

# ***LOOKING FORWARD***



## ***CLIMATE CHANGE ADAPTATION CONTEXT***

### ***CHILMARK***

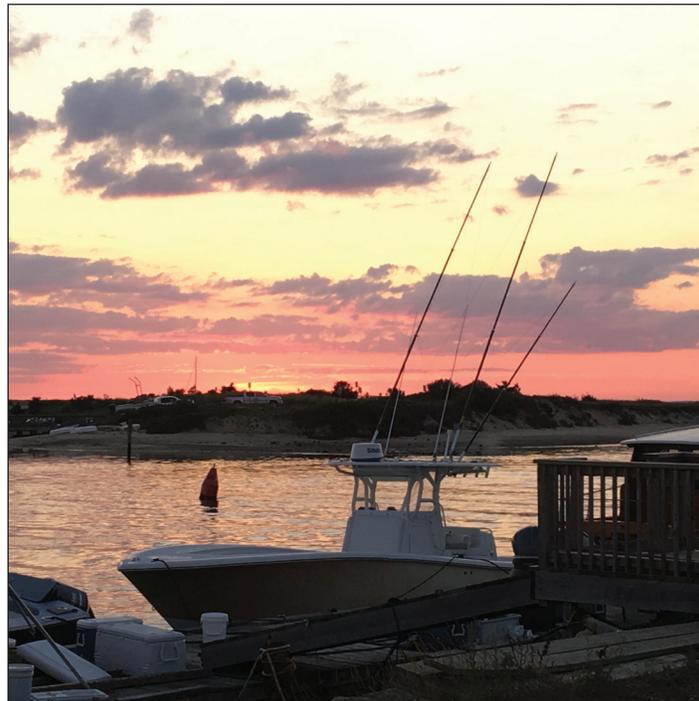


## ***Introduction***

This document aims to share a baseline of information, based on existing published sources, to support resilience planning for Chilmark and the Island of Martha's Vineyard, by providing:

- 1) Up-to-date projections for changes that are expected by mid-century and the end of the century
- 2) Impacts of concern from these changes that Chilmark residents have identified
- 3) Common impacts identified by multiple towns
- 4) Existing strengths and initiatives to support climate change adaptation
- 5) An inventory of relevant reports, policies, and initiatives most relevant to Chilmark in supporting adaptation

The purpose of this document is to foster discussion about how the Martha's Vineyard Commission (MVC) can support Chilmark in these efforts and explore areas for Islandwide collaboration in the drafting of an Islandwide Climate Resilience Plan. We recognize there may be gaps in information, and we hope this document will help to illuminate data and information that needs to be updated.



## ***September 2020***

*Compiled and edited by Meghan Gombos and Alex Elvin  
Maps by Chris Seidel*

*Map Data Sources: FEMA Flood Zones – FEMA Effective 2016; Hurricane Inundation – USACE 2013 based on NOAA's SLOSH Model; Wildfire – MVC delineation using MassGIS Land Use of 2016 and TNC's vegetation data 2002; Open Space/Conservation Land – MVC & Island Conservation Partnership 2020; Structures – Latest available from MassGIS as of 2020. Structures are digitized from aerial photos. Affected Structures – MVC's analysis which only utilized structures having a roof area > 400sq ft. A structure could be a main house, guest house, business, or a large outbuilding.*



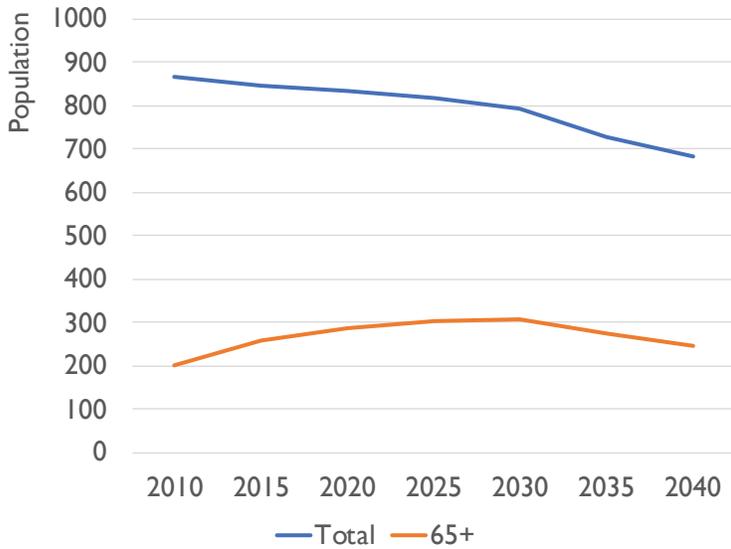
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This section provides basic demographics, along with information related to infrastructure, land use, socio-economic factors, and natural resources, which can be used to support climate-change resilience planning in Chilmark.

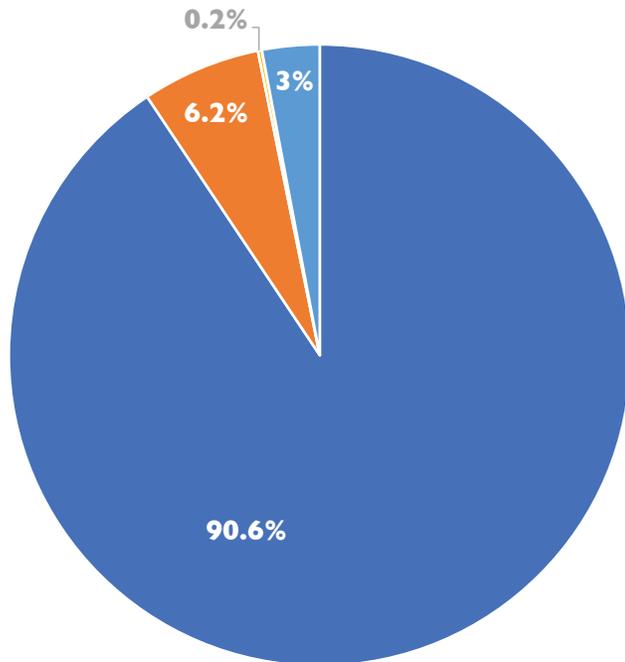
**Demographics**

**Population Projection**



UMass Donahue Institute, 2015; updated in 2018

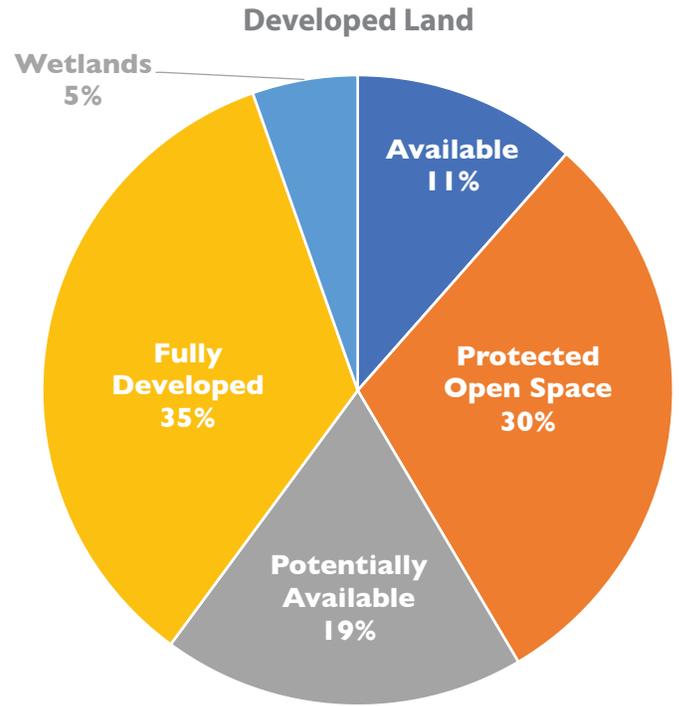
**Ethnic Diversity**



- White
- Two or more races
- African American
- Other
- Asian

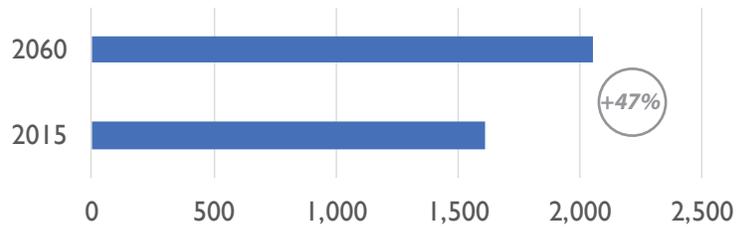
American Community Survey, 2018

**Infrastructure and Land Use**



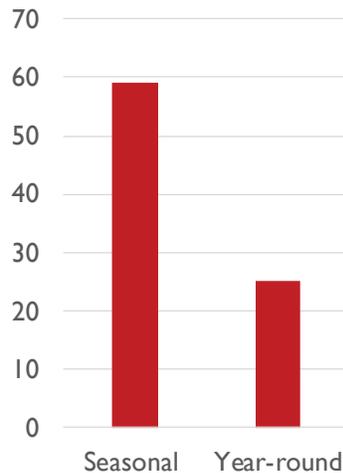
MVC, 2020

**Projected New Houses in 2060**



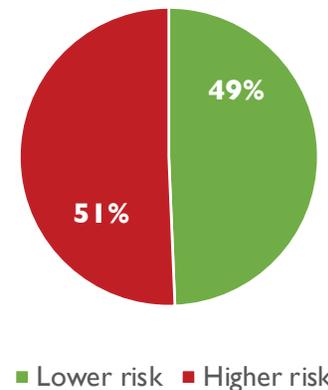
Dukes County Hazard Mitigation Plan, 2015; the MVC projected how many houses would be built by 2060 if current zoning is maintained and past rates of construction continue

**Buildings in 100-Year Floodplain**



MVC, 2018; based on FEMA flood zones

**Homes at Risk from Wildfire**



Dukes County Hazard Mitigation Plan, 2020 (draft)

**Conservation/Open Space Land  
Chilmark, MA**



**Environment**

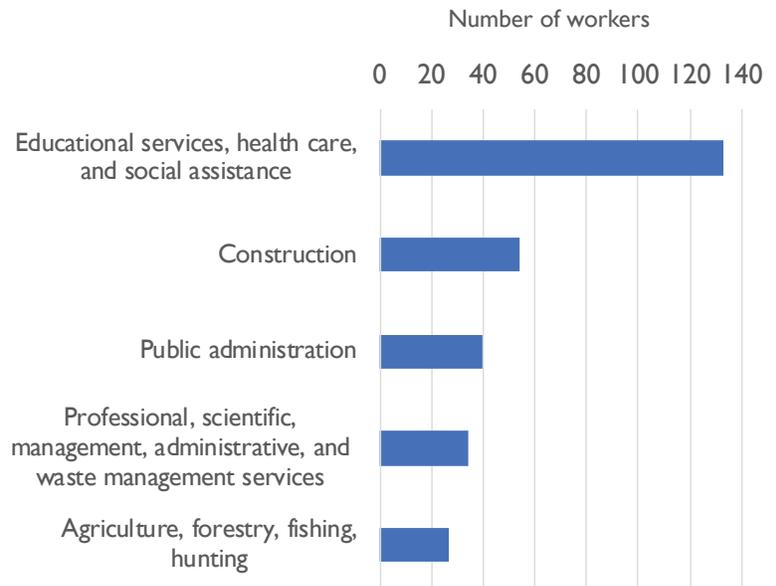
- » Chilmark, Menemsha, Nashaquitsa, Stonewall, Squibnocket, and Tisbury Great ponds, along with beaches, dunes, marshes, wetlands, and inland ponds
- » Menemsha and Squibnocket ponds are shared with Aquinnah, and Tisbury Great Pond with West Tisbury
- » 30% of the land is conserved
- » Special districts include the Menemsha, Nashaquitsa and Stonewall Ponds DCPC, the Wild and Scenic North Shore DCPC, and the town's Squibnocket Pond District, where all forms of development are subject to careful review by local boards and/or committees
- » Most residents rely on well water and electric pumps

**Socio-Economic Factors\***

- » 346 households
- » About 21% of the 1,650 housing units are vacant in the winter, which is significantly less than other Island towns
- » Median household income: \$94,306 (highest on the Island)
- » 40% of the population in 2019 was over 65 (highest on the Island)
- » Menemsha includes a number of water-dependent facilities for the resident fishing fleet and visiting recreational craft, and is an economic center for tourism in Chilmark
- » Chilmark has among the highest median home sale price of any town or city in Massachusetts
- » 18.5% of students at the Chilmark School are considered economically disadvantaged

- » Vulnerable or under-represented communities include:
  - Immigrants and non-English speakers
  - Low- and fixed-income residents
  - Members of the African-American community
  - Residents older than 65
  - Disabled residents
  - Residents who are isolated in some way

**Top Five Industries**



\*Data from American Community Survey, 2018; town street lists, 2019; and MA Dept. of Elementary and Secondary Education, 2019

This section provides more localized projections for climate-change hazards, and highlights some of their impacts in the region.

HAZARD*	LOCAL PROJECTIONS	LOCAL IMPACTS
 <p><b>Rising Temperatures</b></p> <p>Greenhouse gases (e.g. carbon dioxide and methane) trap heat in the atmosphere, causing global temperatures to rise.</p>	<p>Annual average temperatures on Martha's Vineyard are projected to increase by 2.4–5.2°F by 2050, and 3.0–9.1°F by 2100.</p> <p>Annually, we expect to see 2–10 more days with maximum temperatures over 90°F by mid-century, and 4–31 more days by 2100.</p> <p>We expect 19–39 fewer days per year with minimum temperatures below 32°F by mid-century, and 23–63 fewer days by 2100.</p>	<ul style="list-style-type: none"> <li>» Damage to crops and food plants; unpredictable growing seasons</li> <li>» Higher demand on water resources</li> <li>» Increased vector-borne disease</li> <li>» Heat stress, especially among elders</li> <li>» Increased risk of wildfire</li> <li>» Increased potential for invasive species</li> </ul>
 <p><b>Sea-Level Rise</b></p> <p>Sea levels are rising from the expansion of warmer waters and the melting of polar ice.</p>	<p>Sea-level projections vary according to the source and timescale. Sea levels on the Vineyard have risen about 6" since 1970, and are expected to rise another 6" by 2050; projections from the Woods Hole tide gauge show an increase of 1.5–6.5 feet by 2100 relative to mean sea level in 2000</p> <p>By 2050, it's projected we will see 35–135 "sunny-day coastal flooding days" per year, as opposed to 2020, which is expected to have no more than three to seven days</p>	<ul style="list-style-type: none"> <li>» More frequent flooding and nuisance tides</li> <li>» Increase in erosion of beaches and dunes when coupled with storm surge</li> <li>» Damage to coastal property and infrastructure</li> <li>» Potential for saltwater intrusion of coastal wells</li> <li>» Flooding and loss of salt marshes</li> </ul>
 <p><b>Rising Sea Surface Temperatures and Ocean Acidification</b></p> <p>As temperatures and gases increase, much of the heat and CO<sub>2</sub> is absorbed into the oceans, causing sea-surface temperatures to rise and oceans to become more acidic.</p>	<p>The average sea surface temperature in the Atlantic increased 0.74 °F between 1950 and 2009, and is expected to increase 1.8–5.4°F by 2100.</p> <p>Downscaled models project faster rates of warming in the Northeast continental shelf ecosystem compared to the global average.</p> <p>Ocean pH has decreased by approximately 0.1 units over 100 years and is expected to continue to become more acidic in the coming years.</p>	<ul style="list-style-type: none"> <li>» Declines in pond water quality</li> <li>» Loss of habitat for key fisheries</li> <li>» Changes in fish migration patterns</li> <li>» Increased potential for invasive species</li> <li>» Impacts to shellfish life cycles and growth rates</li> <li>» Impacts to commercial and recreational fishing</li> </ul>



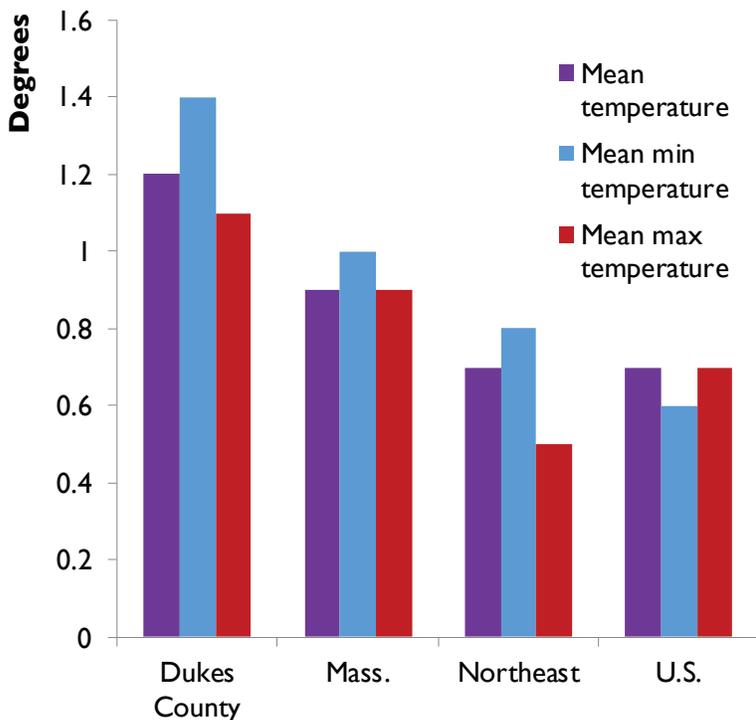
Coastal resources are some of the most critical assets in protecting our communities from the impacts of climate change, and also some of the most threatened by climate change. A 2017 economic valuation of coastal resources done for Oak Bluffs is the only study of its kind completed on Martha's Vineyard, but provides an indication of how valuable these resources are Island-wide. The report estimates that the public coastal resources of Oak Bluffs alone provide an annual value of \$133 to \$168 million in benefits from nature, including but not limited to commercial fishing and shellfishing, storm and flood protection, recreational activities, shoreline stabilization, habitat, and water quality. Assuming these services continue at present values until 2050, the report finds that the total value from 2016–2050 ranges from \$4.5 to \$5.7 billion.

*Precipitation, air temperature, sea-level rise projections, and storm data are sourced from the MA Statewide and Sub-basin Climate Change Projections Guidebook, with sea-level rise projections also based on information in the MA Climate Clearinghouse, the Oak Bluffs Climate Change Vulnerability Assessment and Adaptation Plan, and NOAA Technical Report NOS CO-OPS 092. Storm event data is based on information in the MA Climate Clearinghouse.*

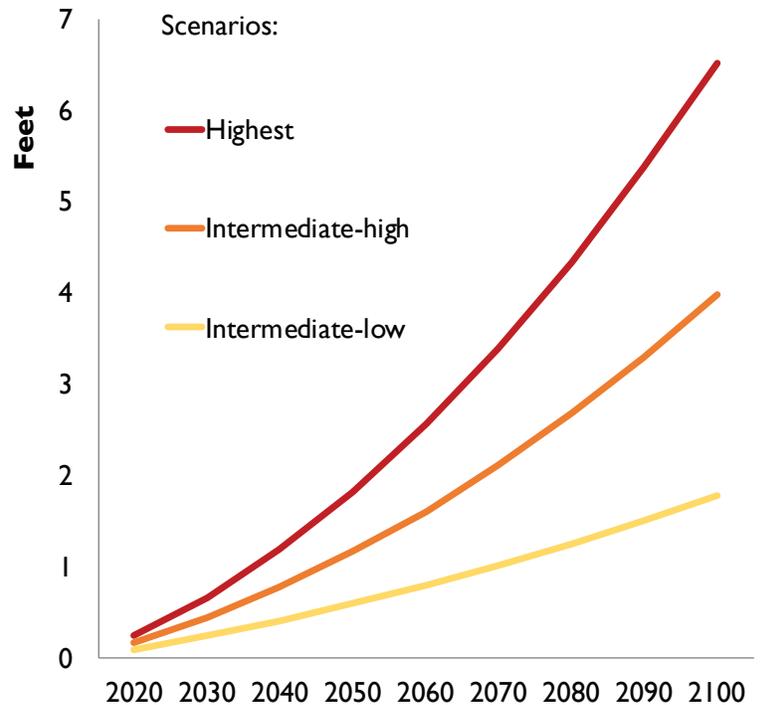
HAZARD*	LOCAL PROJECTIONS	LOCAL IMPACTS
 <p><b>Extreme Storm Events</b></p> <p>All of these changes can create more extreme weather events, including hurricanes, tropical storms, and nor'easters.</p>	<p>Climate change is expected to result in more intense and frequent storm events on the Vineyard.</p> <p>Future hurricanes that form in the North Atlantic will produce more rain and may have higher wind speeds.</p> <p>Some evidence suggests that nor'easters are also increasing in both frequency and intensity.</p>	<ul style="list-style-type: none"> <li>» Increased erosion of beaches and dunes</li> <li>» Increased coastal flooding from storm surge</li> <li>» Increased stormwater runoff and inland flooding</li> <li>» Damage to the natural and built environment, causing economic, health, and safety impacts</li> <li>» More frequent or prolonged power outages</li> </ul>
 <p><b>Changes in Precipitation</b></p> <p>Rising temperatures and other shifting climate patterns will also change the amount, frequency, and timing of rainfall and snowfall.</p>	<p>Total precipitation projections for Martha's Vineyard show variability.</p> <p>The winter season is expected to see anywhere from 4% less to 14% more precipitation by mid-century, and 1% less to 24% more by the end of the century.</p> <p>Martha's Vineyard basin could see a slight decrease, or an increase, in consecutive dry days throughout this century.</p> <p>Annual consecutive dry days during the summer season are expected to increase between by up to 4 days by the end of the century.</p>	<ul style="list-style-type: none"> <li>» Inland flooding from storm runoff</li> <li>» Increased drought and wildfire risk</li> <li>» Increased stormwater runoff</li> <li>» Warmer and wetter winters, potentially increasing risk of tick-borne disease</li> <li>» Increased dampness and mold, and associated health problems</li> </ul>

\*Adapted from the Statewide Integrated Hazard Mitigation and Climate Adaptation Plan

Change in Degrees, 1997–2017



Sea-Level Rise Projections



## Top Climate Change Impacts

Climate change will impact the town’s infrastructure, environment, and socio-economic systems. This section highlights some of the impacts of highest concern identified in the Chilmark/West Tisbury Community Resilience Building Workshops in 2018. It also highlights Island-wide concerns.



### Buildings and Infrastructure

Low-lying infrastructure is particularly susceptible to adverse impacts of climate change, and increased intensity of natural disasters will push the limits of some infrastructure capacity. Planning for long-term projections will help reduce the potential for failures of these systems.

CHILMARK	ISLANDWIDE
<ul style="list-style-type: none"> <li>» Menemsha (including docks and gas station) is highly vulnerable to storms and sea-level rise; has the largest concentration of residents and commercial buildings on the shoreline; lack of rebuilding plan in the event of a catastrophe; flooding of Menemsha dock is projected to occur about every 5.5 days by 2050, compared to about every 8 weeks now</li> <li>» 538 residential buildings; 2 commercial buildings; 3 municipal, public, or non-profit buildings; and stretches of South and State roads are at risk of wildfire</li> <li>» High dependence on electricity for wells; concerns about water access for fire fighting during power outages and droughts; effect of changing water tables on wells and septic systems</li> <li>» Concentrated stormwater can wash out key infrastructure, especially low-lying roads, bridges, undersized culverts, and on private dirt roads, severely impacting emergency access</li> </ul>	<ul style="list-style-type: none"> <li>» Disruption of the supply chain, emergency services, and transportation from flooding and storm damage of major roadways</li> <li>» Impacts to SSA service from storms and flooding</li> <li>» Potential for prolonged power outages with lack of water and communication</li> </ul>



### Natural Resources

Our natural systems (e.g. beaches, dunes, marshes) provide the first line of defense against climate change, and are the foundation for our economy and ways of life on the Vineyard. A healthy environment will be less affected by climate change and will recover faster when problems occur.

CHILMARK	ISLANDWIDE
<ul style="list-style-type: none"> <li>» High wildfire risk from changing forest structure, including increased connectivity and fuel supply from dead wood</li> <li>» Loss of marshes, dunes, and beaches from sea-level rise and storms; can reduce natural protections from climate change</li> <li>» Impacts from stormwater runoff on natural systems, erosion, and water quality (including nutrient loading from septic systems)</li> <li>» Impacts to agricultural systems and fisheries (including herring runs) from severe weather, sea-level rise and increasing temperatures</li> </ul>	<ul style="list-style-type: none"> <li>» Erosion of beaches and dunes from sea-level rise and storm surge</li> <li>» Flooding of marshes from sea-level rise</li> <li>» Warming and nitrification of ponds from higher sea temperatures and runoff from heavy rain</li> <li>» Loss of fishery habitat from higher sea temperatures</li> <li>» Susceptibility to wildfire from droughts and higher air temperatures</li> </ul>



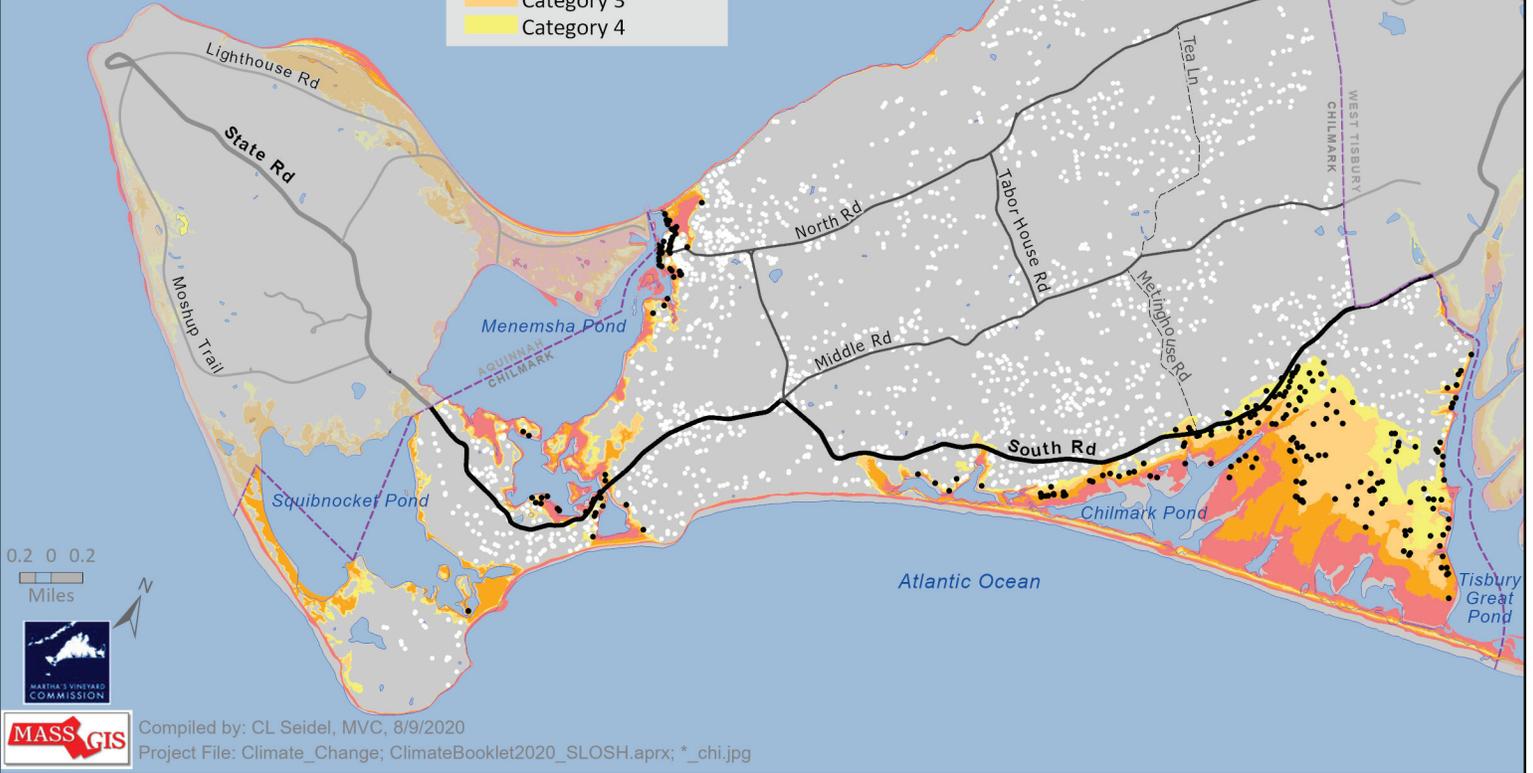
### Socio-Economic Systems

Our socio-economic systems (e.g. health, food security, economy) will face increased stress from climate change. Planning for the impacts can reduce the extent of these stressors.

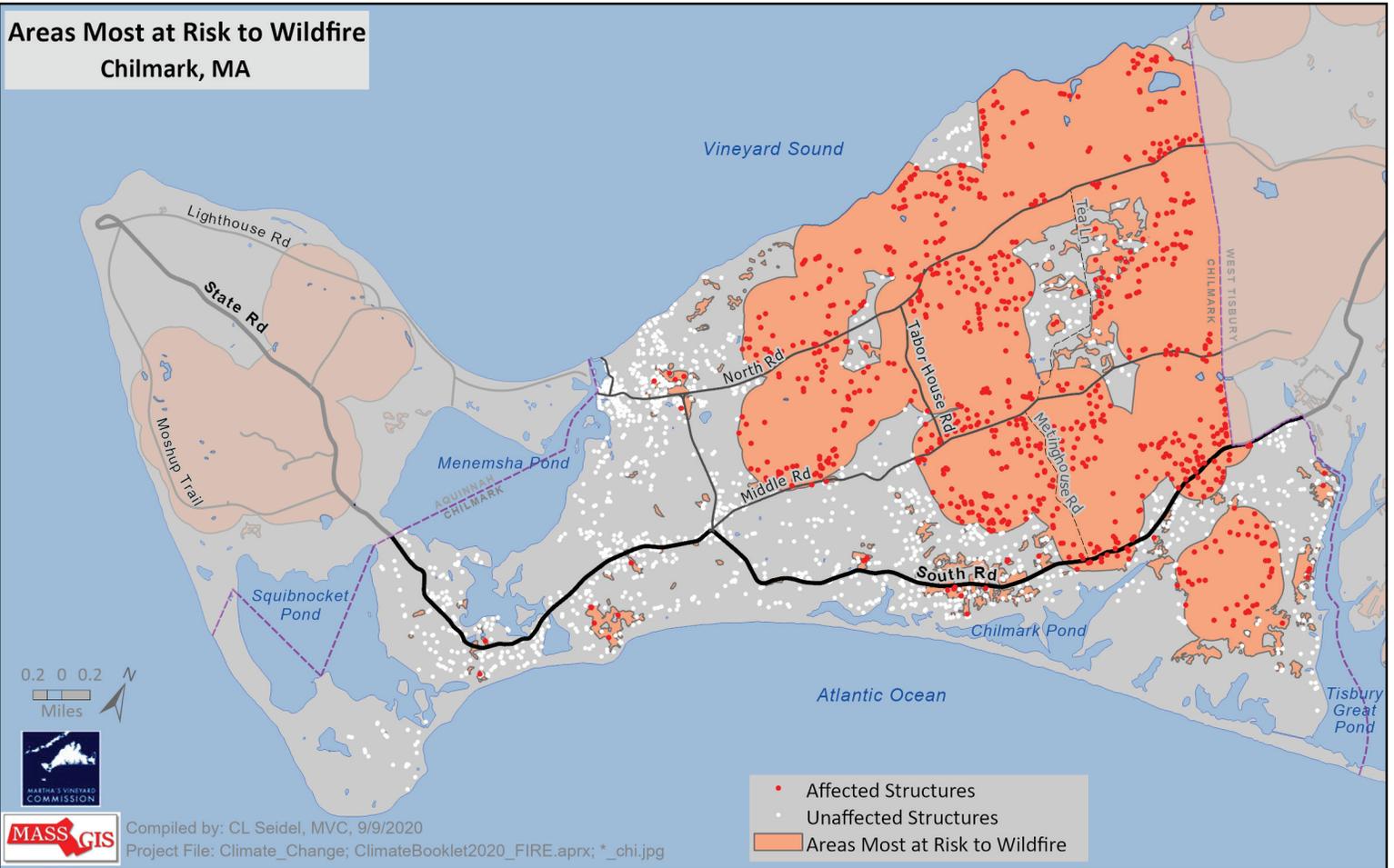
CHILMARK	ISLANDWIDE
<ul style="list-style-type: none"> <li>» Rural and isolated populations could be stranded if roads wash out from storms or disruptions to the electrical grid result in a lack of well water</li> <li>» Aging and/or aging populations that are de-centralized and need at-home care could be stranded or without communications in emergencies</li> <li>» Lack of strategic plans to ensure sustained access and egress to and from town in the wake of major weather or fire event</li> <li>» General lack of forest management awareness to help homeowners minimize potential for wildfire and tick-borne diseases</li> </ul>	<ul style="list-style-type: none"> <li>» Stress on food security</li> <li>» Impact on emergency services, and loss of access</li> <li>» Stress on aging and isolated residents from heat and during natural hazards</li> <li>» Consequences for tourism and the economy from storms, and loss of beaches, coastal homes, and tax revenue</li> <li>» Increased vector-borne disease</li> <li>» Reduced water security</li> </ul>

**Hurricane Inundation Areas**  
Based on SLOSH Model  
Chilmark, MA

- Affected Structures
  - Unaffected Structures
- Hurricane Inundation**
- Category 1
  - Category 2
  - Category 3
  - Category 4



**Areas Most at Risk to Wildfire**  
Chilmark, MA



# STRENGTHS AND CURRENT EFFORTS

The Island and its six towns have many strengths that can help us reduce the negative effects of climate change. This section highlights some of those strengths, as identified during the towns' Community Resilience Building Workshops in 2018–2020.

Islandwide

## Aquinnah

- » A Community Emergency Response Team (CERT) supplementing emergency services
- » Menemsha Harbor is a refuge during storms
- » A major substation upgrade in Chilmark will make the grid more resilient for customers in Aquinnah
- » West Basin and Lobsterville provide an alternative access point in case of damage to Hariphs Creek Bridge
- » Current health of coastal wetlands, fisheries, and wild food sustainability
- » Wampanoag Tribe's ongoing initiatives and access to dedicated funding for federally recognized tribes
- » Restrictive zoning bylaws, including restrictive development in buffers of flood-prone zones, and various DCPCs in Aquinnah
- » The Town and Tribe have multiple shelters and government resources designated for emergencies; the Tribe has a Health Clinic, Community Center (a designated Red Cross Shelter), and Administration Building; town resources include Aquinnah Town Hall and offices, and police and fire stations

- » Town buildings inland can accommodate schools, libraries, town halls
- » Vital amenities and services include fire stations and police stations
- » Emergency responders, including fire and police personnel, are responsive and have a strong communication network
- » Wetlands, salt marshes, dunes provide an essential buffer, offering protection from storms and storm surge
- » Sense of self-sufficiency
- » The community is increasing local food production, both agriculture and aquaculture
- » Pristine sole-source aquifer
- » The Martha's Vineyard Airport provides services to the Island
- » Martha's Vineyard Transit Authority provides a service in all towns
- » Generators are in place at town buildings

## Edgartown

- » Responsive and committed town leadership (day-to-day and in emergencies)
- » Public outreach and communication through the local 1V station
- » Emergency responders and town personnel have a strong commitment to the effective management and protection of the town and its residents
- » Volunteerism and supportive social services provided by the Anchors (Edgartown Council on Aging)
- » Edgartown's tourism industry and the influx of summer visitors are vital to the Edgartown economy
- » The Edgartown school is an emergency shelter and the generator has been upgraded
- » Wells and water distribution systems have been rated at low risk for damage

Oak Bluffs

- » Town barn and generator provide backup power for town-owned infrastructure
- » Town sewer system helps reduce risk of nitrogen runoff
- » Seasonal ferry docks bring supplies to and from the Island, accessible to all of Martha's Vineyard
- » Location of Martha's Vineyard provides a safe place for residents to contact during emergencies
- » The Brazilian population is large and churches are an important part of the community
- » Social-service organizations provide a range of services available
- » Proactive town climate action plan
- » Wastewater infrastructure is being elevated

West Tisbury/Chilmark

- » The independent and self-sufficient nature of year-round Island residents accustomed to periods of enforced isolation during winter storms, occasional interruptions in supplies, and other challenges
- » Most residents are active participants in community life and look out for one another
- » Vulnerable population plan includes a confidential list of priority residents to contact in the event of an emergency
- » Chilmark has a designated public water source with a backup power supply, where residents can fill water containers in emergencies
- » Active and engaged town climate committees

Tisbury

- » The Vineyard Haven Terminal is a year-round port for the delivery of resources
- » The R.M. Packer Marine Terminal receives regular petroleum deliveries for its customers
- » Eversource has been very responsive in past storms in restoring electrical service
- » The town developed a vulnerable population plan for emergency planning purposes
- » The solar array at the landfill provides an alternative energy source to the community
- » The town is a tight-knit community where neighbors help neighbors
- » Veteran's Park provides a natural capacity for flooding and water infiltration
- » West Chop Barrier Beach

As with other Island communities around the world, Chilmark and Martha's Vineyard face significant challenges related to climate change. This section and the following pages highlight the existing groups, initiatives, and resources that can help us address these challenges in the years ahead.

## *Island Climate Change Groups and Committees (and Chilmark contacts)*

Chilmark Energy Committee: Rob Hannemann  
Vineyard Sustainable Energy Committee (VSEC): Rob Hannemann  
Chilmark Climate Change Working Group: Jim Malkin  
MVC Climate Action Task Force (CATF): Rob Hannemann, Joan Malkin, Peter Neilley  
MVC Climate Resilience Committee: Joan Malkin, Peter Neilley  
Island Climate Action Network (ICAN): No Chilmark representatives currently on the steering committee  
Tribal planning: Durwood Vanderhoop, Beckie Finn

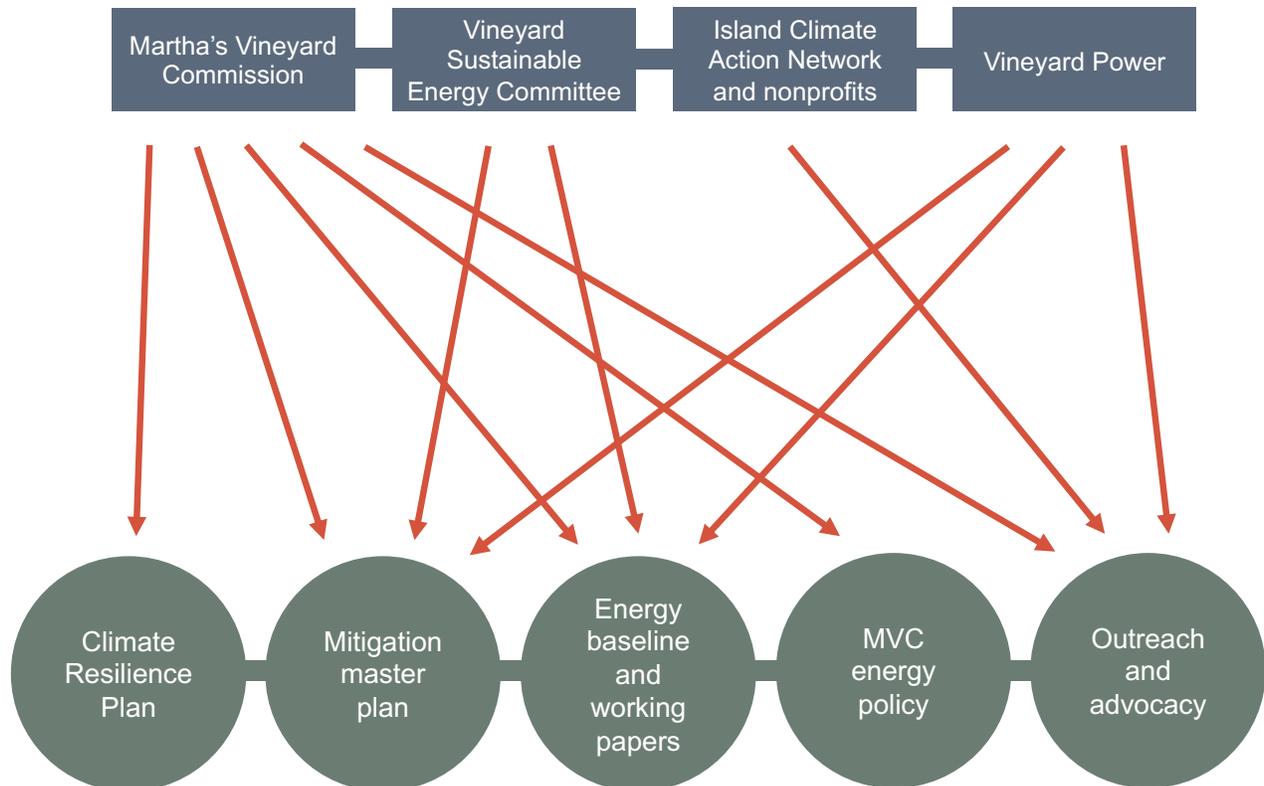
## *Existing Climate Change Resilience Initiatives in Chilmark*

Highly active Chilmark Climate Adaptation Working Group: Completed engagement with 14 groups and stakeholders in town; focused on prioritizing the most significant vulnerabilities to act upon in the next 30 years; developed preliminary findings including vulnerability to the Menemsha docks, risks of wildfire, need to develop and implement an access/egress management plan, and need for better education and communication of climate adaptation issues for year-round, seasonal, and temporary residents  
Approval of Community Resilience Building (a.k.a. Municipal Vulnerability Preparedness) Workshop Summary of Findings (2019)

## *Climate Mitigation Efforts, Islandwide and in Chilmark*

Development of Islandwide energy transformation / climate change mitigation plan (in progress)  
MVC Climate Action Task Force Working Papers on the electricity sector, transportation, buildings and HVAC, and efficiency  
MVC Climate Action Task Force partnership with Eversource on long-term infrastructure needs  
Wampanoag Tribe marsh-elevation and air-quality monitoring  
Vineyard Power is pursuing various energy initiatives, including partnering with Vineyard Wind on its proposed wind farm south of the Island  
100% Renewable warrant article

# Regional planning activity underway



MARTHA'S VINEYARD CLIMATE RESILIENCE PLAN TIMELINE (PROPOSED)

	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June
<b>Project Task Description</b>									FY21	FY22											
Identify and hire consultant	█	█																			
Develop up-to-date vulnerability assessments	█	█	█																		
Conduct community workshops		█	█	█	█	█	█														
Refine and evaluate the adaptation strategies					█	█	█	█	█												
Develop adaptation plan and website										█	█	█	█	█	█	█	█	█	█	█	█

### Looking Forward

While there are many challenges ahead, climate change also presents a chance to look forward, plan to minimize negative impacts, and explore opportunities that benefit the community. To do this, the MVC is initiating a process to develop an Islandwide Climate Resilience Plan.

As a first step, the MVC completed an inventory of relevant policies, regulations, reports, grants, and other material to support resilience planning on the Island. In addition, the MVC Climate Resilience Committee is carrying out a series of stakeholder listening sessions to identify climate impacts of concern, current efforts to address those impacts, and ways that further planning could help. This document presents a summary of these efforts so far, with information that is most relevant for Chilmark. Similar materials have been developed for the other towns as well. These documents provide a quick reference to the extensive body of existing knowledge and efforts supporting climate change adaptation on the Island.

The next 18 months will focus on developing the Climate Resilience Plan through a series of community engagement opportunities that build on the existing information.

#### We want your input to shape this process:

- » What additional resources, information, and support would help you with climate adaptation? (Climate change data, case studies, etc.)
- » How do you see our Island towns working together on these issues?
- » How do you think an Islandwide plan could help?
- » Are there any specific issues you would like to see the resilience plan address?

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 (508) 338-7313

## Inventory of Existing Resources

The following resources have been compiled and are available to support adaptation in Chilmark and on the Island. These are the most directly relevant documents to Chilmark but there are several other documents relevant to the Island and region available [here](#).

### TOWN RESOURCES

POLICIES AND REGULATIONS		
Title	Author/Date	Description
<a href="#">Chilmark Board of Health Regulations</a>	Chilmark Board of Health, 1992	Regulations for private wells, on site sewage treatment and disposal systems, scallop shanties, fuel storage tanks, recycling, and turf fertilizer
<a href="#">Chilmark Development Guidelines</a>	Town of Chilmark	Provides guidance on the siting design of structures
<a href="#">Chilmark General Bylaws</a>	Town of Chilmark, 2019	Sets rules, terms, and procedures including for town committees and meetings, plastic bags, wetlands, fire fighting, and water resources
<a href="#">Chilmark Regulations as to the Taking of Shellfish</a>	Town of Chilmark, 2018	All regulations regarding the taking and culture of shellfish
<a href="#">Chilmark shellfish regulations brochure</a>	Chilmark Shellfish Department	Information on common shellfish habitat, enhancement program, permits, rules and regulations
<a href="#">Chilmark Town Financial Policies</a>	Town of Chilmark, 2013	Documents practices to guide the town's financial operations
<a href="#">Chilmark Waterway Rules and Regulations</a>	Town of Chilmark, 2008	Standard policies and practices to provide for the safety of moored and berthed vessels, safety on all Chilmark waters, and to preserve the historic uses of the ponds and harbor
<a href="#">Chilmark Wetlands Protection Bylaw Amendment</a>	Town of Chilmark, 1990	To protect the wetlands, related water resources, and adjoining land areas in Chilmark by prior review and control of activities deemed by the Conservation Commission likely to have wetland values.
<a href="#">Chilmark Wetlands Protection Bylaw and Regulations</a>	Town of Chilmark, revised 1993	Regulations to protect wetlands by controlling activities deemed to significantly affect effect wetland and water quality values
<a href="#">Chilmark Zoning Bylaws</a>	Town of Chilmark, 2019	Aim to encourage the most appropriate use of land, prevent overcrowding and congestion, conserve the value of land, buildings and the town's rural nature, reduce fire and other hazards, prevent pollution, and conserve the unique values of the town; includes regulations for DCPCs, the Squibnocket Pond District, and other designated areas
<a href="#">Districts of Critical Planning Concern (DCPCs)</a>	MVC, 1975–2014	Including the Menemsha, Nashaquitsa and Stonewall Ponds (2001) and Wild and Scenic North Shore (2001) districts. All forms of development in the DCPCs is subject to careful review by local boards and/or committees
<a href="#">Green Communities Act fact sheet</a>	Chilmark Energy Committee, 2020	Outlines benefits and criteria of the Green Community Program which provides financial and technical support to municipalities that pledge to cut municipal energy use over 5 years and other criteria
<a href="#">Implementation Guidelines for Homesite Housing Zoning Bylaw</a>	Town of Chilmark, 2015	The Homesite Housing Program aimed creating affordable housing for people who have lived, worked, or volunteered in Chilmark for substantial time but cannot afford land due to high prices
<a href="#">Massachusetts Stretch Building Code FAQs</a>	Chilmark Energy Committee	Answers to questions about the state building code focused on improving energy efficiency and lowering energy costs for homeowners
<a href="#">Rules and Regulations Governing Subdivision of Land</a>	Town of Chilmark, amended 2016	Includes general rules, plan procedures, design standards, and requirements for improvements

PLANS, REPORTS, AND OTHER RESOURCES		
<a href="#">Army Corps dredging and jetty repair studies</a>	US Army Corps of Engineers, 2014	Results from several models and associated documents for Menemsha Pond dredging, including velocity and bathymetry
<a href="#">Building permits in Chilmark 2009–2018</a>	MVC, 2019	Table showing building permits issued by Chilmark from 2009 to 2018, with breakdown of type
<a href="#">Chilmark building density and sewerage areas</a>	MVC, 2016	Map showing building density and sewerage areas
<a href="#">Chilmark Climate Change Working Group Presentation</a>	MVC, 2019	Review of climate hazards and potential impacts for Chilmark
<a href="#">Chilmark Housing Production Plan</a>	JM Goldson with RKG Associates, 2017	Establishes a strategic plan for producing affordable housing, and provides a detailed analysis of development constraints due to infrastructure capacity, environmental factors, protected open space, and regulatory barriers
<a href="#">Chilmark Master Plan</a>	Chilmark Planning Board, Chilmark Conservation Commission, and MVC, 1985	Includes information on all aspects of the community and its resources, along with goals and objectives
<a href="#">Chilmark Master Plan Supplement</a>	Town of Chilmark, 2003	Data and information regarding growth and development, town centers and facilities, public safety, public health, technology, natural resources and open spaces, historic resources, and analysis of the 2002 Master Plan Questionnaire
<a href="#">Chilmark Menemsha Master Plan (parts 1 and 2)</a>	Chilmark Planning Board Subcommittee, 2017	An update to the Chilmark Master Plan with a focus on Menemsha; includes a vision for the future, working waterfront ideas, issues surrounding the business community, traffic and pedestrian safety, the comfort station, and other topics
<a href="#">Chilmark Menemsha Master Plan Forum Presentation</a>	Brewster Architects, 2018	Presentation associated with Menemsha Corridor Plan for Improvement (see below)
<a href="#">Chilmark municipal vulnerability assessment</a>	MVC with emergency managers and planning teams of Dukes County, 2015	Matrices highlighting vulnerability to wildfire, flooding, storms, and sea-level rise; projections estimate vulnerability at buildout
<a href="#">Chilmark Planning; Menemsha Corridor Plan for Improvement (Analysis and Recommendations)</a>	Brewster Architects, 2017	Report on existing conditions in regard to issues of parking, traffic flow, and pedestrian access along Basin Road to Menemsha Beach; and conceptual solutions to further develop
<a href="#">Chilmark, Tisbury Great, and Upper Chilmark ponds SLOSH maps</a>	MVC, 2010	Map of Sea, Lake and Overland Surges from Hurricanes (SLOSH) projections
<a href="#">Chilmark water and wellhead protection</a>	MVC, 2016	Map showing town water service and well head protection areas
<a href="#">Eelgrass Restoration of Nashaquitsa Pond report</a>	Chilmark Shellfish Department, ~2016	Methods and results of eelgrass restoration project in Nashaquitsa Pond
<a href="#">Hydrology of Tisbury Great Pond</a>	Kent Healy, 2013	Study of the hydrology of Tisbury Great Pond
<a href="#">Land Use Control Implementation Plan for Tisbury Great Pond Munitions Response Site</a>	Army Corps of Engineers, 2019	Outlines a plan to reduce risk to human health and the environment for the Tisbury Great Pond Munitions Response Area
<a href="#">Map of Menemsha Creek Lots</a>	MA Department of Public Works, 1939	Map of Menemsha Creek Lots
<a href="#">Mass Estuaries Project reports</a>	UMass Dartmouth and MA DEP, 2015	Results from the Linked Watershed-Embayment Model to Determine Critical Nitrogen Loading Threshold for Black Point, Chilmark, Menemsha, Squibnocket, and Tisbury Great ponds
<a href="#">Peaked Hill Pastures progress report</a>	Town of Chilmark, 2019	Background on two town-owned lots, information on affordable/community housing lot models and development, and an examination of other potential uses; includes a short-term timeline of tasks
<a href="#">Roth Woodlands plan</a>	Sheriff's Meadow Foundation, 2020	Notice of Intent and planning documents for Roth Woodlands culvert replacement
<a href="#">Squibnocket project plans and resources</a>	Town of Chilmark, 2015–2016	Plans, resources, correspondence, and other documents related to the Squibnocket causeway/restoration project
<a href="#">West Tisbury/Chilmark Community Resilience Building (MVP) Workshop Summary of Findings</a>	Dodson & Flinker for MA EOEEA, 2019	Identifies hazards in West Tisbury and Chilmark that are being exacerbated by climate change, and prioritizes actions for the towns; includes detailed maps and data

## ISLANDWIDE RESOURCES

<i>POLICIES AND REGULATIONS</i>		
<a href="#">Enabling Act of the Steamship Authority</a>	Massachusetts, amended 2016	Empowers the Steamship Authority to acquire, maintain, and operate a boat line between Woods Hole, and Hyannis, and the Islands
<a href="#">Districts of Critical Planning Concern (DCPCs)</a>	MVC, 1975–2014	Islandwide DCPCs: Coastal (1975), Special Places (1976), Island Road (1975; last amended in 2019), Island Wind (2009), Lawn Fertilizer Control (2014); some districts also apply to specific towns or parts of the Island
<a href="#">MVC Development of Regional Impact (DRI) Checklist</a>	MVC, 2017	Standards and criteria for DRI referral, updated every two years
<a href="#">MVC Development of Regional Impact (DRI) policies</a>	MVC, 2006–2019	Open Space Preservation (2006), Water Quality Management (2018), Site Design and Landscape (2012), Energy and Environmental Building (2008), Housing (2019), Built Environment (2015), Demolitions (2017), DRI Compliance Procedures

<i>PLANS, REPORTS, AND OTHER RESOURCES</i>		
<a href="#">A Meeting of Land and Sea</a>	David R. Foster, 2017	Book on the detailed history of the Island landscape
<a href="#">ACE MV workforce needs presentation</a>	ACE MV, 2015	“Assessing the Continuing Education Needs of the Residents of Martha’s Vineyard”
<a href="#">Climate Vulnerability Assessment: Coastal Properties, Trustees of Reservations</a>	Woods Hole Group, 2017	Includes a risk-based vulnerability assessment for individual assets on the Island, and an evaluation of potential impacts from sea-level rise over the next 10 and 50 years
<a href="#">Community Resilience Building Workshop summaries</a>	MVC, 2020	County-wide and town-by-town summaries of the CRB workshop responses in Edgartown, Gosnold, Oak Bluffs, Tisbury, West Tisbury-Chilmark, and Aquinnah; includes top hazards; categories of concern and challenges, and recommendations
<a href="#">Dukes County Flood Insurance Study</a>	Federal Emergency Management Agency, 2010	Revises and updates information on the existence and severity of flood hazards in Dukes County
<a href="#">Eelgrass study and interim report</a>	Martha’s Vineyard Shellfish Group, 2019 and 2020	Examines the alternative eelgrass propagation methods of using indoor and outdoor nursery stages to rehabilitate drifting shoots
Flood Risk Model (FRM)	MassDOT/ Woods Hole Group/UMass Boston, 2020	A newly updated model for GIS that incorporates both rising sea levels and severe storm influences; local expertise in using the model is provided by the MVC
<a href="#">Hazard Mitigation Plan for Seven Towns in Dukes County</a>	MVC, 2015 (2020 update in progress)	Examines hazards and vulnerabilities throughout the County, including sea-level rise and wildfire; as well as vulnerability assessments, maps, and mitigation strategies for each town
<a href="#">Inventory of Historic Buildings in Dukes County</a>	MVC, 2017	Incorporates the MACRIS and Massachusetts Historical Commission inventories, previous historic inventory surveys, and other resources
<a href="#">Island Plan</a>	MVC, 2009	Set a course for a more desirable future for the Island, including an outline of specific actions
<a href="#">Living shoreline presentation</a>	Martha’s Vineyard Shellfish Group, ~2015	Presentation on the Island’s living shoreline project and the development of ribbed mussel seed production
<a href="#">Map of Chapter 61 Lands and Farmland Soils</a>	ArcGIS, 2020	Map of MA Forest Tax Program Chapter 61 lands, and farmland soils
<a href="#">Map of Island topography and water features</a>	MVC, mid-1970s	Shows topography, streams, ponds, and wetlands
<a href="#">Martha’s Vineyard Regional Transportation Plan 2020–2040</a>	MVC and the MV Joint Transportation Committee, 2019	Provides analyses of the Island transportation network, including all regular modes of travel to and within Dukes County, including long-term goals and objectives; updated every four years

<a href="#">Martha's Vineyard Statistical Profile</a>	MVC, 2019	Wide-ranging profile of the Vineyard in numbers; includes sections on demographics, land use, economy, health and education, housing and real estate, transportation, energy and environment (including weather and climate), and town services
<a href="#">Martha's Vineyard Tick-borne Illness Reduction Initiative</a>	Martha's Vineyard Board of Health, ongoing	A program to reduce the number of ticks and incidence of tick-borne illnesses on the Island through education, advocacy, and cooperation with organizations and individuals
<a href="#">Martha's Vineyard Transportation Improvement Plan (TIP)</a>	MVC and the MV Joint Transportation Committee, 2019	Features detailed 5-year budget for funded transportation projects; updated every year
<a href="#">Municipal Vulnerability Preparedness (MVP) Program</a>	Various consultants on behalf of the towns	All Island towns are now part of the statewide MVP program, which provides technical and financial resources to support municipal resilience to climate change
<a href="#">MV Land Bank Memorandum of Aspirations</a>	MV Land Bank, 2019	Aspirations and ideas for Land Bank management team
<a href="#">MVC Climate Crisis Resolution</a>	MVC, 2019	MV Commissioners adopted a Climate Crisis Resolution agreeing to further consider climate impacts in their decision-making process, and draft both mitigation and adaptation master plans for the Island
<a href="#">Pond and Water Quality Data Reports</a>	MVC, 2003–2008	Results of a program to gather water quality information for Island coastal ponds, funded in part by MassDEP
<a href="#">Population projections</a>	UMass Donahue Institute on behalf of the State, updated in 2017–2018	Population projections through 2040, by sex and age group; for each town in Dukes County and the County as a whole; includes final report
<a href="#">Presentation on SSA finances and operations</a>	MVC, 2020	Overview of SSA enabling act, budgeting procedures, and operations
<a href="#">Property values by town</a>	MVC, 2019	Table of assessed building and land values for each town, with breakout for seasonal and year-round properties
<a href="#">Shell Recovery Program proposal</a>	Martha's Vineyard Shellfish Group, 2019	Proposal for further developing the Island's Shell Recovery Program
<a href="#">Wetland elevation monitoring presentation</a>	MVC, 2016	MVC Coastal Conference 2016 presentation on sea-level rise impacts on salt marshes

#### *GRANTS AND STUDIES IN PROGRESS*

Development of an ArcGIS StoryMap	MVC, in progress	With funding through the Edey Foundation; shows climate change impacts on the Vineyard, with key areas of focus; based on the Sea Level Affecting Marshes Model (SLAMM)
Islandwide storm tide pathway study	MVC and Town of Oak Bluffs, in progress	With funding through the Office of Coastal Zone Management; looks at the actual areas where floodwater goes, as opposed to the general floodplain maps
Martha's Vineyard Climate Resilience Plan	MVC, in progress	Development of an Islandwide Climate Resilience Plan, with funding through the state MVP program; phase one of the project was funded in 2019; phase two funding will be announced in August 2020; anticipated completion of master plan document and website by June 2022
MV-Nantucket Supply Chain Resilience Plan	MVC and Nantucket, proposal pending	The MVC has partnered with the town of Nantucket in applying for an FY21 MVP Action Grant to develop a Supply Chain Resilience Plan for the two islands; funding announcement expected in August 2020
Woods Hole Research Center climate modeling	Woods Hole Research Center, in progress	A climate change modeling pilot project for Dukes County that will provide detailed projections on a decadal time scale; results likely delivered in the fall of 2020

## STATE, NORTHEAST REGION, AND FEDERAL RESOURCES

POLICIES AND REGULATIONS		
<a href="#">Applying the Massachusetts Coastal Wetlands Regulations</a>	MA Office of Coastal Zone Management and Dept. of Environmental Protection, 2017	State guidance to help conservation commissions evaluate projects proposed in coastal areas for their potential to impact the storm damage prevention and flood control interests of the Wetlands Protection Act
<a href="#">Community Preservation Act</a>	Commonwealth of Massachusetts, 2000	All towns in Dukes County have adopted the CPA, which allows them to collect a property surcharge of up to 3% and apply for matching funds from the state; CPA funds may be used for open space, housing, historic preservation, and recreation
<a href="#">Environmental Permitting in Massachusetts</a>	MA Office of Coastal Zone Management, 2003	Guidance and overview related to environmental permitting in the state
<a href="#">FEMA Requirements and Technical Guidance</a>	Federal Emergency Management Agency	Includes the National Flood Insurance Program policy index, and information related to Title 44: Emergency Management and Assistance
<a href="#">Global Warming Solutions Act</a>	Commonwealth of Massachusetts, 2008	Set economy-wide greenhouse gas emission reduction goals for MA, including 25% reduction below 1990 levels by 2020, and 80% reduction by 2050
<a href="#">GreenDOT</a>	MA Dept. of Transportation, 2010	MA Dept. of Transportation's sustainability initiative
<a href="#">MA Building Code and Stretch Energy Code</a>	MA Office of Public Safety and Inspections, 2017	Consists of a series of international model codes and any state-specific amendments adopted by the Board of Building Regulation and Standards; includes Stretch Energy Code; administered by local building inspectors
<a href="#">MA Climate Clearinghouse</a>	MA Office of Energy and Environmental Affairs, ongoing	Climate change data, information on community resiliency, and links to grant programs and technical assistance; catalogs vulnerabilities, risks and strategies concerning agriculture, forestry, local government, education, energy, recreation, and transportation
<a href="#">MA Coastal Program Policies</a>	MA Office of Coastal Zone Management, 2011	MA Coastal Zone Management program policies; serve as the foundation for the MA Coastal Program as approved by NOAA's Office of Ocean and Coastal Resource Management
<a href="#">MA Flood Hazard Management Program</a>	Department of Conservation and Recreation	Works with FEMA to implement the National Flood Insurance Program (NFIP) (technical assistance only, has no regulatory authority)
<a href="#">MA Rural Policy Plan</a>	Rural Policy Advisory Commission, 2019	Intends to illustrate the unique attributes and challenges faced by rural communities, inform policy makers of existing best-practices and identify a series of recommendations for a new Office of Rural Policy
<a href="#">MA Title 5 (Septic System Regulations)</a>	MA Dept. of Environmental Protection, 2016	The state environmental code, including standard requirements for the siting, construction, inspection, upgrade and expansion of on-site sewage treatment and disposal systems and transport and disposal of septage; administered by local boards of health
<a href="#">MA Waterways Regulations</a>	Commonwealth of Massachusetts, 2017	Regulations to protect the public's right to access the state's tidelands and waterways; and the kinds of activities that can take place on coastal and inland waterways
<a href="#">MA Wetlands Protection Act Regulations</a>	Commonwealth of Massachusetts, 2014	Procedures for conservation commissions and MassDEP to follow in issuing permits in areas protected under the WPA; administered by local Conservation Commissions

PLANS, REPORTS, AND OTHER RESOURCES

<a href="#">Cape Cod Climate Initiative</a>	Cape Cod Commission, ongoing	A community-focused, information-based effort to inform a strategic framework and collaborative approach to address the region's contributions to and threats from climate change
<a href="#">Guide to Invasives</a>	The Trustees of Reservations, 2016	Summarizes the problems caused by invasive plant species in natural and more managed landscapes, and provides guidelines for addressing these problems
<a href="#">MA Bureau of Geographic Information (MassGIS)</a>	Commonwealth of Massachusetts	Provides interactive maps and associated information, including extensive library of map information using the on-line mapping viewer, OLIVER
<a href="#">MA Hurricane Resources for Emergency Managers</a>	MA Emergency Management Agency	Various maps and resources to assist emergency managers and public safety officials with hurricane planning and preparedness, response, and recovery
<a href="#">MA Integrated State Hazard Mitigation and Climate Adaptation Plan</a>	Commonwealth of Massachusetts, 2018	Expands on the 2013 State Hazard Mitigation Plan and the 2011 Massachusetts Climate Change Adaptation Report; covers natural hazards, risks and vulnerabilities, current capabilities and adaptability, and strategies
<a href="#">MA StormSmart Coasts Program</a>	MA Office of Coastal Zone Management, ongoing	Provides information, strategies, and tools to help communities address erosion, flooding, storms, sea-level rise, and other climate change impacts; includes MA Sea-Level Rise and Coastal Flooding Viewer, tools for local officials and homeowners, the CZM Shoreline Change Project, a manual for applying the MA Coastal Wetlands Regulations, and StormSmart Coasts publications
<a href="#">Massachusetts Coastal Infrastructure Inventory and Assessment Project</a>	Bourne Consulting and Engineering, for MA Coastal Zone Management and Dept. of Conservation and Recreation, 2009	Reports for various towns and regions, including the Cape and Islands, that include condition ratings and estimated repair or reconstruction costs for publicly owned seawalls, revetments, groins, jetties, and other coastal structures
<a href="#">Massachusetts Coastal Zone map</a>	MA Office of Coastal Zone Management, 2014	Includes the coastal zone boundary, the CZM regions, and the 78 coastal communities directly served by CZM
<a href="#">Massachusetts Cultural Resource Information System (MACRIS)</a>	MA Secretary of the Commonwealth	Searchable Massachusetts Historical Commission database with information on historic properties and areas in the state (does not include all historic properties)
<a href="#">Massachusetts Estuaries Project (MEP)</a>	UMass Dartmouth and MA Dept. of Environmental Protection	The MEP was created in 2001 to help determine current nitrogen loads to southeastern MA estuaries and evaluate reductions necessary to support healthy ecosystems; reports are available for 9 Island pond systems
<a href="#">MassWildlife and Climate Adaptation</a>	MA Dept. of Fish and Wildlife, ongoing	Various projects, tools, and resources to help communities respond to the effects of climate change on wildlife and ecosystems
<a href="#">Overview of Acidification in the Northeast Region</a>	Northeast Coastal Acidification Network, ~2015	Overview of ocean acidification in the northeast
<a href="#">Protecting Coastal Property from Major Storm Damage</a>	MA Dept. of Environmental Protection, 2008	Guidance related to the MA Building Code and Wetlands Protection Act
<a href="#">StormSmart Coasts Factsheets</a>	MA Office of Coastal Zone Management, 2009–2016	Series of fact sheets covering building or rebuilding along the shore, case studies of Cape Cod and other communities, information about protective landscaping and house elevation, artificial dunes and dune nourishment, repair and reconstruction of seawalls and revetments, and other topics; includes chart showing relative costs of shoreline stabilization options

