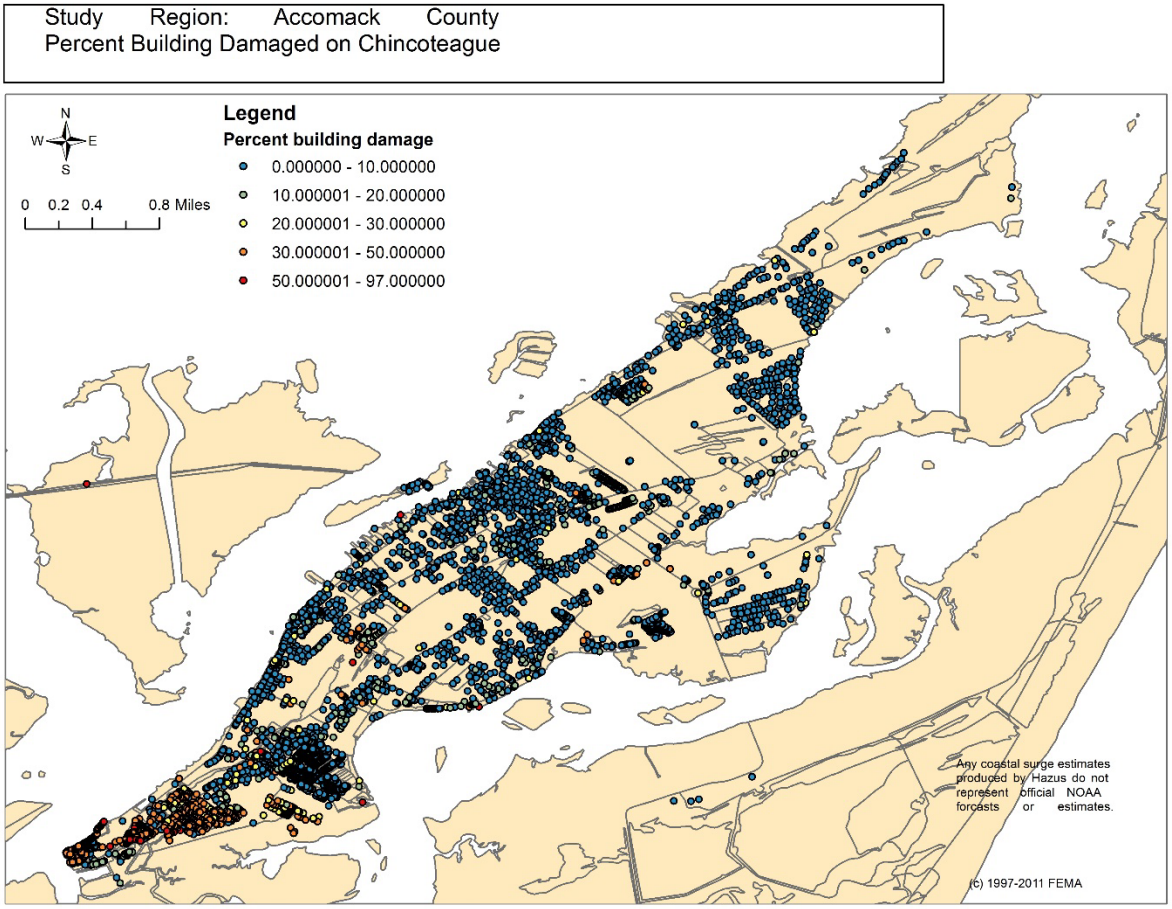

Figure 9: Chincoteague Hazus Estimated Percent Building Damages during 1%-Annual-Chance Event

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 content, but that only about 2% of the total value ($685 million) would be lost. This totals to about $15 million anticipated in building, content, and business disruption losses during a 1%-annual-chance flooding event. Estimates from the 2006 and 2011 HMP indicated approximately $107 million and $208 million respectively in damages from a 1%-annual-chance storm event. Part of the reason for the huge decrease to the 2016 figure is the difference in technique, however a large reason for the change is due to the changes in the FIRM, upon which the Hazus model is based.

Additionally, in such a storm event, Hazus estimates that 19,799 tons, about 792 truckloads, of debris would be generated. Particularly as there is no emergency shelter on Chincoteague Island, it is also important to note that Hazus estimates 809 households will be displaced and that 1,901 people will seek temporary shelter in public shelters.

For Hurricane Sandy the Town's cumulative initial damage assessment found that there were $1.8 M 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 A zones and for the most part lie below 5 feet in elevation. In August 2011, there were 1,269 business licenses within the Town Many of these licenses are for home based businesses and vacation rental homes since U.S. Census Business Patterns zip code data for Chincoteague indicated only 149 business establishments employing 755 persons and 162 businesses employing 807 persons in 2001 and 2008, respectively.

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 health department 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, Phase 1 in 2011, which assessed locations in the Town vulnerable to storm water flooding and prioritized improvements for specific drainage issues. Although Phase 2 of the Plan was not completed in 2013 as intended, there was a flood elevation evaluation completed for both Fowling Gut and Hallie Whealton Smith Ditch in 2013. The plan outlines suggested storm water mitigation actions for Phase II including development of a storm water GIS database, a phased survey of drainage systems, an analysis of selected existing drainage systems, and suggesting site specific improvements. Chincoteague is interested in utilizing HMGP funding to implement Phase II of the master 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 (Storm Water Master Plan, Phase I, 2011).

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, 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 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. (Drought Response and Contingency Plan (DRCP), within the Town's Water Supply Plan (WSP))

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.

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 each third 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.

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. Having storm shelters in place and

information regarding these is very important. Distribution of educational materials could mitigate potential life loss during such events.

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.

Figure 10: Firehouse on Chincoteague Island. Photo by Elaine Meil.

Table 8: Critical Facilities and their Relative Importance to the Town.

Facility	HMP 2006	HMP 2011	HMP 2016	Hazards	No. of People Affected	Loss potential	Relocation Potential	Retrofit Potential
Town-owned Facilities								
Chincoteague Municipal Complex	X	X	X	Wind Manmade	4,000+	Major Disruption	No	Yes
Chincoteague Fire Station	X	X	X	Flooding Wind Manmade	4,000+	Major Disruption	Yes	Yes
Chincoteague Community Center (parking lot serves as the POD)	-	-	X	Flooding Wind Fire Manmade	4,000+	Major Disruption	Yes	Yes
Chincoteague Harbor of Refuge and Dock	X	X	X	Wind Flooding Manmade Erosion	4,000+	Devastating	No	Yes
Chincoteague Water Supply & Distribution	X	X	X	Wind Flooding Fire Loss of Power	4,000+	Devastating	No	Yes

				Manmade Erosion				
Chincoteague Municipal Complex and Public Works Building	-	-	X	Wind Flooding Manmade	4,000+	Major Disruption	Yes	Yes
Not Town-owned Facilities								
Emergency Medical Centers	X	X	X	Wind Flooding Fire Loss of Power	4,000+	Major Disruption	Yes	Yes
ANEC Power Delivery Substation	x	X	X	Wind Flooding Manmade Loss of Power Erosion	4,000+	Devastating	No	Yes
Banks	x	X	X	Wind Flooding Fire Loss of Power Manmade	3,000+	Devastating	No	Yes
Hotels, Motels, Restaurants, Convention Center	X	X	X	Wind Flooding Fire Loss of Power Manmade	12,000+	Devastating	No	Yes
Coast Guard Station	-	X	X	Wind Flooding Fire Loss of Power	15,000+	Major Disruption	Yes	Yes
Route 175 Causeways & Bridges	-	X	X	Wind Flooding Manmade Erosion	30,000+	Devastating	No	Yes
Collector Streets (Maddox, Chicken City, Ridge, Church)	-	X	X	Wind Flooding Manmade	4,000+	Major Disruption	No	Yes
Communications Network	-	X	X	Wind Flooding Manmade	4,000+	Major Disruption	Yes	Yes
Storm Drainage System	-	X	X	Flooding Erosion	4,000+	Major Disruption	No	Yes
Post Office	-	-	X	Wind Flooding Manmade	4,000+	Major Disruption	Yes	Yes

Schools	-	-	X	Wind Flooding Manmade	4,000+	Major Disruption	Yes	Yes
Gas Stations	-	-	X	Wind Flooding Manmade	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 about flooding vulnerability.

2. The new FIRM lowers the BFE for many buildings, this may be an inaccurate assessment of flood water levels during a 1-percent-annual-chance storm. 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 dependent on the tourist industry. A northeaster or a hurricane, causing a 100-year flooding event, could cause tremendous economic problems if the tourism industry was partially shut down thru the summer season.

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 is a concern. There are no dry hydrants on the island since they do not work well in the salt water 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 Route 175 Causeway and bridges are critical infrastructure at risk from major storm events.

6. Potential damages are increasing due to increased storm and tidal exposure from expansion of Chincoteague Inlet.

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