

LOOKING FORWARD



CLIMATE CHANGE ADAPTATION CONTEXT

AQUINNAH



Introduction

This document aims to share a baseline of information, based on existing published sources, to support resilience planning for Aquinnah 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 Aquinnah 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 Aquinnah in supporting adaptation


The purpose of this document is to foster discussion about how the Martha's Vineyard Commission (MVC) can support Aquinnah 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.



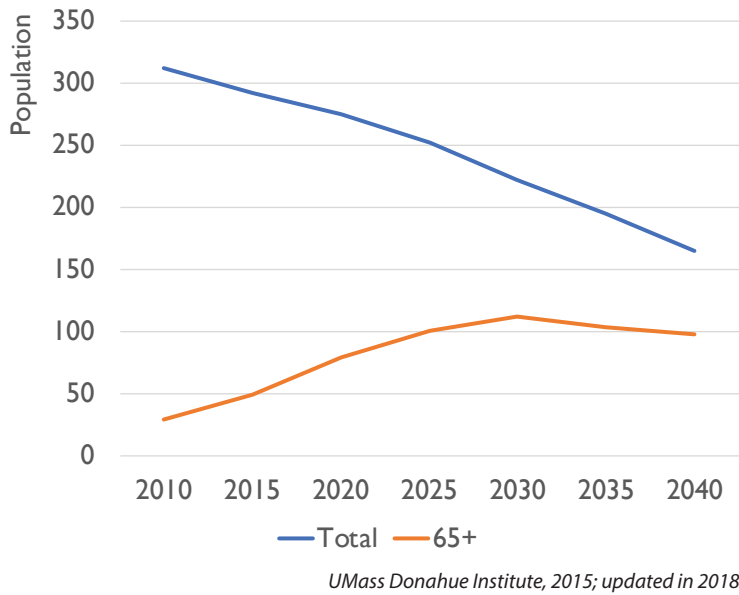
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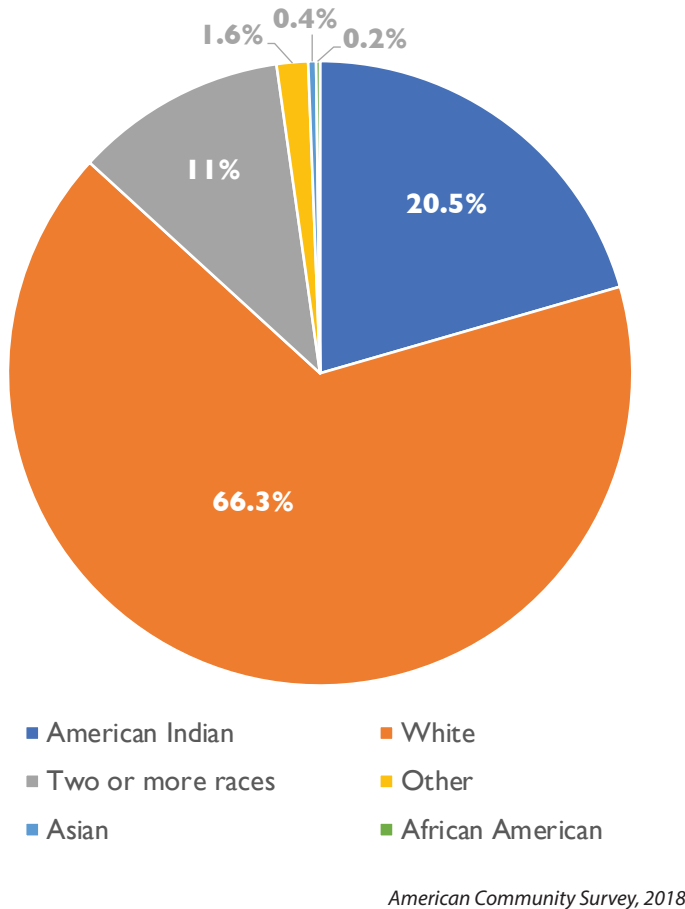
This section provides basic demographics, along with information related to infrastructure, land use, socio-economic factors, and natural resources, which can be used to support climate-change resilience planning in Aquinnah.

Demographics

Population Projection

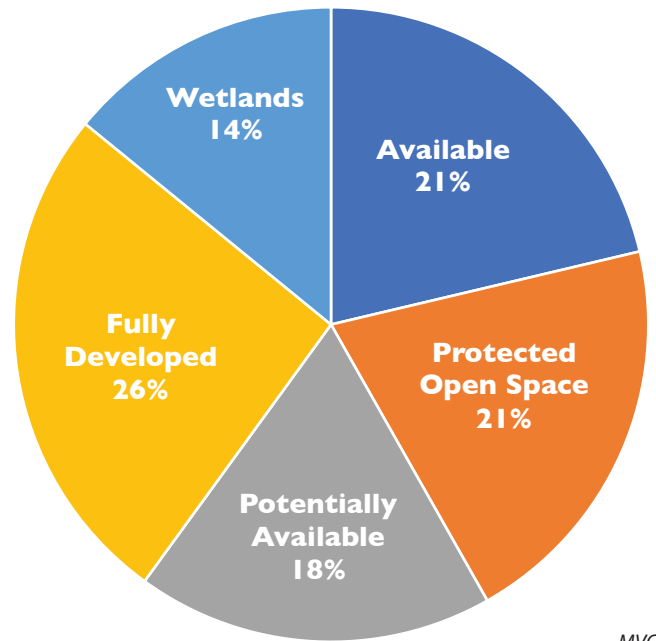


Ethnic Diversity

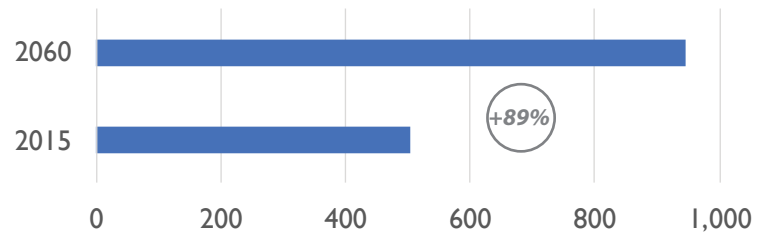


Infrastructure and Land Use

Developed Land

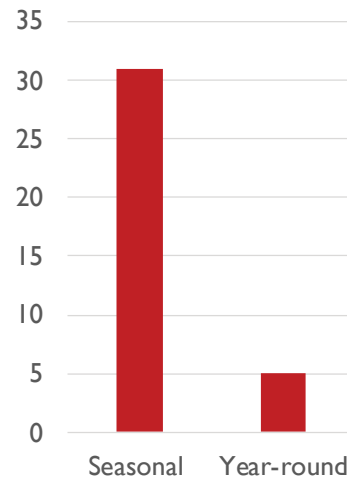


Projected New Houses in 2060

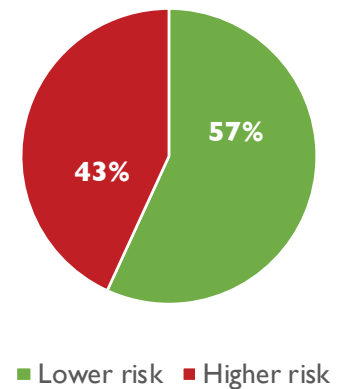


Dukes County Hazard Mitigation Plan, 2015; the MVC projected how many houses would be built by 2060 if current zoning is maintained and past rates of construction continue

Buildings in 100-Year Floodplain



Homes at Risk from Wildfire



Dukes County Hazard Mitigation Plan, 2020 (draft)

Conservation/Open Space Land Aquinnah, MA



Environment

- » Menemsha and Squibnocket ponds (shared with Chilmark), beaches, dunes, marshes, and wetlands
- » 21% of the land is conserved
- » Aquinnah contains several Districts of Critical Planning Concern (DCPCs) and is itself a DCPC, which subjects all forms of development in town to careful review by local boards and/or committees
- » All buildings except in Tribal Housing are on private wells

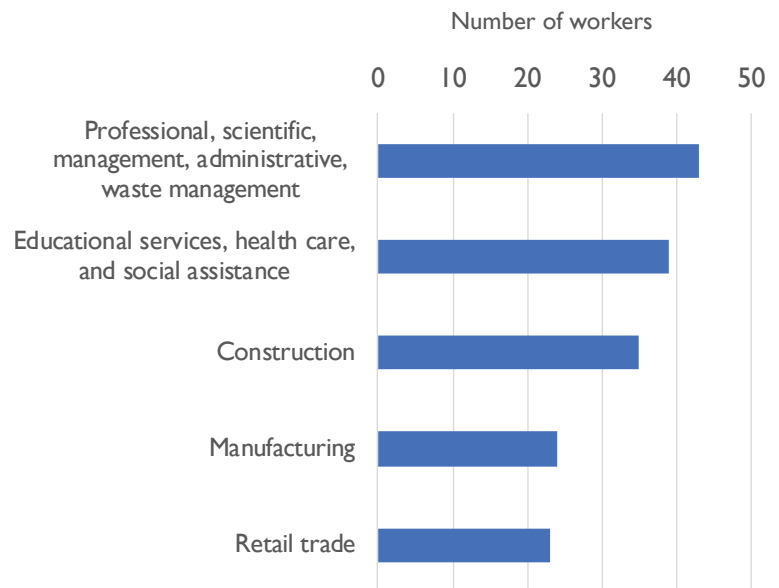
Socio-Economic Factors*

- » Ancestral home of the Wampanoag Tribe of Gay Head (Aquinnah)
- » 494 households (134 year-round, including Tribal Housing)
- » About 73% of all housing units are vacant in the winter, reflecting the strongly seasonal economy
- » Median household income: \$87,000
- » 54% of households on Wampanoag Reservation are low- or moderate-income
- » The cliffs are a National Natural Landmark
- » The Aquinnah Circle is designated as a Massachusetts Cultural District, and is the town's economic center, providing access to the beach, cliffs, shopping, trails, parks, Aquinnah Cultural Center, and Gay Head Light
- » Aging and/or isolated residents

» Vulnerable or under-represented communities include:

- Members of the Wampanoag Tribe
- 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

American Community Survey, 2018



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><i>Rising Temperatures</i></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"> » Damage to crops and food plants; unpredictable growing seasons » Higher demand on water resources » Increased vector-borne disease » Heat stress, especially among elders » Increased risk of wildfire » Increased potential for invasive species
 <p><i>Sea-Level Rise</i></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"> » More frequent flooding and nuisance tides » Increase in erosion of beaches and dunes when coupled with storm surge » Damage to coastal property and infrastructure » Potential for saltwater intrusion of coastal wells » Flooding and loss of salt marshes
 <p><i>Rising Sea Surface Temperatures and Ocean Acidification</i></p> <p>As temperatures and gases increase, much of the heat and CO₂ 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"> » Declines in pond water quality » Loss of habitat for key fisheries » Changes in fish migration patterns » Increased potential for invasive species » Impacts to shellfish life cycles and growth rates » Impacts to commercial and recreational fishing



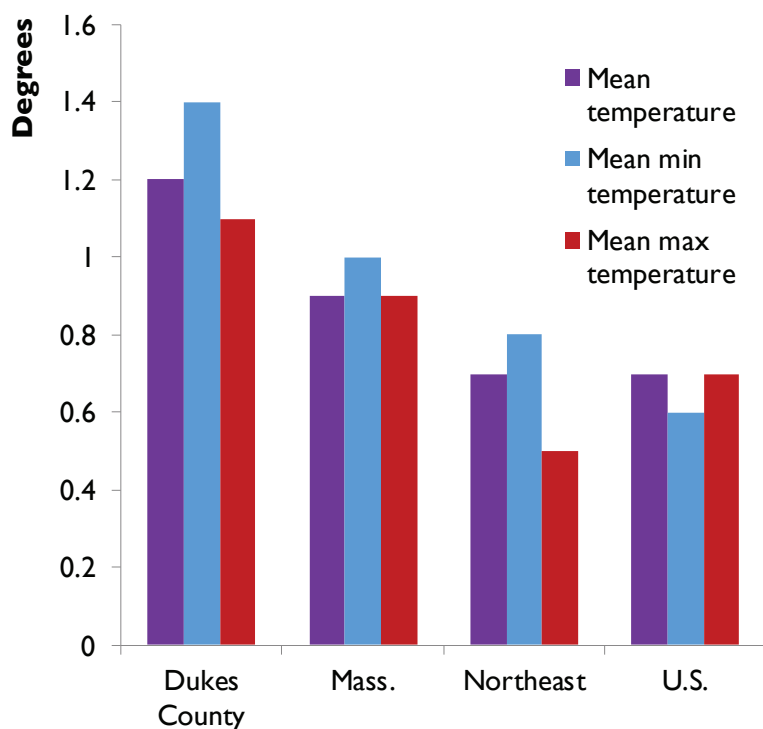
Coastal resources are some of the most critical assets in protecting our communities from the impacts of climate change, and also some of the most threatened by climate change. A 2017 economic valuation of coastal resources done for Oak Bluffs is the only study of its kind completed on Martha's Vineyard, 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.

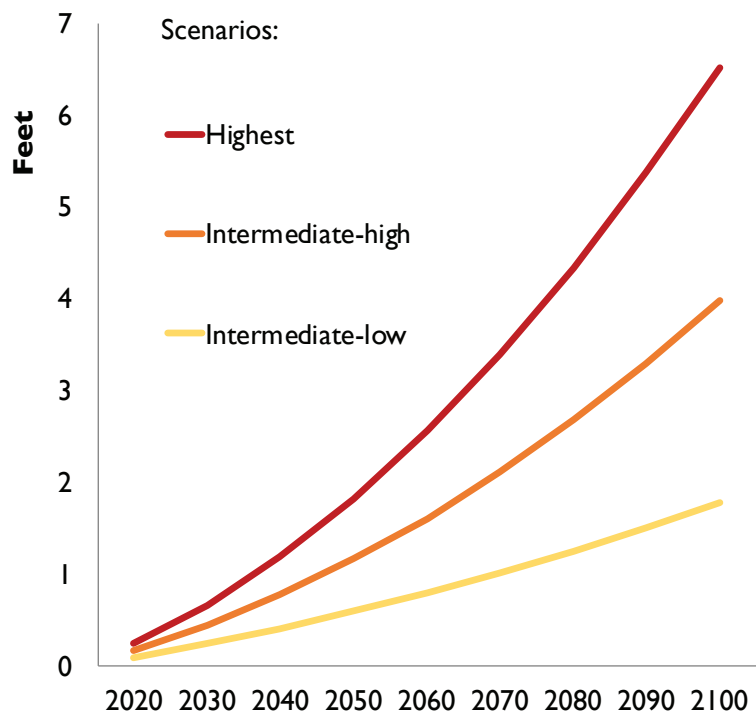
HAZARD*	LOCAL PROJECTIONS	LOCAL IMPACTS
 <p>Extreme Storm Events</p> <p>All of these changes can create more extreme weather events, including hurricanes, tropical storms, and nor'easters.</p>	<p>Climate change is expected to result in more intense and frequent storm events on the Vineyard.</p> <p>Future 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"> » Increased erosion of beaches and dunes » Increased coastal flooding from storm surge » Increased stormwater runoff and inland flooding » Damage to the natural and built environment, causing economic, health, and safety impacts » More frequent or prolonged power outages
 <p>Changes in Precipitation</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"> » Inland flooding from storm runoff » Increased drought and wildfire risk » Increased stormwater runoff » Warmer and wetter winters, potentially increasing risk of tick-borne disease » Increased dampness and mold, and associated health problems

*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 Aquinnah's infrastructure, environment, and socio-economic systems. This section highlights some of the impacts of highest concern identified in the Aquinnah Community Resilience Building Workshops in 2020. 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.

AQUINNAH	ISLANDWIDE
<ul style="list-style-type: none"> » Flooding of roads, limiting access to Moshup Trail, Oxcart Road, Clay Pit Road, Lobsterville, West Basin, and East Pasture Shore » Potential damage to Hariphs Creek Bridge during storms, disrupting the supply chain and evacuation route » Loss of communications from storm events » Property damage in low-lying areas such as Lobsterville and Dogfish Bar » Damage to West Basin and the port of Menemsha from sea-level rise and storm surge 	<ul style="list-style-type: none"> » Disruption of the supply chain, emergency services, and transportation from flooding and storm damage of major roadways » Impacts to SSA service from storms and flooding » Potential for prolonged power outages with lack of water and communication



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.

AQUINNAH	ISLANDWIDE
<ul style="list-style-type: none"> » High rates of erosion to beaches and dunes at Moshup, Philbin, Lobsterville, and West Basin » Eroding cliffs, including Gay Head Cliffs » Adverse impacts to Menemsha and Squibnocket ponds, and to fish and shellfish habitat » Adverse impact on important cultural food crops such as cranberries » Vulnerability of artesian wells 	<ul style="list-style-type: none"> » Erosion of beaches and dunes from sea-level rise and storm surge » Flooding of marshes from sea-level rise » Warming and nitrification of ponds from higher sea temperatures and runoff from heavy rain » Loss of fishery habitat from higher sea temperatures » Susceptibility to wildfire from droughts and higher air temperatures

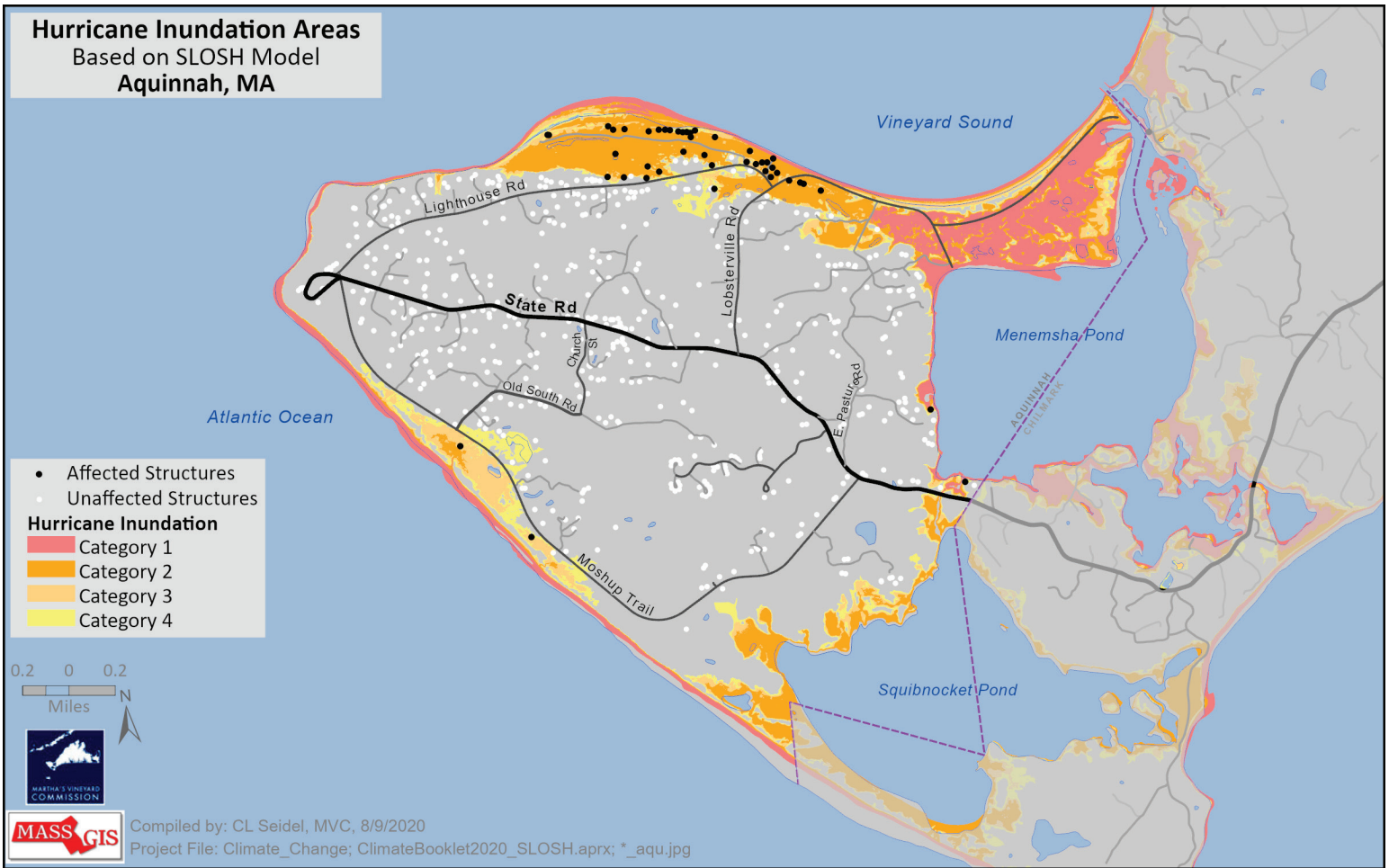


Socio-Economic Systems

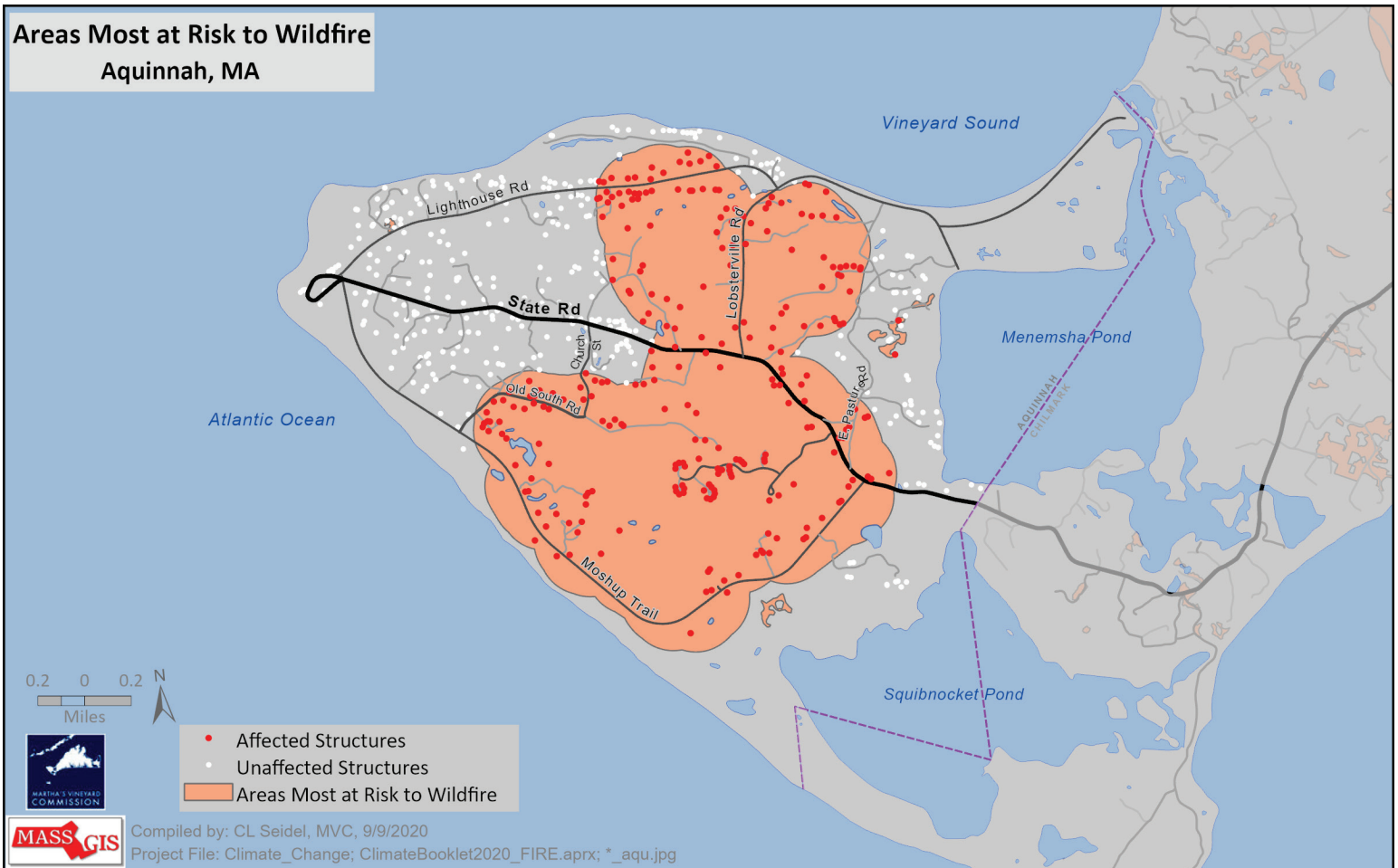
Our socio-economic systems (e.g. health, food security, economy) will face increased stress from climate change. Planning for the impacts can reduce the extent of these stressors.

AQUINNAH	ISLANDWIDE
<ul style="list-style-type: none"> » Loss of cultural resources, including the Gay Head Cliffs, low-lying archaeological sites, and cranberry bogs » Loss of tourism, and tax revenue from low-lying coastal homes » Aging and isolated residents in times of emergency (50% of population is projected to be over 65 by 2035) » Increased cost of living; damages will have greater impact on lower-income populations 	<ul style="list-style-type: none"> » Stress on food security » Impact on emergency services, and loss of access » Stress on aging and isolated residents from heat and during natural hazards » Consequences for tourism and the economy from storms, and loss of beaches, coastal homes, and tax revenue » Increased vector-borne disease » Reduced water security

Hurricane Inundation Areas Based on SLOSH Model Aquinnah, MA



Areas Most at Risk to Wildfire Aquinnah, 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 a schools, libraries, town halls
- » Vital amenities and services stations and police stations
- » Emergency responders, including personnel, are responsive and communication network
- » Wetlands, salt marshes, dunes essential buffer, offering the storms and storm surge
- » Sense of self-sufficiency
- » The community is increasing food production, both agricultural
- » Pristine sole-source aquifer
- » The Martha's Vineyard Airport services to the Island
- » Martha's Vineyard Transit Authority service in all towns
- » Generators are in place at the buildings

Edgartown

- » Responsive and committed town leadership (day-to-day and in emergencies)
- » Public outreach and communication through the local TV 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 owned infrastructure
- » Town sewer system helps of nitrogen runoff
- » Seasonal ferry docks bring supplies to and from the to all of Martha's Vineyard
- » Location of Martha's Vineyard residents to contact during
- » Vulnerable population plan churches are an important
- » The Brazilian population is churches are an important
- » Social-service organizations services available
- » Proactive town climate action
- » Wastewater infrastructure 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, Aquinnah 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 Aquinnah contacts)

Energy and Climate Committee: William Lake, Noli Taylor
 Vineyard Sustainable Energy Committee (VSEC): William Lake
 MVC Climate Action Task Force (CATF): Kathy Newman, Noli Taylor
 MVC Climate Resilience Committee: Kathy Newman
 Island Climate Action Network (ICAN): Noli Taylor
 Tribal Planning: Durwood Vanderhoop and Beckie Finn

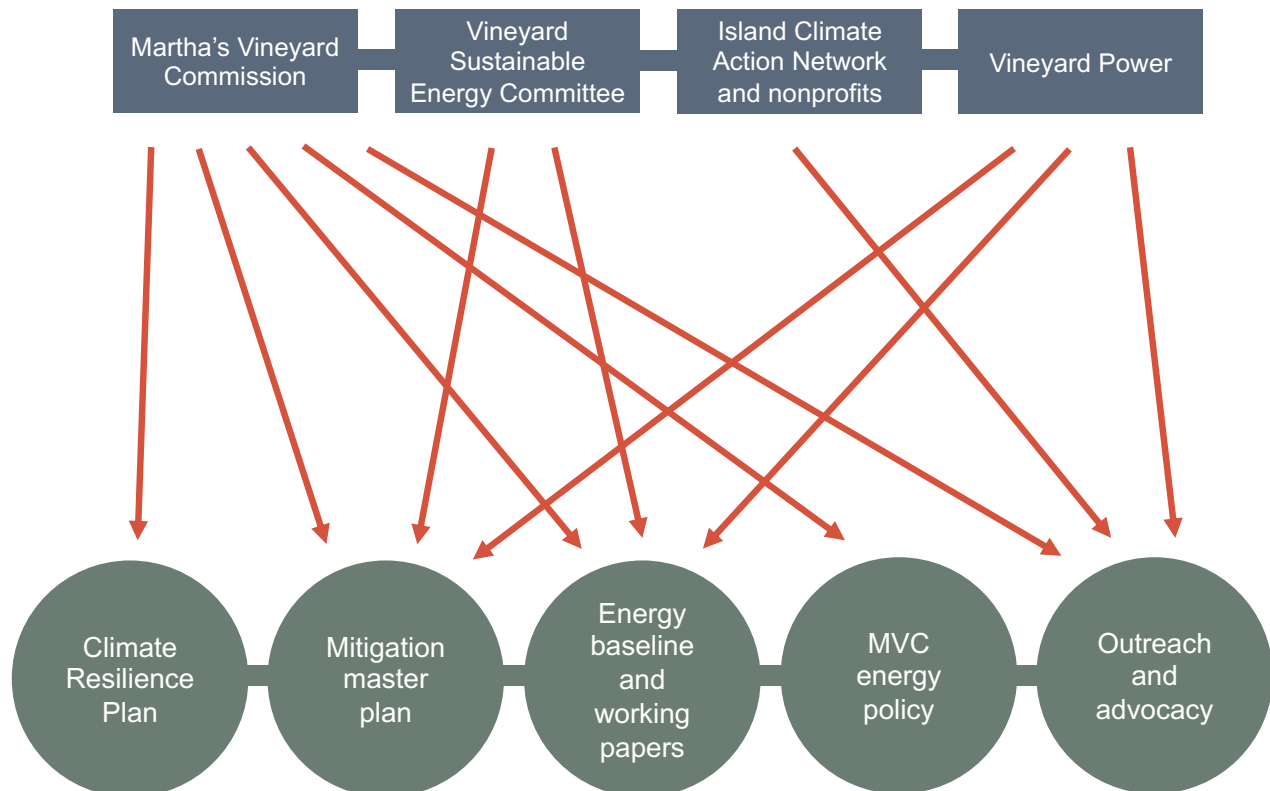
Existing Climate Change Resilience Initiatives in Aquinnah

Approval of Community Resilience Building (a.k.a. Municipal Vulnerability Preparedness) Workshop Summary of Findings (2020)
 Active Community Emergency Management Team (CERT)
 Development of micro-grid for town hall (in progress)
 Designation of Tribal Town Hall as Red Cross Shelter and closed point of dispensing for emergency medications
 Food Forest, Community Space, and Affordable Housing Project (in progress)
 Culvert Vulnerability Assessment and Retrofit Project (proposed)
 Wampanoag Tribe Climate Change Adaptation Plan (in progress)
 Local assessment of artesian well vulnerability and action development (in progress)

Climate Mitigation Efforts, Islandwide and in Aquinnah

Micro-grid development for Aquinnah town hall
 Green Community designation; led to \$126,000 state grant to improve energy efficiency of town buildings
 MassEVIP Workplace Charging grant to buy two EV charging stations that were installed by Eversource (one at the town hall and one at the cliffs)
 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
Project Task Description									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 Aquinnah. 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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Inventory of Existing Resources

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

TOWN AND TRIBE RESOURCES

POLICIES AND REGULATIONS		
Title	Author/Date	Description
Aquinnah Board of Health Rules and Regulations	Town of Aquinnah, adopted 2020	Board of Health Rules and regulations including well regulations, Sewage disposal and septic tanks, Food service establishments, boarding establishments, fertilizer regulations
Aquinnah General Bylaws	Town of Aquinnah, amended 2019	Rules for taking of land and clay, hunting, scallop licenses, vehicles on beaches, septic system covers, planning board procedures, protection of wetlands and conservation commission procedures; the wetlands protection and Stretch Building Code amendment to promote energy efficiency in construction were added in 2019
Aquinnah Zoning Bylaw	Town of Aquinnah, amended 2019	Rules and regulations for town zoning, including DCPCs (Moshup Trail; Gay Head Cliffs; Building Permit Limitation; Town of Aquinnah; Menemsha, Quitsa and Stonewall Ponds; Energy), and summaries of rules for Moshup Trail, cliffs and floodplain zone
Green Community Designation	MA Dept. of Energy Resources, 2020	The Green Community Designation and Grant Program provides a road map and financial and technical support to municipalities that pledge to cut municipal energy use by 20 percent over 5 years and meet other criteria
Rules and Regulations Governing the Subdivision of Land	Town of Aquinnah	Planning Board rules and regulations governing the subdivision of land
Wampanoag Tribe of Gay Head (Aquinnah) Land Use Ordinance Environmental Regulations	Wampanoag Tribe, 1999	All environmental regulations pertaining to tribal lands in Aquinnah; available upon request

PLANS, REPORTS, AND OTHER RESOURCES		
Aquinnah Circle Landscape Master Plan	The Conway School, 2017	A plan for improving Aquinnah Circle to support the town economically and culturally, communicate environmental values, and increase the resiliency of the landscape
Aquinnah Community Development Plan	MVC, 2004	Prepared GIS mapping to aid in the evaluation of land suitability and help plan for appropriate growth management
Aquinnah Community Resilience Building (MVP) Workshop Summary of Findings	MVC, 2020	Identifies the top hazards facing Aquinnah, the environmental, cultural, and infrastructural features comprising the town, and a range of strategies identified by local stakeholders to mitigate risk
Aquinnah Housing Production Plan	M Goldson community preservation + planning with RKG Associates, Inc., 2017	A strategic plan for production and preservation of affordable housing based upon a comprehensive housing needs assessment and part of an effort to complete Housing Production Plans for all six towns
Envisioning Community in Aquinnah: Aquinnah Village Center Master Plan Phase I	The Conway School, 2020	A plan for combined affordable housing, playground, and food forest on town property behind the town buildings
Aquinnah water and wellhead protection map	MVC	Map showing town water service and wellhead protection areas
Building permits in Aquinnah	MVC, 2009-2018	Data on showing building permits issued by town, with breakdown of type
Cooperative Resource Management Plan for the Bay Scallop in the Menemsha Pond Complex	Wampanoag Tribe Natural Resources Department, 2017	Aims to ensure the proper management of the bay scallop resource in Menemsha Pond and create a framework for management of other important resources
Flood Zones and Affected Buildings in Dukes County	MVC, 2019	Map showing flood zones and affected buildings (seasonal and year-round shown separately)
Map of building density and sewered areas	MVC, 2016	Map showing building density and sewered areas in Aquinnah

Menemsha Master Plan Part 1	Chilmark Planning Board subcommittee, 2017	A review of existing conditions in Menemsha
Menemsha Master Plan Part 2	Chilmark Planning Board subcommittee, 2017	Describes concerns raised by meeting participants in areas other than traffic and pedestrian safety, and includes specific suggestions
MVC presentation for Chilmark Climate Change Working Group	MVC, 2019	Includes data, projections, and local/regional impacts, focused mostly on sea-level rise and the Dukes County Hazard Mitigation Plan
Hazard Mitigation Plan Update for the Wampanoag Tribe of Gay Head (Aquinnah)	MVC and Tribal Hazard Planning Mitigation Team, 2019	A pre-disaster mitigation plan; includes risk assessment, description of hazards and vulnerabilities, and strategies to reduce losses from typical natural hazards
Vulnerability Assessment for Aquinnah	MVC, emergency managers, and the town	Includes numbers of buildings and by value and at buildout, and vulnerability to wildfire, flooding, storms and sea-level rise, along with detailed maps
Wampanoag Tribe Climate Change Adaptation Plan	Wampanoag Tribe, in progress	The Tribe's official Climate Change Adaptation Plan



ISLANDWIDE RESOURCES

POLICIES AND REGULATIONS		
Enabling Act of the Steamship Authority	Massachusetts, amended 2016	Empowers the Steamship Authority to acquire, maintain, and operate a boat line between Woods Hole, and Hyannis, and the Islands
Districts of Critical Planning Concern (DCPCs)	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
MVC Development of Regional Impact (DRI) Checklist	MVC, 2017	Standards and criteria for DRI referral, updated every two years
MVC Development of Regional Impact (DRI) policies	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

PLANS, REPORTS, AND OTHER RESOURCES		
A Meeting of Land and Sea	David R. Foster, 2017	Book on the detailed history of the Island landscape
ACE MV workforce needs presentation	ACE MV, 2015	“Assessing the Continuing Education Needs of the Residents of Martha’s Vineyard”
Climate Vulnerability Assessment: Coastal Properties, Trustees of Reservations	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
Community Resilience Building Workshop summaries	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
Dukes County Flood Insurance Study	Federal Emergency Management Agency, 2010	Revises and updates information on the existence and severity of flood hazards in Dukes County
Eelgrass study and interim report	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
Hazard Mitigation Plan for Seven Towns in Dukes County	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
Inventory of Historic Buildings in Dukes County	MVC, 2017	Incorporates the MACRIS and Massachusetts Historical Commission inventories, previous historic inventory surveys, and other resources
Island Plan	MVC, 2009	Set a course for a more desirable future for the Island, including an outline of specific actions
Living shoreline presentation	Martha’s Vineyard Shellfish Group, ~2015	Presentation on the Island’s living shoreline project and the development of ribbed mussel seed production
Map of Chapter 61 Lands and Farmland Soils	ArcGIS, 2020	Map of MA Forest Tax Program Chapter 61 lands, and farmland soils
Map of Island topography and water features	MVC, mid-1970s	Shows topography, streams, ponds, and wetlands
Martha’s Vineyard Regional Transportation Plan 2020–2040	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

Martha's Vineyard Statistical Profile	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
Martha's Vineyard Tick-borne Illness Reduction Initiative	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
Martha's Vineyard Transportation Improvement Plan (TIP)	MVC and the MV Joint Transportation Committee, 2019	Features detailed 5-year budget for funded transportation projects; updated every year
Municipal Vulnerability Preparedness (MVP) Program	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
MV Land Bank Memorandum of Aspirations	MV Land Bank, 2019	Aspirations and ideas for Land Bank management team
MVC Climate Crisis Resolution	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
Pond and Water Quality Data Reports	MVC, 2003–2008	Results of a program to gather water quality information for Island coastal ponds, funded in part by MassDEP
Population projections	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
Presentation on SSA finances and operations	MVC, 2020	Overview of SSA enabling act, budgeting procedures, and operations
Property values by town	MVC, 2019	Table of assessed building and land values for each town, with breakout for seasonal and year-round properties
Shell Recovery Program proposal	Martha's Vineyard Shellfish Group, 2019	Proposal for further developing the Island's Shell Recovery Program
Wetland elevation monitoring presentation	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		
<u>Applying the Massachusetts Coastal Wetlands Regulations</u>	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
<u>Community Preservation Act</u>	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
<u>Environmental Permitting in Massachusetts</u>	MA Office of Coastal Zone Management, 2003	Guidance and overview related to environmental permitting in the state
<u>FEMA Requirements and Technical Guidance</u>	Federal Emergency Management Agency	Includes the National Flood Insurance Program policy index, and information related to Title 44: Emergency Management and Assistance
<u>Global Warming Solutions Act</u>	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
<u>GreenDOT</u>	MA Dept. of Transportation, 2010	MA Dept. of Transportation's sustainability initiative
<u>MA Building Code and Stretch Energy Code</u>	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
<u>MA Climate Clearinghouse</u>	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
<u>MA Coastal Program Policies</u>	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
<u>MA Flood Hazard Management Program</u>	Department of Conservation and Recreation	Works with FEMA to implement the National Flood Insurance Program (NFIP) (technical assistance only, has no regulatory authority)
<u>MA Rural Policy Plan</u>	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
<u>MA Title 5 (Septic System Regulations)</u>	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
<u>MA Waterways Regulations</u>	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
<u>MA Wetlands Protection Act Regulations</u>	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		
Cape Cod Climate Initiative	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
Guide to Invasives	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
MA Bureau of Geographic Information (MassGIS)	Commonwealth of Massachusetts	Provides interactive maps and associated information, including extensive library of map information using the on-line mapping viewer, OLIVER
MA Hurricane Resources for Emergency Managers	MA Emergency Management Agency	Various maps and resources to assist emergency managers and public safety officials with hurricane planning and preparedness, response, and recovery
MA Integrated State Hazard Mitigation and Climate Adaptation Plan	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
MA StormSmart Coasts Program	MA Office of Coastal Zone Management, ongoing	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
Massachusetts Coastal Infrastructure Inventory and Assessment Project	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
Massachusetts Coastal Zone map	MA Office of Coastal Zone Management, 2014	Includes the coastal zone boundary, the CZM regions, and the 78 coastal communities directly served by CZM
Massachusetts Cultural Resource Information System (MACRIS)	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)
Massachusetts Estuaries Project (MEP)	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
MassWildlife and Climate Adaptation	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
Overview of Acidification in the Northeast Region	Northeast Coastal Acidification Network, ~2015	Overview of ocean acidification in the northeast
Protecting Coastal Property from Major Storm Damage	MA Dept. of Environmental Protection, 2008	Guidance related to the MA Building Code and Wetlands Protection Act
StormSmart Coasts Factsheets	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

