LOOKING FORWARD

CLIMATE CHANGE ADAPTATION CONTEXT

OAK BLUFFS

MARTHA'S VINEYARD COMMISSION

Introduction

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

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

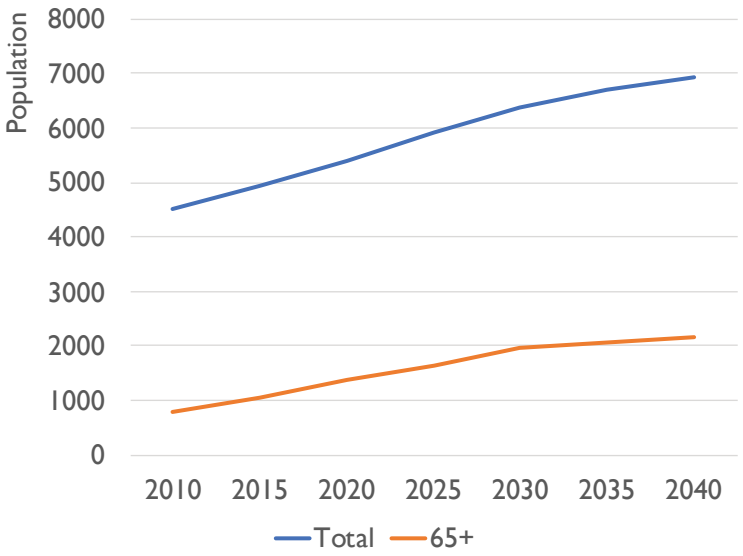
Contents

BACKGROUND

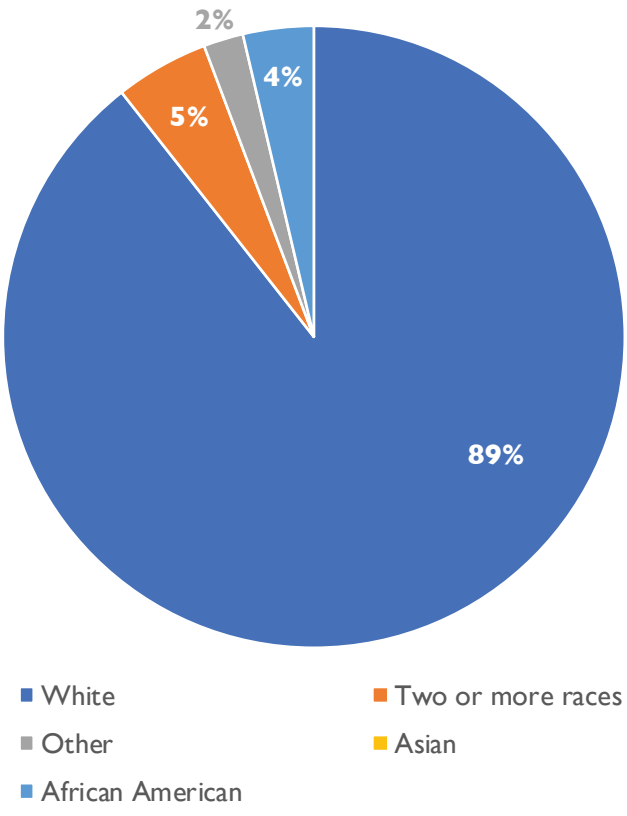
This section provides basic demographics, along with information related to infrastructure, land use, socio-economic factors, and natural resources, which can be used to support climate-change resilience planning in Oak Bluffs.

Demographics

Population Projection



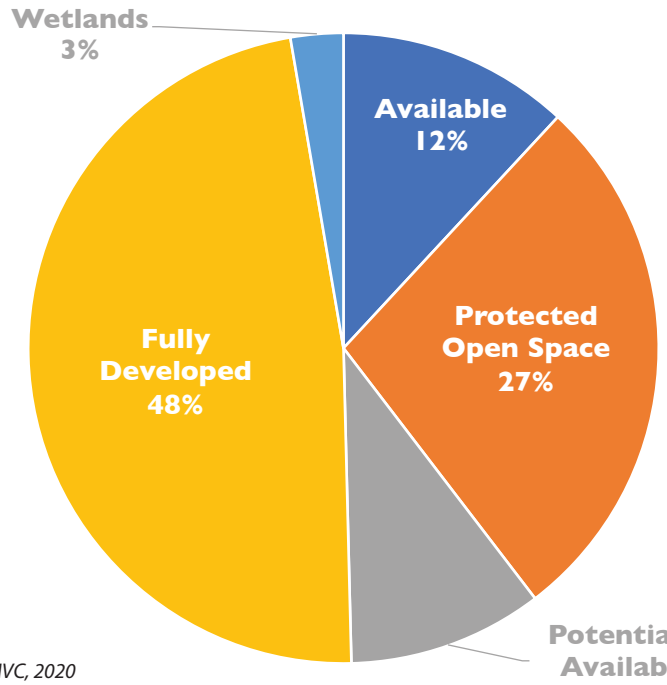
Ethnic Diversity



American Community Survey, 2018

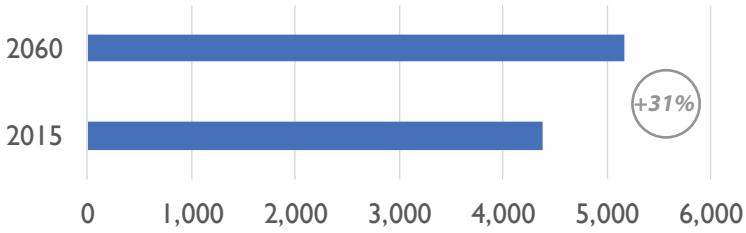
Infrastructure and Land Use

Developed Land



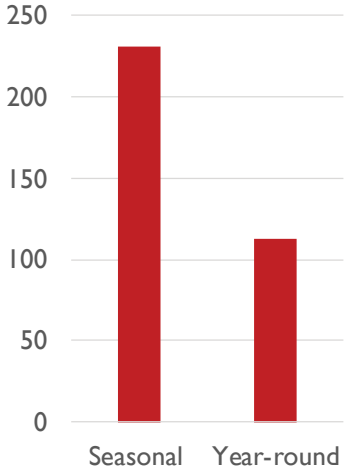
MVC, 2020

Projected New Houses in 2060



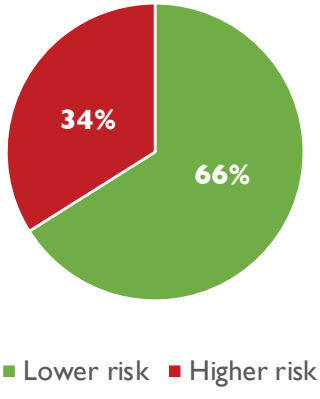
Dukes County Hazard Mitigation Plan, 2015; the MVC projected how many houses would be built by2016 if current zoning is maintained and past rates of construction continue

Buildings in 100-Year Floodplain

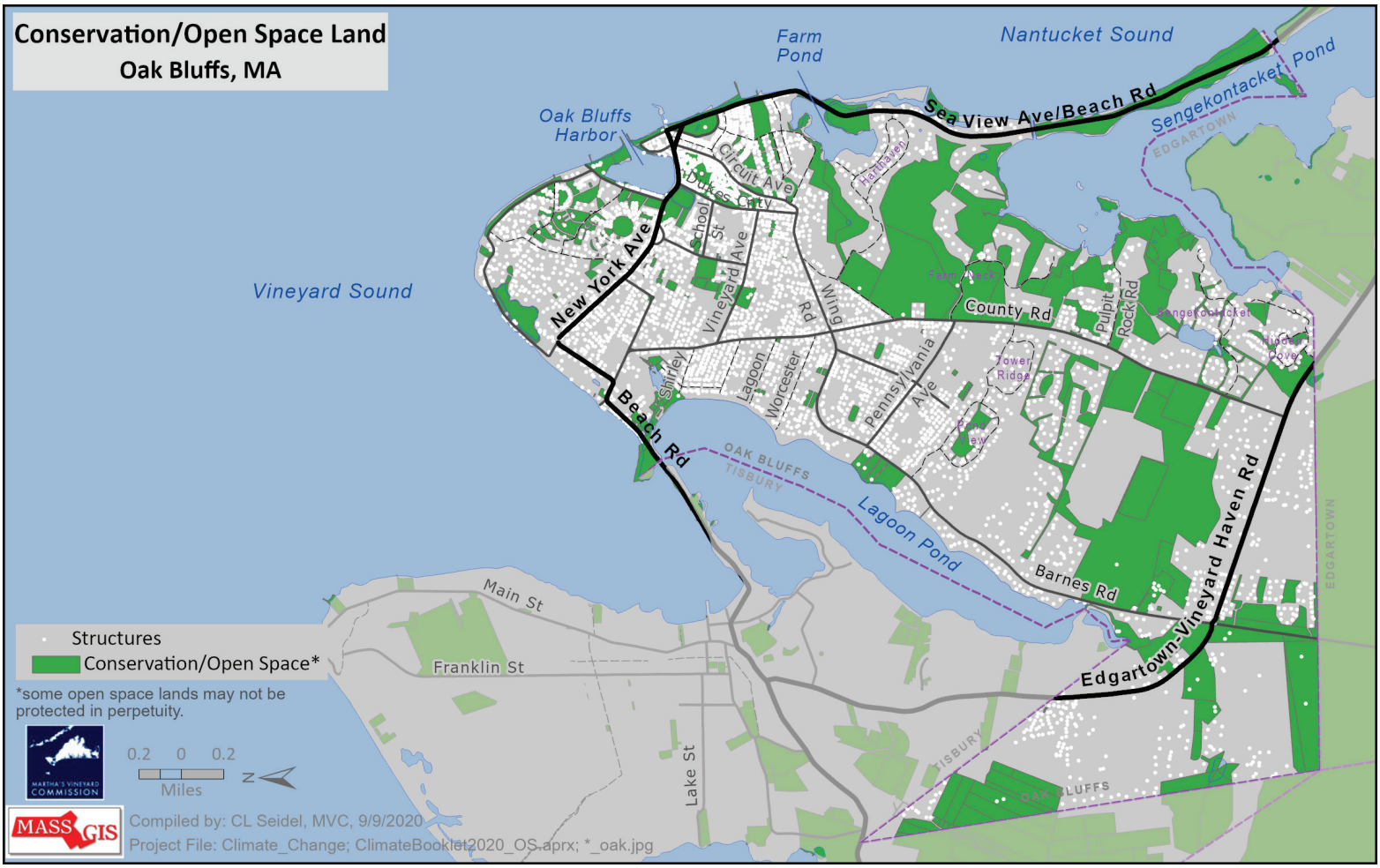


MVC, 2018; based on FEMA flood zones

Homes at Risk from Wildfire



Dukes County Hazard Mitigation Plan, 2020 (draft)



Environment

- » Lagoon and Sengekontacket ponds, along with beaches, dunes, marshes, wetlands, and inland ponds
- » Lagoon Pond is shared with Tisbury, and Sengkontacket Pond with Edgartown
- » Farm Pond, Brush Pond, and Crystal Lake
- » 27% of the land is conserved
- » DCPCs include the Copeland Plan, Lagoon Pond, Oak Bluffs Harbor, Sengekontacket Pond, and Southern Woodlands districts, where all forms of development are subject to careful review by local boards and/or committees
- » Town drinking water comes almost entirely from public wells drawn from the Island's sole-source aquifer

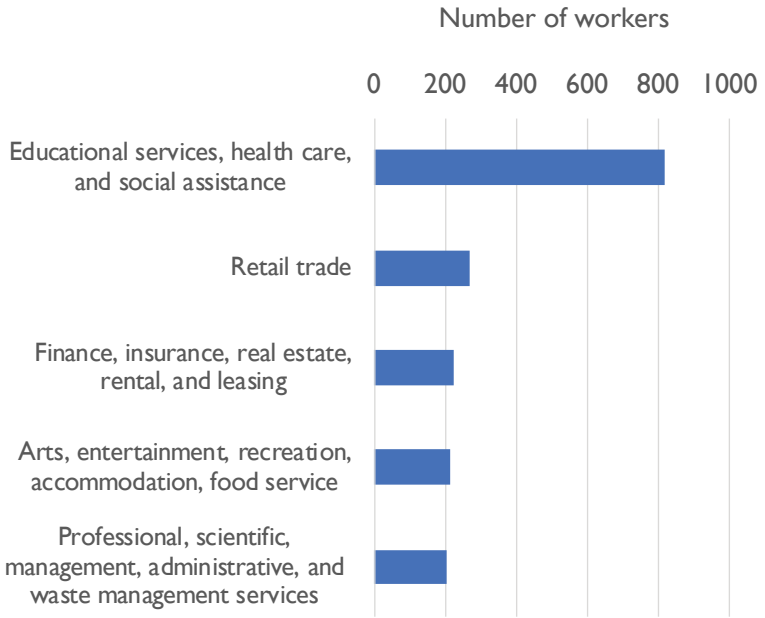
*Socio-Economic Factors**

- » 1,760 households
- » About 63% of the 4,715 housing units are vacant in the winter, reflecting the strongly seasonal economy
- » Median household income: $82,045
- » 29% of residents are over 65
- » Oak Bluffs Harbor and Ocean Park support the town's economic center, which includes parks, beaches, Circuit Ave., and the Martha's Vineyard Camp Meeting Association
- » The Campground is an important historical and cultural asset and a National Historic Landmark
- » 25.5% of students at the Oak Bluffs School speak a first language other than English; 26% are considered economically disadvantaged

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

- » 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



American Community Survey, 2018

HAZARDS AND IMPACTS

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

HAZARD*	LOCAL PROJECTIONS	LOCAL IMPACTS
 ***Rising Temperatures*** Greenhouse gases (e.g. carbon dioxide and methane) trap heat in the atmosphere, causing global temperatures to rise.	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. 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. We expect 19–39 fewer days per year with minimum temperatures below 32°F by mid-century, and 23–63 fewer days by 2100.	» 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
 ***Sea-Level Rise*** Sea levels are rising from the expansion of warmer waters and the melting of polar ice.	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 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	» 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
 ***Rising Sea Surface Temperatures and Ocean Acidification*** As temperatures and gases increase, much of the heat and CO_2 is absorbed into the oceans, causing sea-surface temperatures to rise and oceans to become more acidic.	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. Downscaled models project faster rates of warming in the Northeast continental shelf ecosystem compared to the global average. 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.	» 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

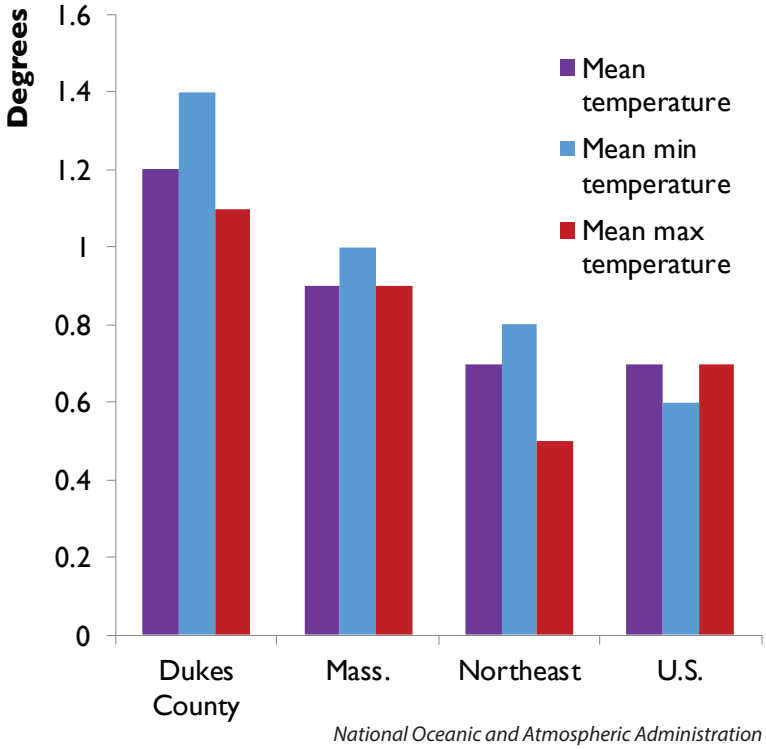
Coastal resources are some of the most critical assets in protecting our communities from the impacts of climate change, and also some of the most threatened by climate change. A 2017 economic valuation of coastal resources done for Oak Bluffs is the only study of its kind completed on Martha's Vineyard, 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
Extreme Storm Events All of these changes can create more extreme weather events, including hurricanes, tropical storms, and nor'easters.	Climate change is expected to result in more intense and frequent storm events on the Vineyard. Future hurricanes that form in the North Atlantic will produce more rain and may have higher wind speeds. Some evidence suggests that nor'easters are also increasing in both frequency and intensity.	» 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
Changes in Precipitation Rising temperatures and other shifting climate patterns will also change the amount, frequency, and timing of rainfall and snowfall.	Total precipitation projections for Martha's Vineyard show variability. 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. Martha's Vineyard basin could see a slight decrease, or an increase, in consecutive dry days throughout this century. Annual consecutive dry days during the summer season are expected to increase between by up to 4 days by the end of the century.	» 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

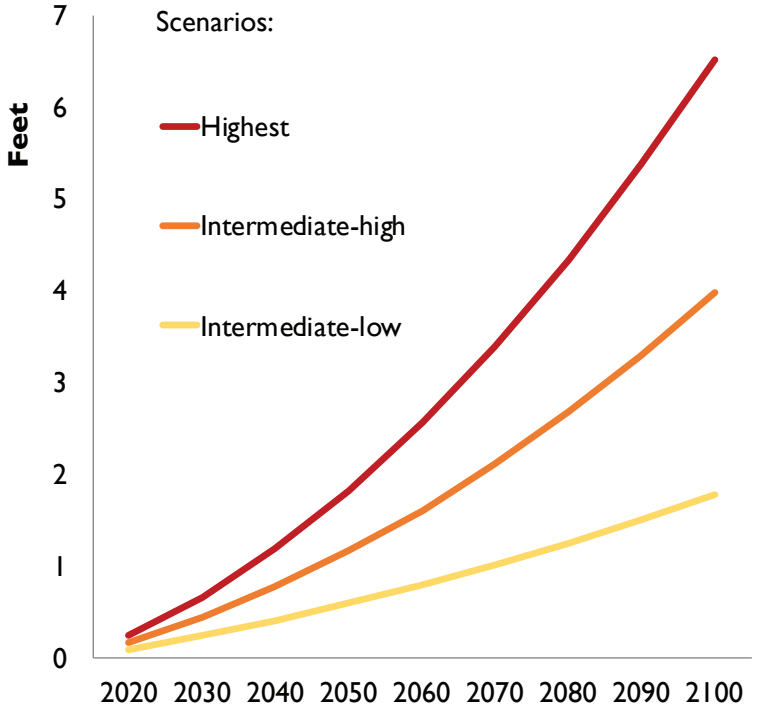
**Adapted from the Statewide Integrated Hazard Mitigation and Climate Adaptation Plan*

Change in Degrees, 1997–2017



National Oceanic and Atmospheric Administration

Sea-Level Rise Projections



Oak Bluffs Climate Change Vulnerability Assessment and Adaptation Plan

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 Oak Bluffs 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.

OAK BLUFFS	ISLANDWIDE
» *Flooding and storm damage to Eastville Ave., East Chop Dr., East Chop Bluff, County Rd., Seaview Ave., and Beach Rd., as well as Lagoon Pond Bridge, the Farm Pond culvert and buildings in the flood zone*	» *Disruption of the supply chain, emergency services, and transportation from flooding and storm damage of major roadways*
» *Limited access to Martha's Vineyard Hospital and Windemere Nursing Home*	» *Impacts to SSA service from storms and flooding*
» *Flooding and storm damage to the Harbor and adjacent commercial center*	» *Potential for prolonged power outages with lack of water and communication*
» *Impacts to low-lying utilities such as the town well, electric panel, police station, and gas stations*	
» *Densely populated areas downwind of forests are at risk of wildfire*	
» *Water supply by Upper Lagoon Pond is vulnerable to saltwater intrusion*	

Natural Resources

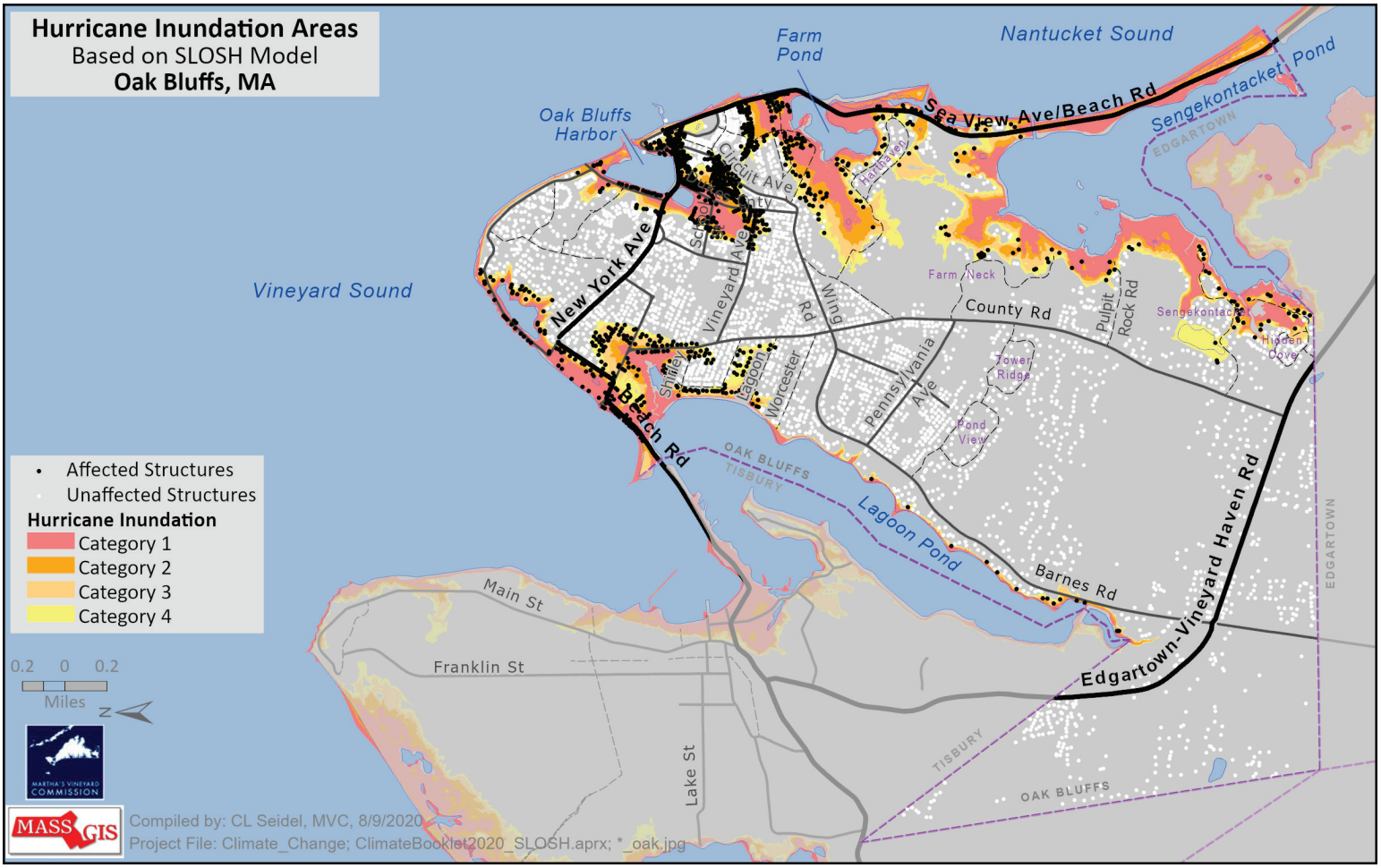
Our natural systems (e.g. beaches, dunes, marshes) provide the first line of defense against climate change, and are the foundation for our economy and ways of life on the Vineyard. A healthy environment will be less affected by climate change and will recover faster when problems occur.

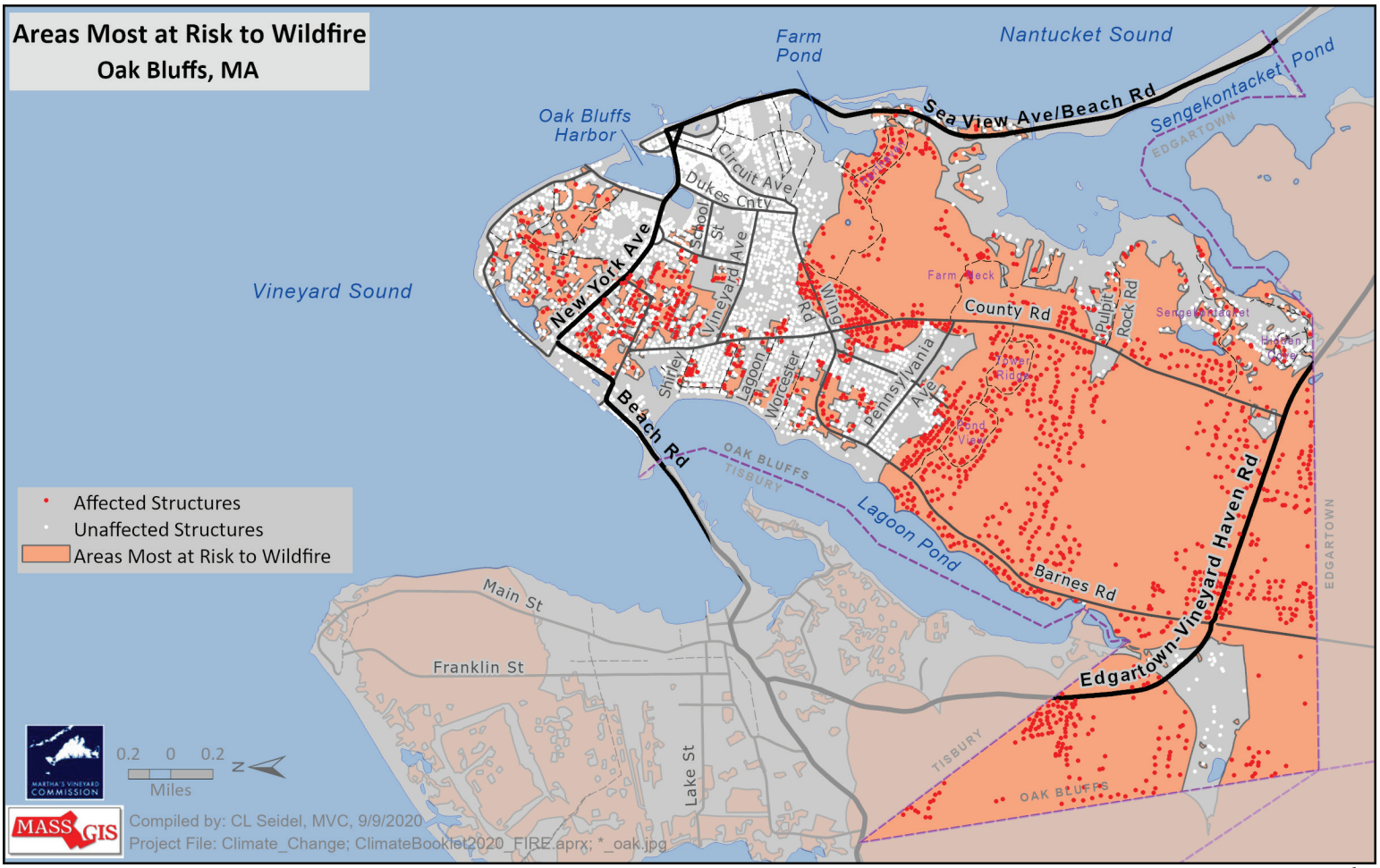
OAK BLUFFS	ISLANDWIDE
» *High rates of erosion to beaches and bluffs*	» *Erosion of beaches and dunes from sea-level rise and storm surge*
» *Changing salinity of freshwater*	» *Flooding of marshes from sea-level rise*
» *Harmful nitrogen levels in ponds like Sengekontacket Pond and Lagoon Pond*	» *Warming and nitrification of ponds from higher sea temperatures and runoff from heavy rain*
» *Impacts to salt marshes on Sengekontacket, Brush and Farm Ponds, and Sunset Lake*	» *Loss of fishery habitat from higher sea temperatures*
» *Loss of marshes in Brush Pond, Crystal Lake, Sengekontacket Pond and Farm Pond*	» *Susceptibility to wildfire from droughts and higher air temperatures*
» *Impacts to shellfish habitat, migration patterns, and herring spawning habitat*	
» *Forests in the southern part of Oak Bluffs are at risk of wildfire*	

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.

OAK BLUFFS	ISLANDWIDE
» *Impacts to cultural and historic resources like the Campground houses from flooding or fire*	» *Stress on food security*
» *Loss of tourism and economy due to erosion, impacts to economic center near the Harbor; loss of recreation due to increased heat*	» *Impact on emergency services, and loss of access*
» *Loss of tax revenue from low-lying homes*	» *Stress on aging and isolated residents from heat and during natural hazards*
» *Increased vector-borne disease*	» *Consequences for tourism and the economy from storms, and loss of beaches, coastal homes, and tax revenue*
» *Aging population*	» *Increased vector-borne disease*
	» *Reduced water security*


Hurricane Inundation Areas
Based on SLOSH Model
Oak Bluffs, MA
Farm Pond
Nantucket Sound
Oak Bluffs Harbor
Sea View Ave/Beach Rd
Sengekontacket Pond
EDGARTOWN
Vineyard Sound
New York Ave
Circuit Ave
Dukes Cnty
School St
Vineyard Ave
Wing Rd
Farm Neck
County Rd
Pulpit Rock Rd
Sengekontacket
Hidden Cove
Shirley
Lagoon
Worcester
Pennsylvania Ave
Tower Ridge
Pond View
Beach Rd
OAK BLUFFS
TISBURY
Lagoon Pond
Barnes Rd
Edgartown-Vineyard Haven Rd
Main St
Franklin St
Lake St
Affected Structures
Unaffected Structures
Hurricane Inundation
Category 1
Category 2
Category 3
Category 4
0.2 0 0.2
Miles
N
MASS GIS
Compiled by: CL Seidel, MVC, 8/9/2020
Project File: Climate_Change; ClimateBooklet2020_SLOSH.aprx; *_oak.jpg


Areas Most at Risk to Wildfire
Oak Bluffs, MA
Farm Pond
Nantucket Sound
Oak Bluffs Harbor
Sea View Ave/Beach Rd
Sengekontacket Pond
EDGARTOWN
Vineyard Sound
New York Ave
Circuit Ave
Dukes Cnty
School St
Vineyard Ave
Wing Rd
Farm Neck
County Rd
Pulpit Rock Rd
Shirley
Lagoon
Worcester
Pennsylvania Ave
Tower Ridge
Pond View
Beach Rd
OAK BLUFFS
TISBURY
Lagoon Pond
Barnes Rd
Edgartown-Vineyard Haven Rd
Main St
Franklin St
Lake St
Affected Structures
Unaffected Structures
Areas Most at Risk to Wildfire
0.2 0 0.2
Miles
N
MASS GIS
Compiled by: CL Seidel, MVC, 9/9/2020
Project File: Climate_Change; ClimateBooklet2020_FIRE.aprx; *_oak.jpg

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.

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

Islandwide

- Town buildings inland can a schools, libraries, town halls
- Vital amenities and services stations and police stations
- Emergency responders, incl personnel, are responsive a communication network
- Wetlands, salt marshes, dun essential buffer, offering the storms and storm surge
- Sense of self-sufficiency
- The community is increasin food production, both agric
- Pristine sole-source aquifer
- The Martha's Vineyard Airpo services to the Island
- Martha's Vineyard Transit Au service in all towns
- Generators are in place at th 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 owned infrastructure
- Town sewer system helps of nitrogen runoff
- Seasonal ferry docks brin supplies to and from the to all of Martha's Vineyard
- Location of Martha's Vine
- Vulnerable population pl residents to contact durin
- The Brazilian population is churches are an important
- Social-service organizatio services available
- Proactive town climate ac
- Wastewater infrastructure elevated

act as emergency shelters:
s, MV Ice Arena, and the YMCA
are located inland, such as fire

luding volunteers and town
nd committed and have a good

nes, and beaches act as an
e first line of defense against

g Island self-sufficiency through
culturally and hunting/fishing
for drinking water
ort provides regular passenger

uthority provides regular bus

ne SSA and other municipal

rs are home to crucial town-

s to limit the concentration

g cars, passengers, and
Island and are a critical asset
d
yard Hospital
an includes a list of priority
ng outages
tight-knit and self-reliant, and
communication network
ons make critical social

daptation planning
e in flood zone has been

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

Adapted from the Community Resilience Building Workshop Summaries of Findings for each town and West Tisbury/Chilmark

GROUPS AND INITIATIVES

As with other Island communities around the world, Oak Bluffs 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 Oak Bluffs contacts)

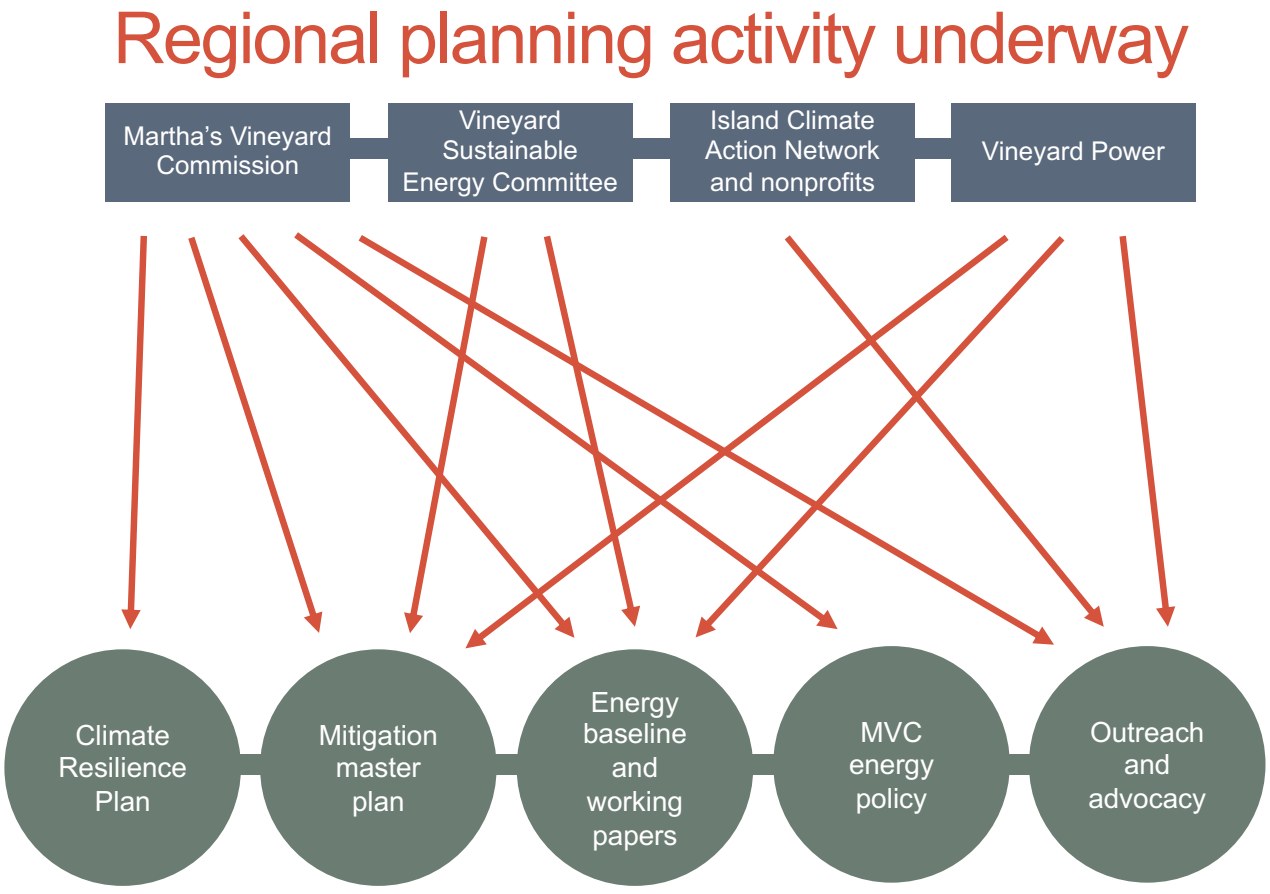
MVC Climate Action Task Force (CATF): Richard Toole, Liz Durkee
MVC Climate Resilience Committee: Liz Durkee
Oak Bluffs Energy Committee: Richard Toole
Island Climate Action Network (ICAN): Liz Durkee
Vineyard Sustainable Energy Committee (VSEC): Richard Toole
Tribal Planning: Durwood Vanderhoop, Beckie Finn

Existing Climate Change Resilience Initiatives in Oak Bluffs

Approval of Community Resilience Building (a.k.a. Municipal Vulnerability Preparedness) Workshop Summary of Findings (2019)
MVP Action Grant to renourish North Bluff Beach (in progress)
Oak Bluffs Water District planning to address saltwater intrusion in Lagoon Pond Well (in progress)
Planning for Farm Pond culvert enlargement (in progress)
Plans and permitting in place for Inkwell Renourishment and groin realignment project
Planning and permitting in place for East Chop bluff stabilization project
CZM Coastal Resiliency Grant to develop resiliency strategies in the harbor area for the next 50 years (completed)
North Bluff Preservation: Seawall, pedestrian boardwalk, beach nourishment, and other improvements (several grants; work completed)
County Road drainage improvements (completed)
Elevation of wastewater infrastructure in flood zone (completed)
Climate Change Vulnerability Assessment and Adaptation Plan (completed)

Climate Mitigation Efforts, Islandwide and in Oak Bluffs

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
Renovated Town Hall to be fossil fuel free
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



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 Oak Bluffs. 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 resilience 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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Lucy Morrison
Executive Assistant
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Inventory of Existing Resources

The following resources have been compiled and are available to support adaptation in Oak Bluffs and on the Island. These are the most directly relevant documents to Oak Bluffs but there are several other documents relevant to the Island and region available here.

TOWN RESOURCES

POLICIES AND REGULATIONS		
Title	Author/Date	Description
Cottage City Historic District Architectural Guidelines	Oak Bluffs Historical Commission	Regulations to help preserve the architectural and visual character of the Cottage City Historic District
Districts of Critical Planning Concern (DCPC) regulations	MVC, 1975–2014	Including the Copeland Plan (1991), Lagoon Pond (1988), Oak Bluffs Harbor (1997), Sengekontacket Pond (1976), and Southern Woodlands (1998) districts; development within DCPCs is subject to review by local boards and/or committees
Martha's Vineyard Camp Meeting Association Rules and Regulations	Martha's Vineyard Camp Meeting Association, 2014	These rules govern the MVCMA lands and leaseholders, including construction and preservation
Oak Bluffs Aquaculture Regulations	Town of Oak Bluffs, 2016	Functions to protect and preserve existing fisheries and minimize impact on other uses of the marine environment
Oak Bluffs Board of Health Regulations	Town of Oak Bluffs	Including stormwater management, and protection for sensitive resource areas including coastal areas, Lagoon and Sengekontacket pond districts, and stormwater management regulations
Oak Bluffs Floodplain Overlay District Bylaw	Town of Oak Bluffs, 2010	Part of the town zoning bylaw; establishes the flood overlay district and regulations to limit development in flood-prone areas, reduce surface and groundwater contamination, ensure emergency access to homes and other structure, minimize losses from storm damage, preserve the benefits of natural storm protection, and preserve access to areas with public value; updated through CZM StormSmart Coasts program
Oak Bluffs General Bylaws	Town of Oak Bluffs, updated 2018	Sets rules, terms, and procedures for town boards and departments, historic preservation, sewer assessment, affordable housing, shellfishing, parks and recreation, and protection of wetlands
Oak Bluffs General Wetlands Bylaw	Town of Oak Bluffs, amended 2006	Regulations for activities deemed to significantly affect town wetlands and water quality
Oak Bluffs Open Space and Recreation Plan	Town of Oak Bluffs, 2015	A plan to protect and enhance the town's parks and open spaces, with a focus on threats from climate change and nitrogen, and ways to improve parks and recreation
Oak Bluffs Recodified Zoning Bylaws	Town of Oak Bluffs, amended 2019	Regulations to promote health and safety; encourage appropriate land use; preserve cultural, historical, and agricultural heritage; increase town amenities; and reduce risk from fire
Oak Bluffs Wetlands Protection Act	Town of Oak Bluffs, 1994	Establishes standard definitions and procedures by which the Oak Bluffs conservation commission may carry out its responsibilities under federal, state, and the local laws; includes rules for vegetation management
Parks and Recreation By-Laws	Town of Oak Bluffs	Bylaws governing the use of parks-and-recreation lands and facilities
Rules and Regulations Governing the Subdivision of Land	Town of Oak Bluffs, 1974	Planning board rules regarding subdivisions
Wetlands Bylaw Pier Regulations	Town of Oak Bluffs, updated in 2006	Bylaws pertaining to water-dependent structures, including piers, docks, and float systems

PLANS, REPORTS, AND OTHER RESOURCES		
Assessment of Shore Protection Options to Improve Coastal Resiliency along the Oak Bluffs Harbor Shoreline	Applied Coastal for the Town of Oak Bluffs, 2020	Funded by the CZM Coastal Resilience Grant Program, an engineering study to develop options for protecting shore and coastal infrastructure in the Oak Bluffs Harbor area

Climate Change Vulnerability Assessment and Adaptation Plan	Kleinfelder on behalf of the Town of Oak Bluffs, 2016	Assesses areas vulnerable to sea-level rise and storm surge, including public infrastructure and natural resources; and identifies adaptation strategies to help to mitigate the long-term effects
Comprehensive Wastewater Master Plan (CWMP) Needs Assessment Report	GHD on behalf of the Town of Oak Bluffs, 2018	Draft needs assessment for the CWMP, which aims to provide an environmentally sound plan for nitrogen reduction, wastewater treatment, and effluent recharge for the town
Cottage City Historic District map	Town of Oak Bluffs	Basic map of the Cottage City Historic District
County Road Memo	Horsley Witten Group, 2018	Plans for improving drainage along County Road at Tradewinds, including green infrastructure techniques
Green Communities Act fact sheet	Oak Bluffs Energy Committee and Planning Board subcommittee, 2020	Outline of the benefits and criteria for the Green Communities program, which provides financial, and technical support to municipalities that pledge to cut municipal energy use over 5 years and meet other criteria
Master plans for 9 town parks	Bradford Associates on behalf of the town of Oak Bluffs, 2016	Conceptual master plans for the Oak Bluffs parks commission: Hartford-Penacook; Hiawatha, Nashawena, Naushon, Sunset, Viera, Waban, Washington, and Wesleyan parks
New Flood Zone map with parcels	MVC, 2016	Mapping showing the extent of the revised floodplain
Oak Bluffs building density and sewered areas	MVC, 2016	Map showing building density and sewered areas
Oak Bluffs Coastal Sediment Transport Study	Applied Coastal Research and Engineering, 2010	Evaluation of the shoreline extending from East Chop to Farm Pond; shoreline armoring has maintained upland development but prevented erosion of bluff sediments that supplied the beach system
Oak Bluffs Coastal Services Valuation Report	Abt Associates, 2017	This study identifies ecosystem services, calculates their dollar value, and helps in assessing the relative importance of coastal resources when considering land use
Oak Bluffs Community Resilience Building (MVP) Workshop Summary of Findings	Dodson and Flinker, for MA Executive Office of Energy and Environmental Affairs, 2019	Builds on the 2015 Dukes County Hazard Mitigation Plan and 2016 Coastal Vulnerability Assessment and Adaptation Plan, with a broader range of community vulnerabilities and updated list of priorities and actions
Oak Bluffs MapsOnline website	Town of Oak Bluffs, 2014	Interactive website with GIS layers, including parcels, buildings, contours, flood zones, wetlands, and zoning districts
Oak Bluffs Master Plan	Master Plan Update Committee, 2019	Based on input from the community, strategies are organized around protecting important resources, managing growth and change, addressing emerging issues, and meeting community needs
Oak Bluffs property values	MA Dept. of Revenue, 2018	Table of assessed property values from 2003–2018
Oak Bluffs Streetscape Master Plan	Consultant Teams and Town of Oak Bluffs, 2015	A framework for future planning, development, and design of Oak Bluffs, working within the existing character of the downtown
Oak Bluffs water and wellhead protection map	MVC, 2016	Map showing town water service and well head protection areas
Properties in the FEMA flood zone	MVC, 2016	List of properties in the FEMA flood zone, including assessed building value
Site Plan Review Criteria	Citizen Planner Training Collaborative, 2015	Planning Board site plan review criteria
Vulnerability Assessment for Oak Bluffs	MVC with emergency managers and planning teams of Dukes County, 2015	Matrices of vulnerability to wildfire, storms, flooding, and sea-level rise; projections estimate vulnerability at buildout
Water Protection Overlay District	MVC, 2019	Map of the Oak Bluffs Water Protection Overlay District

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		
Applying the Massachusetts Coastal Wetlands Regulations	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
Community Preservation Act	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
Environmental Permitting in Massachusetts	MA Office of Coastal Zone Management, 2003	Guidance and overview related to environmental permitting in the state
FEMA Requirements and Technical Guidance	Federal Emergency Management Agency	Includes the National Flood Insurance Program policy index, and information related to Title 44: Emergency Management and Assistance
Global Warming Solutions Act	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
GreenDOT	MA Dept. of Transportation, 2010	MA Dept. of Transportation's sustainability initiative
MA Building Code and Stretch Energy Code	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
MA Climate Clearinghouse	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
MA Coastal Program Policies	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
MA Flood Hazard Management Program	Department of Conservation and Recreation	Works with FEMA to implement the National Flood Insurance Program (NFIP) (technical assistance only, has no regulatory authority)
MA Rural Policy Plan	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
MA Title 5 (Septic System Regulations)	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
MA Waterways Regulations	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
MA Wetlands Protection Act Regulations	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	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
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