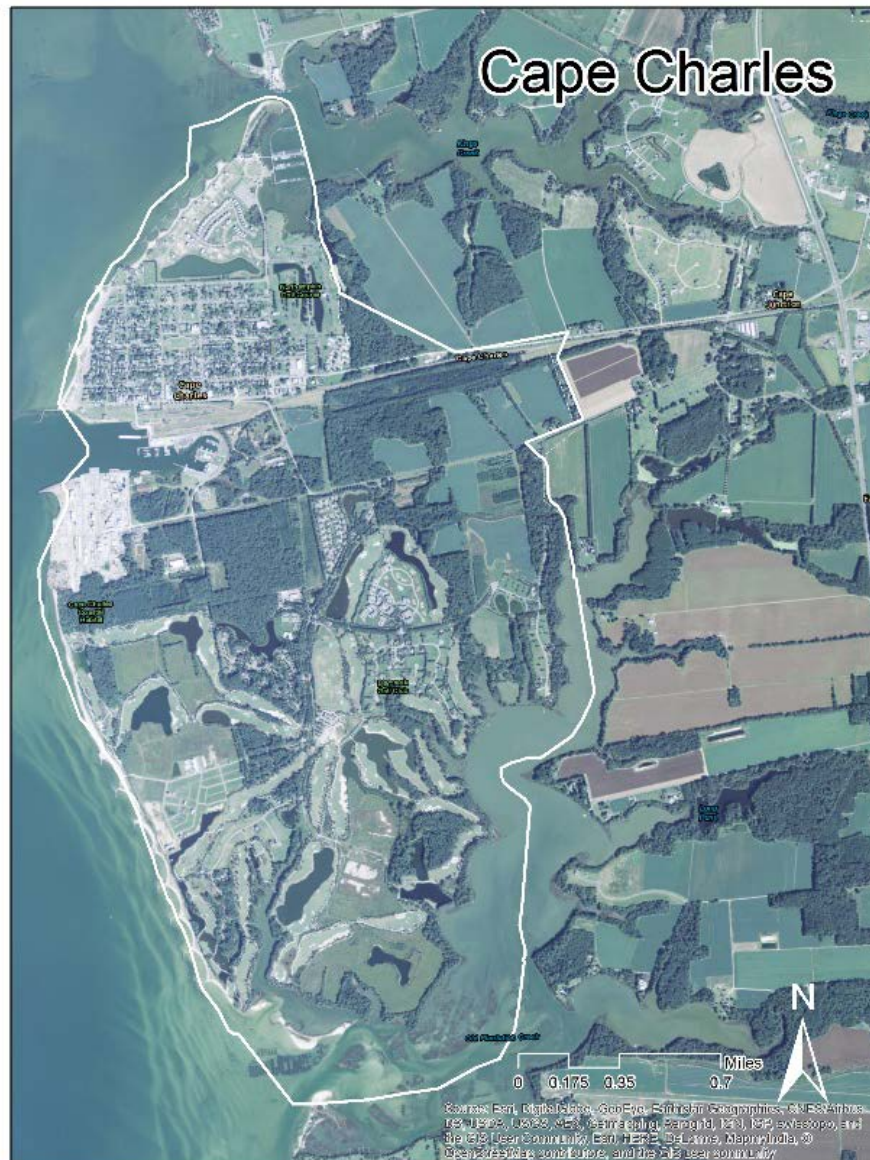


# TOWN OF CAPE CHARLES

## TOWN PROFILE

The Town of Cape Charles was created in 1884 as a planned community at the southern terminus of the railroad. It is located in southern Northampton County on the Chesapeake Bay, and it was incorporated in 1886. An area west of the town on the Bay was incorporated in 1909, and it was called the Sea Cottage Addition. Further annexations occurred in the southern and northern portions of the neck in the 1990 (*ESVA Hazard Mitigation Plan, 2011*).



**Figure 1: Cape Charles Aerial Map**

## SOCIO-ECONOMIC

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

### DEMOGRAPHICS

The 2010 Census indicated that the Town had a population of 1,009, which is an 11.1% decline from the 1,134 people that lived in the Town during the 2000 Census (U.S. Census; 2000, 2010). The American Community Survey (ACS) estimate for 2014 matches that of the 2010 census (ACS, 2010 – 2014). The Town has become a popular destination for retirees, tourists, and second home owners in the last decade and is experiencing a greater influx of seasonal residents during the warmer summer months. This trend is expected to continue to grow in the future, and the Town is planning accordingly (*ESVA Hazard Mitigation Plan, 2011*). Town representatives indicate that the year-round population estimate for the most recent years might even be a bit high, however in the next 5 to 10 years this number is anticipated to grow significantly as owners that are currently leasing their properties will be retiring and move to the Town as their primary residence (Jeb Brady, Building Official, personal communications, June 8, 2016). These new residents will require additional outreach in hazard preparation and mitigation education.

**Table 1 : Cape Charles Demographic Information**

	2014***	2013**	2010*	2000****
Population	1009	1009	1009	1134
Median Age	NA	50.6	48.7	44.2
Disability	NA	62	NA	NA
Income				
Median Household Income	NA	\$27,132	NA	\$22,237
Poverty Level	NA	24.9%	NA	NA
Language	**	**	**	
Only English	94.8%	95.3%	95%	97.1%
Other	5.2%	4.7%	5%	2.9%
Spanish	1.5%	2%	2.3%	1.4%
Ind-Euro	2.8%	2%	2.2%	1.5%

\* U.S. Census 2010, \*\* ACS 2009 – 2013, \*\*\* Annual Estimates of the Residential Population: 2010 – 2014, \*\*\*\* U.S. Census 2000

**WORK FORCE**

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.

Most of the local workforce in Cape Charles works in the Educational and Medical fields. There is also a large portion of the population working in Arts and Retail, reflective upon the large seasonal and tourist populations that come to the town (ACS, 2010 – 2014). Between 2000 and 2010 the workforce grew significantly. The estimated values provided by the American Community Survey for 2014 would indicate a severe and rapid decline in the workforce, but Town representatives indicated that this is inaccurate and a continued increase since 2010 is probably more accurate. This estimate may have come as a result of a decrease in employment at Bayshore Concrete, however that decline reached its low in 2014 and has now rebounded to approximately 300. (Jeb Brady, Building Official, personal communications, June 8, 2016).

**Table 2: Cape Charles Workforce**

Civilian Employed Population						
Industry	2014*		2010*		2000**	
	Count	Percent	Count	Percent	Count	Percent
Agriculture, forestry, fishing/hunting, or mining	15	4.5%	0	-	13	2.9%
Construction	21	6.3%	42	7.6%	31	7%
Manufacturing	17	5.1%	37	6.7%	68	15.3%
Wholesale trade	4	1.2%	9	1.6%	7	1.6%
Retail trade	49	14.7%	51	9.3%	30	6.8%
Transportation and warehousing, and utilities	2	0.6%	25	4.5%	31	7%
Information	3	0.9%	4	0.7%	10	2.3%
Finance, insurance, real estate, and rentals	15	4.5%	25	4.5%	19	4.3%
Professional, scientific, waste management	52	15.6%	56	10.2%	38	8.6%
Educational and health care services	85	25.5%	146	26.5%	85	19.1%
Arts, entertainment, recreation, food	46	13.8%	83	15.1%	51	11.5%
Public Admin	22	6.6%	41	7.5%	13	2.9%
Other	2	0.6%	31	5.6%	48	10.8%
<b>TOTAL CIVILIAN EMPLOYED POPULATION</b>	<b>333</b>	<b>-</b>	<b>550</b>	<b>-</b>	<b>444</b>	<b>-</b>

Source: \*American Community Survey, 2010 – 2014; \*\* U.S. Census 2000

**BUSINESSES**

Business data provide 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

## Town of Cape Charles

recovery resources. Finally, it can help to prioritize restoration of utility and infrastructure functions following a high-intensity hazard.

Cape Charles has seen a steadily growing business market since 2000. Seasonal tourism and Bayshore Concrete provide opportunities for economic growth and development. The decline in total number of employees could be related to Bayshore Concrete employment trends (Jeb Brady, Building Official, personal communications, June 8, 2016). Many of the surrounding towns in Northampton County have citizens that commute into Cape Charles to work (*ESVA Hazard Mitigation Plan, 2011*).

**Table 3 : Cape Charles Business Types**

Industry Code Description	Total Establishments		
	2013	2011	2009
Agriculture, Forestry, Fishing and Hunting	1	1	1
Utilities	1	1	0
Construction	3	5	9
Manufacturing	2	2	2
Wholesale Trade	5	5	5
Retail Trade	15	14	19
Transportation and Warehousing	1	1	1
Information	1	1	2
Finance and Leisure	5	3	3
Real Estate and rental and leasing	3	3	5
Professional, Scientific, and Technical Services	10	6	7
Management of companies and enterprises	0	0	1
Administrative and Support and Waste Management and Remediation Services	2	2	2
Educational Services	2	2	3
Health Care and Social Assistance	5	5	5
Arts, Entertainment, and Recreation	1	4	3
Accommodation and Food Services	18	17	19
Other Services (Except Public Admin)	8	9	8
Industries not classified	0	0	1
Total, All Establishments	83	81	96
Total Employees	587	837	864

Source: Census Zip Code Business Pattern, 2000, 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 hazard events, safe cover for those wanting to stay, and a way to leave towards safety.

### HOUSING UNITS

Knowledge of a community’s housing base contributes to hazard and vulnerability analysis by identifying how many homes are at risk. Vehicles available to households is one indicator of a household’s ability to evacuate when necessary.

According to the ACS, between 2000 and 2014 there was almost a 20% increase in housing units built in Cape Charles. This is a statement with which the Town of Cape Charles Building Official agrees, however does believe that there has not been any decrease in units between 2010 and 2014 as the ACS indicates. The Town consists of an historic downtown area with many older, historic homes. Many of these homes either renovated seasonal homes, or they are older homes in poor condition (*Town of Cape Charles Comprehensive Plan, 2009*). There is also the Bay Creek Golf Resort which has two 18-hole golf courses as well as residential development (*ESVA Hazard Mitigation Plan, 2011*). Although property values have increased for homeowners, this has caused an increase in rent and housing prices that create difficulties for low and moderate income households (*Town of Cape Charles Comprehensive Plan, 2009*).

The high number of vacant housing units are primarily for seasonal, recreational, or occasional use in Cape Charles (U.S. Census; 2000, 2010). These kind of vacant buildings are typically kept well and pose less of a hazard during high wind events. Although it appears that there is a lack of available of vehicles for nearly a quarter of the population, this is also a result of the high number of second homes in the Town.

Approximately 150 of the older homes have been redeveloped and renovated since 2000 – this figure does not include new construction (Jeb Brady, Building Official, personal communication, November 22, 2016). Because Cape Charles has been in the SFHA for many years, new homes were built above BFE and many restorations involved raising the building and/or building new editions above BFE.

The highest density areas are in the Seabreeze complex, where the property has experienced significant erosion problems during storms in the past, and these populations could be considered high risk during an emergency situation.

**Table 4 : Cape Charles Housing**

	2014*	2010**	2000***
Total Housing Units	936	958	740
Occupied	498	516	536
Vacant	438	442	204
Owner-Occupied	278	247	248
Renter-Occupied	220	269	288
Median Housing Value	356,600	NA	NA

Source: \* ACS, 2010 – 2014, \*\* U.S. Census 2010, \*\*\* U.S. Census 2000

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## TRANSPORTATION

The local transportation system links the Town to the rest of the region. Routes 184 and 642 are the Town’s two main arterial roads, and they intersect U.S. Route 13. The historic downtown area exhibits a historic grid system. There are also many alley ways, sidewalks, and multi-use paths through the Town. The railroad and harbor have played an important role historically to the Town, and continue to do so to this day (*Town of Cape Charles Comprehensive Plan, 2009*). There is an anticipated increase in industrial activity at the Harbor due a new Harbor Access Road, which will intersect Stone Road and include bike/walking lanes. This new project will aid in providing safe walkability to grocery stores and supplies before or after an emergency.

Cape Charles Harbor currently serves the Bay Coast Railroad, Bay Shore Concrete, United States Coast Guard, Mid-Atlantic Maritime Academy, commercial fisherman, and recreational boaters. New development has been proposed on private parcels around the harbor as well (*Town of Cape Charles Comprehensive Plan, 2009*).

There are only two roads leading into the Town, and so lack of accessibility is a risk factor for the Town. In the past, accidents have closed the main road leaving only one route accessible. Both roads have mature trees that could also close the road in a wind event. Ice and snow events occasionally threaten accessibility to the Town on both roads. According to the *ESVA Transportation Infrastructure Inundation Vulnerability Assessment*, roads in the historic area are more vulnerable to inundation than Bay Creek or other areas of the Town.

The measure of vehicles available to households is one indicator of a household’s ability to evacuate when necessary. As of 2010, over a quarter of the Town’s occupied residences are estimated to not own a vehicle (Table 5), however, much of this is attributed to the high percentage of second homes for which there is no locally registered vehicle. Stop numbers 1 – 3 & 29- 34 all serve the Town and immediate surrounding area with Star Transit’s Yellow, Lower Shore Loops Line, which provides additional transportation options for residents of the Town to medical services, grocery stores, etc. There are an estimated 200 golf carts in the Town, these could serve as an important resource during times of emergency.

**Table 5: Cape Charles Vehicles Available per Households**

Vehicles Available	2010**	2000**
None	61	159
One	195	214
Two	155	118
Three or more	68	43

Source: \* ACS, 2010 – 2014, \*\* U.S. Census 2000

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## COMMERCIAL AREAS

The main commercial activity in Cape Charles is located within the historical core of the Town. The historical commercial core has increased and will continue to do so as the demand for goods increases with the growing population. The expansion of commercial activity outside of the Historic District is predicted to occur around the Cape Charles Harbor and the northern part of Town along King’s Creek as well (*Town of Cape Charles Comprehensive Plan, 2009*).

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## COMMUNITY SERVICES AND FACILITIES

## Eastern Shore of Virginia Hazard Mitigation Plan

Community facilities comprise all the public services and facilities provided by the Town to all residents. Those services include public water and sewage treatment facilities, police and fire departments, wharf, parks and recreation facilities, and solid waste management.

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### PUBLIC SAFETY

Cape Charles has the basic services required for the safety and convenience of its citizens. The Cape Charles Police Department works in conjunction with county and state resources there are 5 officers and 5 vehicles with potentially one more officer and vehicle coming on next year (Jeb Brady, Building Official, personal communication, June 8, 2016). The Cape Charles Volunteer Fire Company and the Cape Charles Rescue, Inc. also work cooperatively with other local fire companies and rescue squads to provide fire protection and emergency medical services (*Town of Cape Charles Comprehensive Plan, 2009*). There are no paid employees at the Fire Company, but there are about 10 auxiliary volunteers and about 20 volunteer firefighters. The Town employees that are also volunteers of the Fire Company are permitted to respond to calls while on the payroll, which aids in improved responses. The Fire Company is equipped with two engines, 95 foot aerial truck, 1 tanker, 1 brush truck, but no medics and/or ambulances, etc. (Jeb Brady, Building Official, personal communications, June 8, 2016).

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### SCHOOLS

Cape Charles Christian School is located in the historic district, but outside of the .2%-annual-chance flood zone. The school serves pre-kindergarten through eighth grade and has about 50 students.

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### PARKS AND RECREATION

Cape Charles has a variety of community facilities available including the Cape Charles Harbor, the public beach, the Fun Pier, and Central Park (*Town of Cape Charles Comprehensive Plan, 2009*). Putting a divided median in and new lighted sidewalks from Fig to the Bay along Washington Avenue. There is a plan to connect the entire town with none-motorized trails.

Cape Charles Beach is the only public beach in Northampton County. It provides an important recreational function and vital protection against hazards. Almost half of the historic area of Cape Charles is considered to be in the 500 year flood plain, but the beach is identified as being in the VE Zone (zone of high velocity waters). The wide shallow water area, the development of the dunes, and the breakwaters are necessary to provide a storm buffer between the Chesapeake Bay and the historic housing area (*Town of Cape Charles Comprehensive Plan, 2009*).

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### WATER SUPPLY AND WASTEWATER

The Town's public utility systems have allowed more dense development in Cape Charles than the rest of Northampton County. The Town prohibits new private deep wells and septic systems due to them threatening the Town's water supply (*Town of Cape Charles Comprehensive Plan, 2009*). According to the 2014 Drinking Water Consumer Confidence Report, the Town's drinking water, which originates from five active wells in the Upper and Middle Yorktown-Eastover Aquifers, only has one contaminant at violation level (a by-product of drinking water disinfection). The Cape Charles Waste Water Treatment Plant (WWTP) was upgraded in 2008 and although the design flow stayed the same, the amount of discharged nutrients has subsequently decreased to about a quarter of pre-retrofit levels.

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### SOLID WASTE

The Town contracts with Davis Disposal for weekly residential trash collection, which is transported to a county transfer station. There is also a community cardboard recycling bin from Davis Disposal and yard debris pick up weekly (Jeb Brady, Zoning Official, personal communications, June 8, 2016).

POWER AND COMMUNICATIONS INFRASTRUCTURE

The Town does not typically have problems with long-term power outages during or following storm events. Most mobile service is consistent throughout the Town. The Town of Cape Charles is part of the Eastern Shore Broadband Network Project, and has a community network that is connected to the fiber running the length of the Shore from the Maryland state line.

NATURAL ENVIRONMENT

There is an abundance of natural resources in Cape Charles. Wetlands, natural areas, and the public beach are present within the Town’s boundaries and provide important buffers to natural hazards. They also provide an important economic function related to tourism and recreation that provide jobs for Northampton County (*Town of Cape Charles Comprehensive Plan, 2009*).

LAND USE LAND COVER

Cape Charles consists of land which is largely developed and agricultural. The north end of the town is where the historical, planned community exists with smaller pockets of urban development near the southern ends of the town. In Figures 2 and 3 on the following page, the USGS seems to have mislabeled the Cape Charles Natural Area Preserve as cultivated crop and the area south of the Preserve as barren, although it is a residential area. Despite this misappropriation, the overall trend towards increasing developed lands is valid. There are many challenges that accompany increased development and increased populations, from impervious surfaces and storm water to increased demand for utility and emergency services.

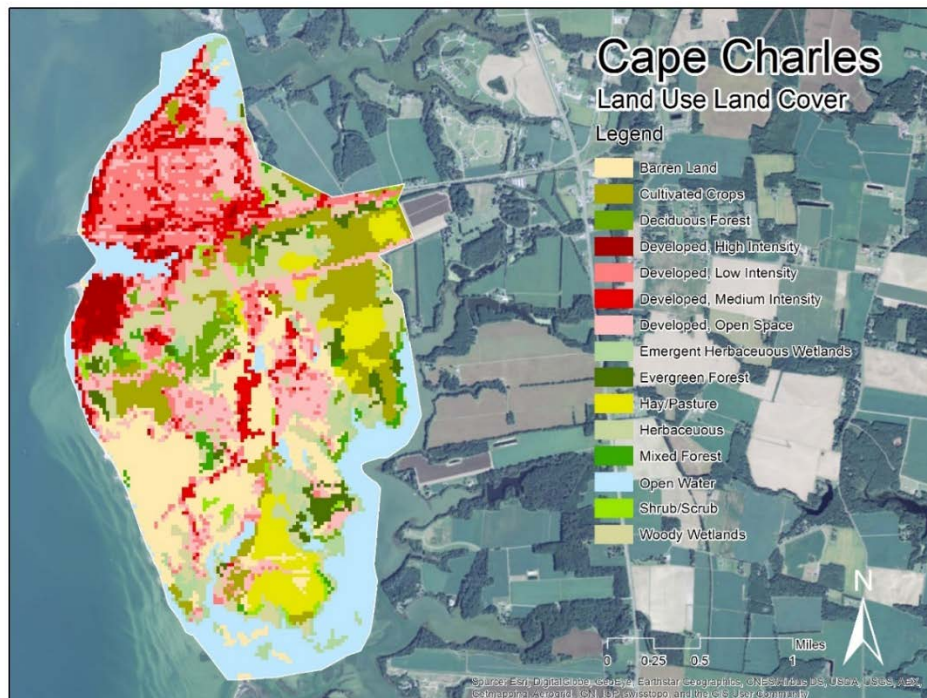
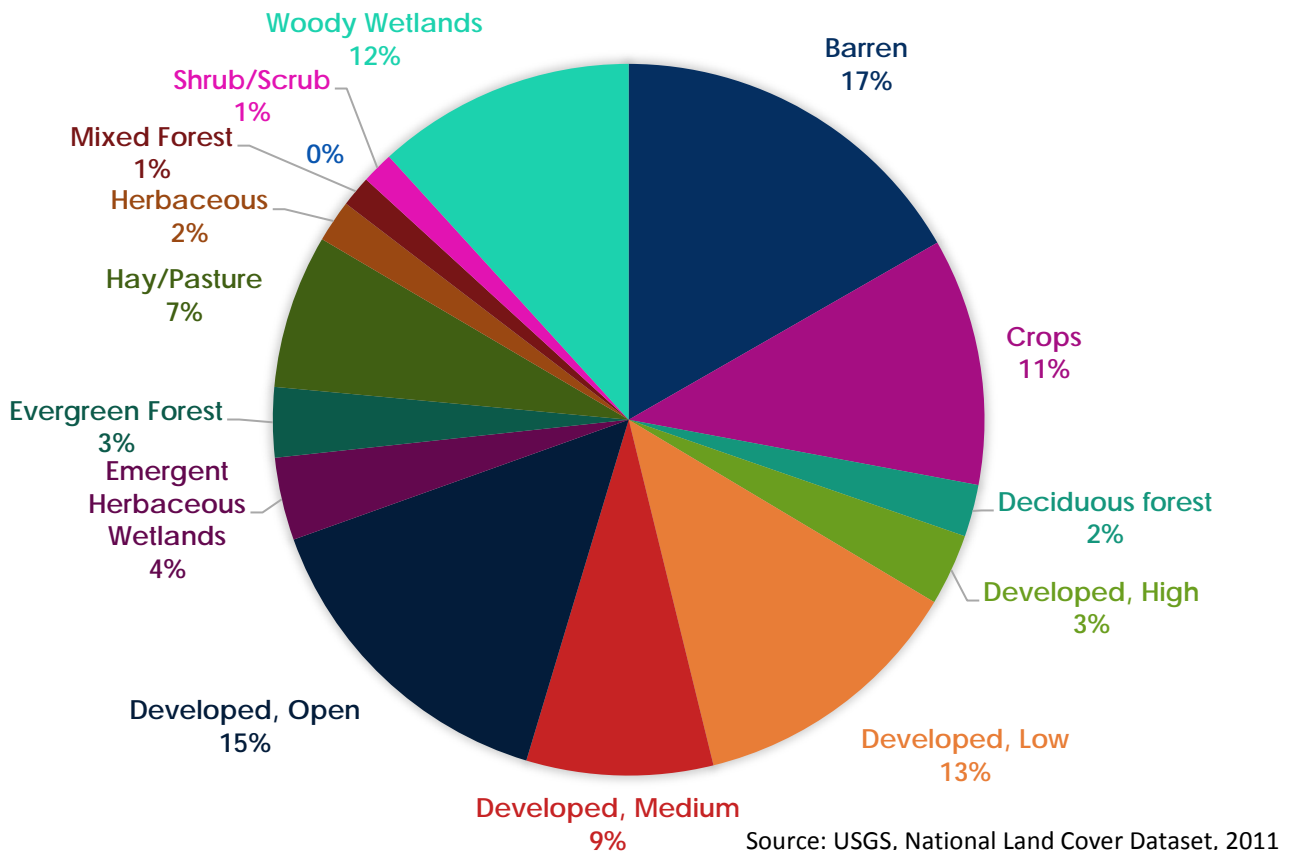


Figure 2 : Cape Charles Land Use Land Cover Map





**Figure 3 : Cape Charles Land Use Land Cover Percentages**

# HAZARD PREPAREDNESS & COMMUNITY CAPABILITIES

## PREVIOUS HAZARD MITIGATION PLANS

Cape Charles has participated in the hazard mitigation planning process since 2006. The primary hazard for Cape Charles has been coastal flooding, storm water flooding, and winds associated with hurricanes and northeasters.

Cape Charles is currently updating its Comprehensive Plan. The previous update is from 2009, and it does not mention coastal hazards within the document. Due to the Town’s participation in the hazard mitigation process, they use this document as the primary resource for preparing for coastal hazards.

The following table contains authorities, policies, programs and resources, and intentions or ability to expand to address reductions in hazard vulnerability.

**Table 6 : Cape Charles Hazard Vulnerability Resources**

	Ordinances, Plans, & Publications												Resources, Committees					
Authority	Building Code	Chesapeake Bay Act	SWMP	Hazard Mitigation Plan	Comprehensive Plan	Zoning Ordinance	Storm Water Regulations	Transportation Infrastructure Inundation Vulnerability Report	All Hazards Preparedness	Emergency Operations Plans	Mutual Aid	Neighborhood Emergency Help	Virginia Hurricane Evacuation	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

The Town has utilized post-disaster funds to repair the substantially damaged fun pier and to complete a beach renourishment.

### NFIP

The Town joined the NFIP on February 2, 1983. The January 2016 FEMA NFIP insurance report shows that the Town has 234 flood insurance policies, a decrease of 82 policies since 2011, but still 51 policies more than in 2003. The new Flood Insurance Rate Map (FIRM) is most likely the cause of the vast reduction in the number of overall policies, however as of January 2016 there were still 150 low-risk policies, indicating that residents would still like to be prepared for flood events.

Cape Charles participates in the Community Rating System (CRS) program, which provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When a community completes specified activities, the insurance premiums of these policyholders in communities are reduced. The Town received an initial score of nine as a new participant meaning that residents receive a five percent discount on flood insurance, but anticipate a new score of 8 in the near future (Jeb Brady, Zoning Official, personal communication, June 8, 2016). The highest CRS score is a one. The Town is working diligently to improve its CRS rating to earn its residents an even greater discount in the future.

**Table 7 : Summary of Cape Charles' past NFIP participation**

	<b>HMP 2006</b>	<b>HMP 2011</b>	<b>HMP 2016</b>
NFIP (date joined)	February 2, 1983	February 2, 1983	February 2, 1983
Number of policies	183 15 not in SFHA	316: 266 A-Zone, and 50 other (not in SFHA)	234 policies: 84 A-Zone, and 150 other (not in SFHA)
Total Premium Amount	-	-	\$159,120
Total Coverage Amount	-	-	\$66,162,900
Number of Claims (since 1978)	6	9	13
Total Paid (since 1978)	\$2,825	\$25,304	\$85,914
HMGP	NA	NA	NA
CRS Score (1 highest, 10 lowest)	NA	9 (5% policy discount)	9 (5% policy discount)

Source: FEMA NFIP Insurance Report 2006, 2011, January 2016

### HMGP

The Town has not participated in the Hazard Mitigation Grant Program.

## HAZARD PROFILE

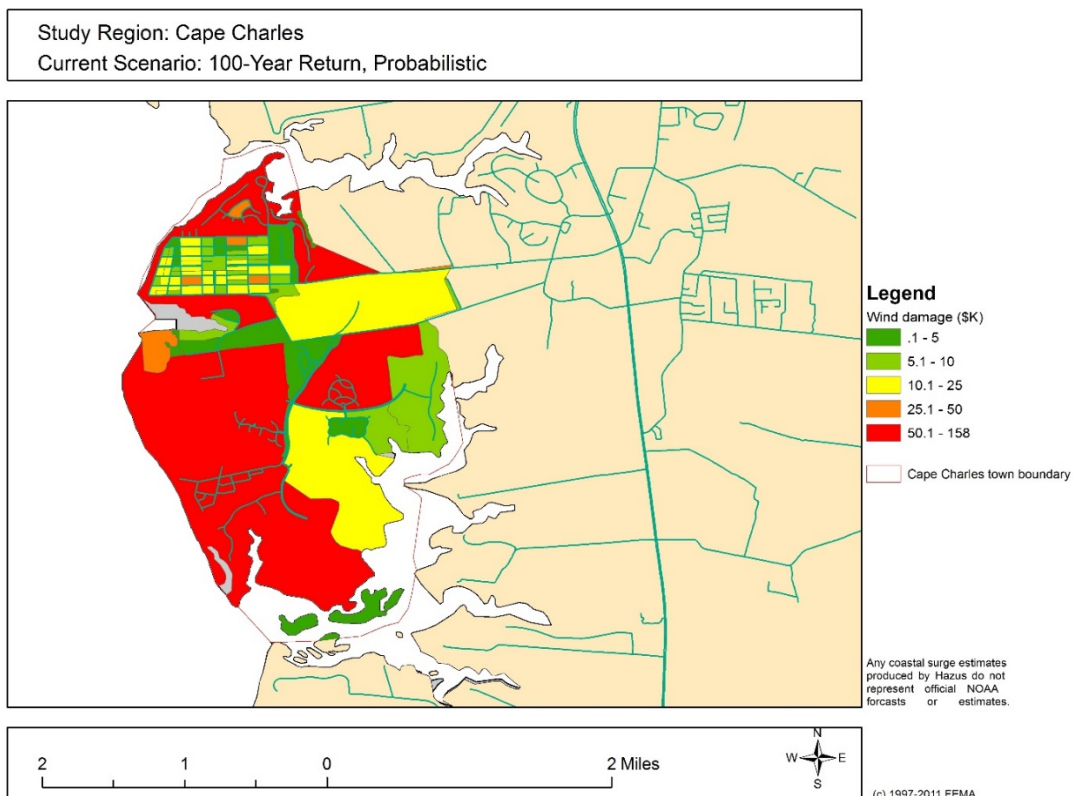
### WIND

## Town of Cape Charles

During a 1% chance annual storm event, Cape Charles is estimated to sustain \$1.41 million in wind damages (Hazus®) including costs from building damages, content damages, inventory, relocation, and lost income and wages. This is over \$5 million less than the estimates from the 2006 and 2011 Hazard Mitigation Plans, but agreed to be more accurate (personal communication, June 8, 2016). A large portion of the Town is within the wind borne debris hazard area, which is defined as the area extending 1-mile inland from the shoreline. In 2003, it was estimated that there were 687 structures in the area, and the original methodology applied a formula to all of these structures. The new Hazus® model incorporates additional information, such as probable roofing material based on the type of building and wind patterns and roughness, which provides some insight into the difference in total damage estimates between the years.

In addition to direct wind damage, much of the Town has mature trees that are a potential secondary hazard to the structures in that area as well as accessibility for emergency services. As seen during Hurricane Isabel in 2003, historic northeasters, and other high wind events, structures are vulnerable to being damaged by large trees that come down. There are many mature trees within the Town that are vulnerable during a high wind event. The Cape Charles building stock in the older part of Town consists of larger historic homes (*ESVA Hazard Mitigation Plan, 2011*). The historic district is more susceptible to wind damages due to the fact that the buildings are newer, built to higher standards, and have fewer large trees.

Straight line winds also are a threat to the Town and were credited with some of the damaged incurred from the Cherrystone tornado, particularly damages to a crane at Bayshore Concrete. In mid-February 2012, the train storage building, built to withstand 110mph gusts sustained damages from straight line winds as well. These kinds of intense wind events may become more common with changes in the climate.



**Figure 4 : Cape Charles Wind Damages by Census Block 1% Annual Chance Storm**

## COASTAL EROSION

During the past eight years the Town of Cape Charles has had an aggressive plan to mitigate erosion along its entire shoreline and harbor area. Twenty (20) offshore breakwaters have been built to protect the northern Marina Village, Town Beach, Harbor entrance and the Bay Creek Beach on the south. These have been built with both private and public funds. There are now three breakwaters at the mouth of the Harbor, and the height of the two older breakwaters were also increased. More breakwaters are required on the northern and central sections of the coastline. Mitigation could continue, but has been halted due to lack of funding from both public and private sources.

Last year the inner and outer harbor was dredged and the sand was used to nourishment the Town beach. Soon, they will dredge the Federal Channel and any sand spoil that is suitable will again be used to nourish the Town beach, most likely on Labor Day weekend (of 2016). The long-term intent is to add dunes on the northern end of the beach and perhaps be built higher from the sand fences (Jeb Brady, Building Official, personal communications, June 8, 2016).

FEMA's post-storm inspections show that most privately funded erosion control structures fail during storm events. FEMA notes in the Coastal Construction Manual that some communities choose to distinguish between erosion control structures that protect existing development and those that are constructed to create a buildable area on an otherwise unbuildable site. Buildings destroyed by erosion are not covered under a NFIP flood insurance policy.

During Hurricane Sandy in 2012, significant erosion occurred along the shoreline adjacent to the Seabreeze Apartment Building on Washington Avenue. These repair cost were not included in the NFIP claims. The erosion undermined the foundation of the apartment building to the extent that the building was deemed unsafe for occupancy. Seven families were displaced as result (Eastern Shore Post; November 2, 2012) for several months, but are now currently inhabited. About 15 feet of land eroded in about 2 hours (Jeb Brady, Zoning Official, personal communication, June 8, 2016). This building and the home on the adjacent house are within fifty feet of the shoreline and at immediate danger to damage from erosion during a storm event.

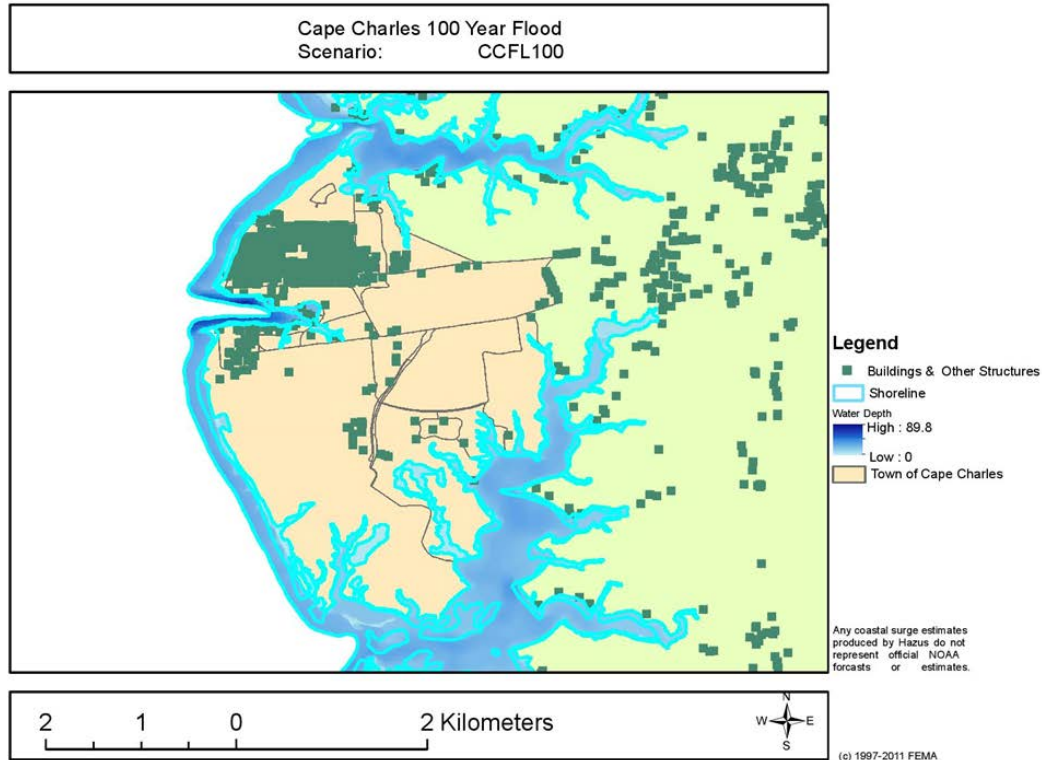
Also, during Sandy, the water almost got into the Shanty Restaurant. All of the stationary docks were completely submerged, but the roads were not submerged. In general, however, erosion to the more susceptible golf courses and beach is a higher threat to the Town than damages. There is some bulk heading to protect these areas on Nicklaus Drive, but some areas on Nicklaus Drive and on Palmer Drive are still in need of additional reinforcements. During Hurricane Isabel in 2003 and the November storm Nor'Ida of 2009, many portions of the northern section of the Town were eroded. (Jeb Brady, Zoning Official, personal communication, June 8, 2016)

## COASTAL FLOODING

The Flood Insurance Study identifies that the greatest threat of flood inundation comes from hurricanes and northeasters. In 1935, a wooden bulkhead was constructed to protect the Town from surge water. Many times this bulkhead had to be refurbished or repaired. Dunes now protect the area of old Town from Washington Avenue to Mason Avenue from smaller floods. A series of offshore breakwaters exist off the public beach and the mouth of the harbor and are designed to prevent erosion and attenuate wave action. These provide protection against coastal flooding and are described in greater detail in the following Coastal Erosion section.

## Town of Cape Charles

Using Hazus®, minimal flooding is anticipated during a 1% annual chance flood event, as shown in Figure 4. Only two buildings on six properties within the Special Flood Hazard Area are likely to be damaged, both belonging to the Town. The total damages are estimated to be almost \$20,000 primarily from content and inventory losses.



**Figure 5 : Cape Charles 100 Year Flood Estimates**

The 2015 FIRM removed half of a square mile of land from the Special Flood Hazard Area (SFHA), and with it some 431 buildings. Although the V Zone total area did not change, there was also a net loss of two buildings from this zone. The current estimated flood damage loss from buildings and contents just exceeds \$20,000 according to Hazus®, which is a vast change from the 2011 estimated \$52.9 million in structure and content damages (*ESVA Hazard Mitigation Plan, 2011*).

## STORM WATER FLOODING

Several factors cause the Town of Cape Charles storm water system to be prone to flooding during significant rain events. The Town's storm water drains from east to west, ending at the Chesapeake Bay. The southern half of the Town has surface drainage only while the northern half of Town has an underground drain system. The Town continues to work with VDOT on maintenance but mitigation would be preferred. The responsibility of the maintenance of ditches along public streets within the Town falls on VDOT. The Peach Street and Washington Avenue intersection now drains to Crystal Lake instead of directly into the Chesapeake Bay which seems to help with storm water flooding in this area and will help with fresh water retention and reducing runoff.

Storm water flooding occurs during significant rain events at the intersection of Plum Street and Madison Avenue. During a northeaster in 2007, storm water completely inundated the streets of the western portion of the Town due to floodwaters being unable to drain at the time of the storm. Some homes experienced minor flooding during this event (Verbal Communication with Town Staff, 2010). During a short rain event on August 2, 2016, there was significant water flowing quickly over the intersection of Tazewell Avenue and Plum Street, which appeared to be a

consistent problem throughout the Historic district (Shannon Alexander, A-NPDC, personal communications, August 3, 2016).

## HAZARDS OF LOCAL SIGNIFICANCE

### WATER SUPPLY CONTAMINATION

Contamination from saltwater intrusion has already been documented for the Town’s water supply. With sea-level rise and continued drawdown of our sole-source aquifer, this is a continued concern for the Town.

### SEA-LEVEL RISE

According to the *ESVA Transportation Infrastructure Inundation Vulnerability Assessment*, roads in the historic area are more vulnerable to inundation than Bay Creek or other areas of the Town, but the rail yard and harbor, two vital economic drivers, are first at risk. In addition, sea-level rise would threaten the Town beach, Bayshore Concrete, the Coast Guard Station, and various low lying areas in the area.

## CRITICAL FACILITIES

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

**Table 8 : Cape Charles Critical Facilities**

Facility	Hazards	No of People Affected	Loss potential	Relocation Potential	Retrofit Potential
<b>Town-Owned Facilities</b>					
Waste Water Treatment Plant and Water Tower	Wind, Storm Water, Flooding	1,000+	Devastating	No	Yes
Police Departments & Municipal Building	Wind, Storm Water, Flooding	1,000+	Devastating	No	Yes
Central Park	Wind, Storm Water	1,000+	Inconvenience	No	Yes
Town Beach	Wind, Flooding, Erosion	1,000+	Major Disruption	No	Yes
Town Pier	Wind, Flooding, Erosion	1,000+	Major Disruption	No	Yes
Town Harbor	Wind, Flooding	Entire Town and region	Devastating	No	Yes

Town of Cape Charles

Pump Stations (4 in the old Town, 1 in the marina, 3 more in Bay Creek - those 3 are vacuum stations)	Storm Water, Flooding	1,000+	Major Disruption	No	Yes
Town Wells	Salt water intrusion	1,000+	Major Disruption	Yes	Yes
Public Works and Utility Buildings (behind Rayfield's Pharmacy) and vehicles (~30 including tractors)	Wind, Storm Water	1,000+	Minor Disruption	Yes	Yes
<b>Other Critical Facilities</b>					
Post Office	Wind, Storm Water, Flooding	Entire Town and surrounding area	Major Disruption	No	Yes
Riverside Medical Center	Wind, Storm Water	1,000+	Inconvenience	No	Yes
Pharmacy	Wind, Storm Water	Entire Town and Southern Northampton County	Major disruption	No	Yes
Volunteer Fire	Wind, Storm Water	Entire Town and Southern Northampton County (Cheriton to CBBT)	Major Disruption	No	Yes
Dredge Spoil Basin (Federally owned)	Erosion	1,000+		No	No
Coast Guard Station	Wind, Flooding, Storm Water	Entire Town and Chesapeake Bay Region	Major disruption	No	Yes
Cape Charles Christian School	Wind, Storm Water	Students and families	Inconvenience	No	Yes
Rail Yard	Wind, Flooding, Storm Water	Entire Town and region	Minor Disruption	Yes	Yes



## Eastern Shore of Virginia Hazard Mitigation Plan

Civic Center	Storm Water, Wind	1000+	Inconvenience	Yes	Yes
Museum & Welcome Center	Wind, Flooding, Storm Water	1000+	Inconvenience	Yes	Yes

# FINDINGS

1. The new FIRM shows a reduction of 431 structures now located in the 100-year flood zone. This may increase a false sense of security in the Town about flooding.
2. The Town has 234 flood insurance policies, a decrease of 82 policies since 2011, but still 51 policies more than in 2003. The new FIRM is most likely the cause of the vast reduction in the number of overall policies, however as of January 2016 there were still 150 low-risk policies, indicating that residents would still like to be prepared for flood events.
3. The most reasonable worst-case scenario for the Town is a storm that pushes water toward Cape Charles and increase the tidal elevation.
4. The older historic homes were built with “basements” where the boiler was housed. Due to the high water table these basements could not be very deep and therefore the first floor above grade is generally above the flood level.
5. Most critical facilities are subject to flooding and high wind.
6. Multifamily dwellings at Washington Avenue are highly susceptible to damages during storm events, as evident by damages during Hurricane Sandy.
7. Transient population increase and updates to the older homes to make them more resilient to damages. The new FIRM and statement about misconception about vulnerability.
8. Cape Charles is located on a peninsula with only two roads entering or leaving town. If evacuation prior to a hurricane is delayed, a blocked road could preclude persons in hazard areas from taking refuge outside the Town. The official evacuation route is to the north parallel to the coast with at least 90 miles before an inland access is available. Early evacuation could be across two bridge-tunnel complexes and westward to higher ground.