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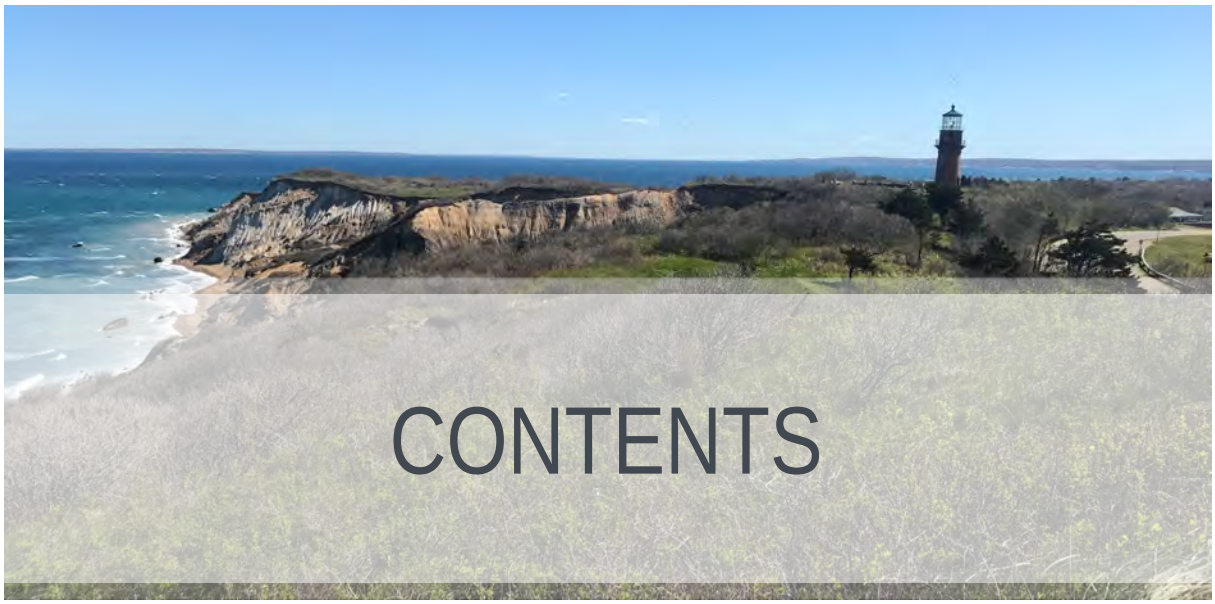
SWCA
ENVIRONMENTAL CONSULTANTS

Dukes County
Community Wildfire Protection Plan



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EXECUTIVE SUMMARY

This Dukes County Community Wildfire Protection Plan (DCCWPP) addresses hazards and risks of wildland fire throughout Dukes County (hereafter referred to as the County) and makes recommendations for fuel reduction projects, public outreach and education, structural ignitability reduction, and fire response capabilities. The County comprises a diverse landscape and land ownership but a population with a common concern: the need to prepare for wildfire to reduce the risk of loss of life and property.

While community members have not experienced frequent, extensive, high-severity fire, wildfire is still a concern within the County. The County exhibits large expanses of flammable vegetation with an interspersed population; heavy seasonal recreational use with accompanying influxes of visitors; dense occurrence of values at risk; scattered historic and culturally significant structures and landmarks; and fire response issues associated with an island-based fire response network. Local fire managers understand the fire risk is increasing, and a large fire in the County is possible. This DCCWPP has been developed to assist the County in ensuring that a catastrophic wildfire will be mitigated in the future by assessing areas at risk and recommending risk-reduction measures.

The purpose of the DCCWPP is to assist in protecting human life and reducing property loss due to wildfire throughout the County. The plan is the result of a community-wide wildland fire protection planning process and the compilation of documents, reports, and data developed by a wide array of contributors. This plan was compiled in 2021. All versions of the DCCWPP have been developed in response to the federal Healthy Forests Restoration Act (HFRA) of 2003.

The DCCWPP meets the requirements of the HFRA by addressing the following:

1. Having been developed collaboratively by multiple agencies at the state and local levels in consultation with federal agencies and other interested parties.
2. Prioritizing and identifying fuel reduction treatments and recommending the types and methods of treatments to protect at-risk communities and pertinent infrastructure.
3. Suggesting multi-party mitigation, monitoring, and outreach.
4. Recommending measures and action items that residents and communities can take to reduce the ignitability of structures.
5. Soliciting input from the public on the draft DCCWPP.

A group of multijurisdictional agencies (tribal, federal, state, and local), organizations, and residents joined together as a Core Team to develop this DCCWPP process. Core Team members have had many years of experience working in fire management in the County, ensuring that this plan is tailored to the local concerns and conditions.

The planning process has served to identify many physical hazards throughout the County that could increase the threat of wildfire to communities. While no public meetings were convened due to COVID-19 restrictions, Martha's Vineyard Commission (MVC) and SWCA Environmental Consultants worked very hard to incorporate a diverse group of stakeholders. By incorporating public and Core Team input into the recommendations, treatments are tailored specifically for the County. The DCCWPP emphasizes the importance of collaboration among multijurisdictional agencies in order to develop fuels mitigation treatment programs to address wildfire hazards. The County has a committed team of career and volunteer firefighters, who work arduously to protect the life and property of citizens. However, without homeowners taking on some responsibility of reducing fire hazards in and around their own homes, these resources are severely stretched. A combination of homeowner and community awareness, public education, and agency collaboration and treatments are necessary to fully reduce wildfire risk in Dukes County.

Some of the highest-risk areas identified in this DCCWPP are communities located within and adjacent to State Forest land and the wildland urban interface (WUI). The WUI is the area in which wildland fuels become intermixed with human development. The Massachusetts Department of Conservation and

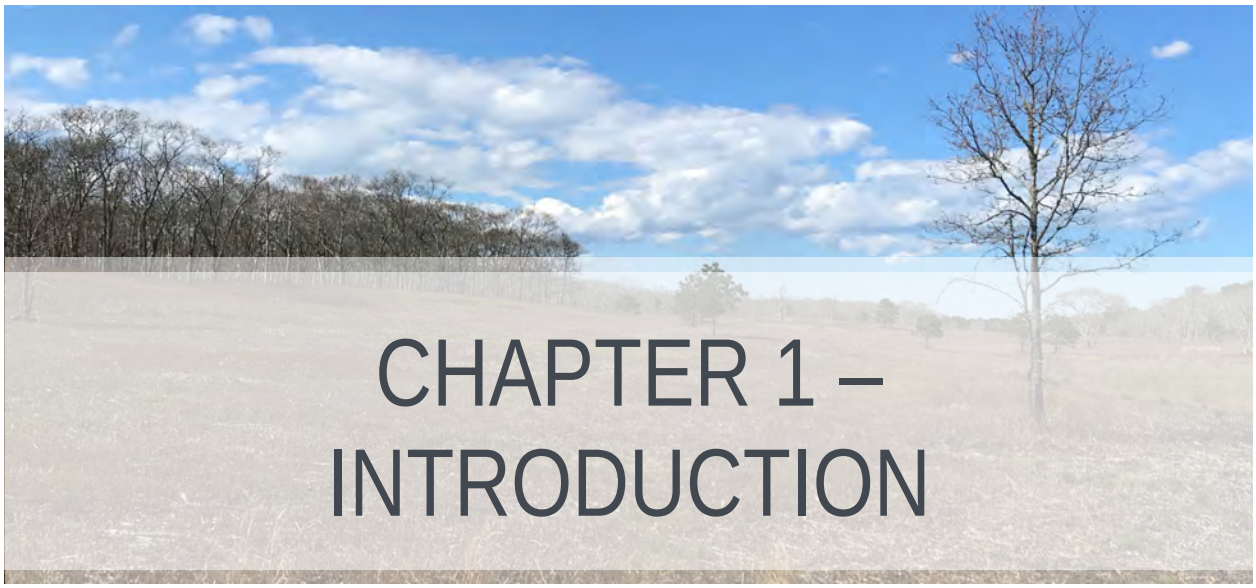
Recreation (DCR) manages the State Forest but does not have the ability to conduct significant vegetation management due to the forest's protected status. Although there are various well-maintained fuel breaks throughout the forest, it remains an area of concern for surrounding communities. Treatments to fuels in these high-hazard areas contribute to decreasing the likelihood of wildfire's negative impacts on communities in the County WUI. Continued preventive activities are needed, however, to further reduce the negative impacts that wildland fire can have on communities and community members living in the WUI.

Communities located in riparian, grassland, and shrubland areas of the County also need to prepare for fast-paced wildfire spread in these fine fuel areas. Recommendations for improving wildfire mitigation in these communities include focusing on actions to reduce the presence of flammable noxious and invasive weeds in WUI communities and around structures; encouraging residents to mow borders around their properties, implement defensible space around their homes and other structures, harden their homes to potential flame impingement from fast moving grass fires; and equipping fire departments to respond quickly to these fast-paced wildfire events.

The DCCWPP provides background information, a Composite Hazard-Risk Assessment, and recommendations. Much of this background information is housed in several appendices to the main document in order to focus the main document on analysis and action items. Chapter 1 provides a general overview of community wildfire protection plans (CWPPs). Chapter 2 presents an overview of the fire environment and specific information about fuel types. Chapter 3 describes the results of the Composite Hazard-Risk Assessment and summarizes the community risk ratings. Chapter 4 provides recommendations with respect to the three primary goals of the National Cohesive Wildfire Strategy: 1) restore and maintain landscapes, 2) create fire-adapted communities, and 3) improve wildfire response. Recommendations outlined under each goal include action plans and monitoring strategies for implementing fuels reduction projects, reducing structural ignitability, improving fire response capabilities, and initiating public outreach and education. Chapter 5 describes monitoring strategies and details regarding implementation of actions.

The plan does not require implementation of any of the recommendations, but the message throughout this document is that the greatest fire mitigation could be achieved through the joint actions of individual homeowners and local, state, and federal governments. It is important to stress that this document is an initial step in raising public awareness and treating areas of concern and should serve as a tool in doing so.

The DCCWPP should be treated as a live document to be updated annually or immediately following a significant fire event. The plan should continue to be revised to reflect changes, modifications, or new information. These elements are essential to the success of mitigating wildfire risk throughout Dukes County and will be important in maintaining the ideas and priorities of the plan and the communities in the future.



CHAPTER 1 – INTRODUCTION

The United States is facing urgent forest and watershed health concerns. While the number of annual wildfires throughout the United States has been slightly decreasing (67,700 fires in 2016 vs. 59,000 fires in 2020), the number of acres burned has been on the rise (Congressional Research Service [CRS] 2021). On average, 7 million acres are burned every year due to wildfire, more than double the annual average of acres burned in the 1990s (CRS 2021). Communities are seeing the most destructive wildfire seasons in history. The 2015 fire season had the most acreage impacted in a single year since 1960 at 10.13 million acres, and 2020 was the second most extensive year for wildfire with 10.12 million acres burned (CRS 2021). These statistics demonstrate that wildfires are becoming larger and harder to control.

The northeast region of the United States experiences the largest number of wildfires year after year (Northeast Regional Strategy Committee [NRSC] 2019), with over 11,000 wildfires annually, burning on average 130,000 acres. Most of these fires are small but occur close to homes and values at risk (NRSC 2019). Because of the heightened population density of the northeast region, all wildfires have the potential to have devastating impacts on life and property.

The Massachusetts State Forest Action Plan (MSFAP) states that Massachusetts faces urgent issues concerning forests and watersheds, including catastrophic wildfires, epidemic insect outbreaks, and changing climate conditions (Massachusetts Department of Conservation and Recreation [DCR] 2020).

As wildfire severity increases, communities need a plan to prepare for, reduce the risk of, and adapt to wildland fire events. Community wildfire protection plans (CWPPs) help accomplish these goals. A CWPP provides recommendations that are intended to reduce, but not eliminate, the extreme severity or risk of wildland fire.

While CWPPs have been completed for nearby regions, this is the first for Dukes County (the County). The development of this CWPP included meaningful collaboration among many stakeholders including local and state officials, as well as other interested parties such as non-governmental stakeholders and private citizens.

This document, hereinafter known as the 2021 Dukes County Community Wildfire Protection Plan (DCCWPP) identifies potential priority areas where mitigation measures are needed to protect from wildfire the irreplaceable life, property, and critical infrastructure in the County. This 2021 DCCWPP presents potential treatments for mitigation of wildfire-related risks in the priority areas but does not attempt to mandate the type and priority for treatment projects that will be carried out by the land management agencies and private landowners. With the responsibility for implementing wildfire mitigation treatments being totally at the discretion of the landowner, the 2021 DCCWPP will only identify potential treatments and a suggested priority for these projects.

PURPOSE

It is the intent of this 2021 DCCWPP to provide a County-wide scale of wildfire risk and protection needs and then bring together the responsible wildfire management and suppression entities in the County to address the identified needs and to support these entities in planning and implementing the necessary mitigation measures.

This DCCWPP process involves looking at past fires and treatment accomplishments using the knowledge and expertise of the professional fire managers who work for the various agencies and governing entities in the County. This process identifies the current local wildfire risks and needs in the County, supporting these with relevant science and literature from the northeast region.

The Core Team collaboratively identified the following goals and objectives for the plan:

- Identify all wildland fire hazards throughout Dukes County
- Develop a County map displaying hazard areas
- Develop community-scale mapping of the hazard areas
- Rank priority areas for developing more detailed Wildfire Preparedness Plans
- Develop a County-wide system for rating the risk of wildfire
- Provide information on various strategies that will address fire hazards and serve as a guide for future fire planning
- Assess current wildland fire suppression capacities
- Identify areas that require increased effectiveness of wildland suppression capacities

NAVIGATION

The plan provides background information, a Composite Hazard-Risk Assessment, and recommendations to reduce or mitigate wildfire risk to communities. The DCCWPP is designed to be used by the residents of the County, as well as stakeholders tasked with forest, fire, and emergency management. Some information is therefore highly technical in order to provide sufficient detail to aid in project implementation.

This DCCWPP is organized into several chapters with more detailed information compiled into appendices. Chapter 1 provides an overview of CWPPs and describes the need for a plan; Chapter 2 gives an overview of the fire environment and introduces the reader to fire history information and well as fire response; Chapter 3 describes the methodology for the Composite Hazard-Risk Assessment and the results in detail; Chapter 4 outlines the mitigation strategies that could be implemented to reduce wildfire risk under the umbrella of the National Cohesive Strategy, including action plans that outline priorities and recommendations for reducing fuels, initiating public education and outreach, reducing structural ignitability, and improving fire response capabilities; and Chapter 5 provides suggested approaches to monitoring actions.

The DCCWPP does not require implementation of any of the recommendations; however, these recommendations may be used as guidelines for the implementation process if funding opportunities become available. The recommendations for fuels reduction projects are general in nature; site-specific planning that addresses location, access, land ownership, topography, soils, and fuels would need to be employed upon implementation. Also, it is important to note that the recommendations are specific to wildland urban interface (WUI) areas and are expected to reduce the loss of life and property.

In developing the DCCWPP, a large amount of background information on the County was compiled and analyzed, including location and land use data, climate and weather data, baseline vegetation data, historic conditions, population, and demographics, CWPP planning process, fire regime and baseline

conditions, fire policy, and other supporting background information. This information is presented in Appendix A, Community and DCCWPP Background.

Additional appendices to this DCCWPP include maps in Appendix B; the Core Team contact list in Appendix C; community descriptions and hazard ratings in Appendix D; the National Fire Protection Association (NFPA) Wildfire Fire Risk and Hazard Severity Form 1144 in Appendix E; funding opportunities in Appendix F; a homeowner's guide in Appendix G; and community outreach information in Appendix H.

ALIGNMENT WITH THE NATIONAL COHESIVE STRATEGY

This DCCWPP will be aligned with the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) and its Phase III Northeast Regional Action Plan (NERAP) by adhering to the nationwide goal: "*To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire*" (NRSC 2015).

The primary, national goals identified as necessary to achieving the vision are:

Restore and maintain landscapes: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.

Fire-adapted communities: Human populations and infrastructure can withstand a wildfire without loss of life and property.

Wildfire response: All jurisdictions participate in making and implementing safe, effective, and efficient risk-based wildfire management decisions.

For more information on the Cohesive Strategy, please visit: https://www.northeasternwildfire.net/wp-content/uploads/2019/09/2015_regional_action_plan.pdf

Alignment with these Cohesive Strategy goals is described in more detail in Chapter 4, Mitigation Strategies.

In addition to aligning with the Cohesive Strategy, the DCCWPP also incorporates information on post-fire recovery, the significant hazards of a post-fire environment, and the risk that post-fire effects pose to communities (Figure 1.1).

Figure 1.1. The three primary goals of the Cohesive Strategy, in addition to post-fire recovery, incorporated in the DCCWPP to serve as holistic plan for fire prevention and resilience.

EXISTING PLANS AND PROGRAMS

LOCAL

In May 2020, Dukes County released a draft of the most recent update to the 2015 Dukes County Multi-Jurisdictional Hazard Mitigation Plan (HMP). The goal of this plan is to improve community preparedness and outline recommended actions regarding disasters. The plan outlines vulnerabilities within the County, hazard identifications and assessments, and mitigation recommendations (Martha's Vineyard Commission [MVC] et al. 2020). With regard to wildfire, the HMP notes that while wildfires are more commonly associated with the western United States, Dukes County is incredibly flammable. In 1957, a fire within the County burned at the rate of 53 acres per minute for the first 6 hours. The combination of forested lands with dry, sandy soils on the islands increases wildfire risk. Additionally, the HMP ranks wildfire mitigation efforts such as vegetation management and prescribed burns at 75 out of 85 for prioritization (MVC et al. 2020).

In 2013, the community of Cuttyhunk developed a community-scale CWPP. The CWPP included fuels analysis to determine potential fire risk and hazard and identified a series of projects to be implemented to protect values at risk on the island. Treatments included Firewise treatments on individual properties

and around structures, mowed fuel firebreaks to reduce fuel continuity, prescribed burning in uninhabited areas and along the firebreak, and road clearance/widening to improve access for emergency vehicles. These treatments were incorporated into the Dukes County HMP in the plan's Drought and Wildfire Hazards Assessment and Mitigation section and are also integrated into this CWPP by reference. Cuttyhunk is also an NFPA Federal Firewise Community. On-site hazard assessments were not completed for Gosnold or Cuttyhunk specifically, but desktop analysis was completed for the Elizabeth Islands to determine wildfire vulnerability under updated fuel models.

TRIBAL

In April 2002, the University of Massachusetts Department of Natural Resources and Conservation developed a fire management plan for the Wampanoag Tribe of Gay Head (Aquinnah). The plan is a programmatic-level planning document that outlines various wildfire management tactics such as agency coordination, initial and extended attack methods, hazard reduction strategies, and overarching fire planning measures. In addition, the plan touches on land descriptions and use, fire management zones, preparedness, response and mobilization, prevention, hazard reduction, fuels management, and recovery. Some recommended strategies include the use of prescribed fire, community hazard assessments, structure hardening, hazardous fuels reduction, and defensible space creation and maintenance (Clark and Patterson 2002).

STATE

In December 2019, the Commonwealth of Massachusetts (2019) developed the Commonwealth of Massachusetts Fire Services and EMS Mobilization Plan. This plan was created through the distillation of past experiences to provide community access to resources outside of the district in the event that resources have been or will soon be depleted. This document includes an introduction to the plan, situations in which the plan might be activated, plan activation protocol, and extensive appendices of resources related to the plan. Although this mobilization plan assumes that most incidents that require fire services are local in scope, it also recognizes that there are situations in which a local entity may be overwhelmed by the presence of a large and catastrophic event for which additional resources and support may be needed. For more information the mobilization plan, please visit: https://www.mass.gov/doc/statewide-fire-mobilization-plan/download.

In 2020, the DCR developed the MSFAP. This plan was created to provide an informational resource on forest health trends and threats within Massachusetts (DCR 2020). Topics covered within the plan include forest ecosystem health and biodiversity, ecosystem services, forest production capacity, socioeconomic benefits, policy, and priority landscape areas. The plan shows Dukes County varies from moderate to extreme fire risk and recommends vegetation management to reduce fire risk (DCR 2020). This DCCWPP aligns with many of the goals and strategies laid out in the 2020 MSFAP, as described in Chapter 4. Future updates to the DCCWPP should continue to align with the MSFAP.

The final draft of the Manuel F. Correllus State Forest Fire Management Plan was issued in April 2020. This document includes 28 fire management objectives that are used to accomplish the plan's main goal of developing a proactive, cooperative, integrated program to manage the landscape in a way that allows for continued public use and safety while also restoring and maintaining ecological values. The plan defines the site and its conditions, fire policy and partnerships, management and operational guidance, and management zones. The document notes that the Manuel F. Correllus State Forest is an area of excessively drained soils, little running water, high fuel concentrations, and active recreational use. Furthermore, the state forest is surrounded by residential and commercial development, creating a critical need for the development of a fire management plan for this site.

In addition to stewarding planning documents, the DCR runs Forest Fire Control Programs. These programs include Forest Fire Prevention and Forest Fire Suppression and Detection Programs. The Prevention Program was established in 1926 and primarily utilizes prescribed burning, fuel reduction, and education to reduce wildfire risk (Commonwealth of Massachusetts 2021a). The Forest Fire Suppression and Detection Program utilizes a statewide network of fire towers to observe fires.

In addition, County-based fire patrols monitor forested lands during high fire danger to ensure quick mobilization upon ignition. If there is an ignition, DCR fire suppression units are called in for all fires on state-owned forest land and may be used for mutual aid on non-state land as well (Commonwealth of Massachusetts 2021b).

FEDERAL

The NERAP was updated in 2015 by NRSC (2015). The NERAP was developed to identify who will do what, where, and by when with regard to wildland fire management and response. The goals of the NERAP align with the three goals of the Cohesive Strategy with regional considerations, updates, and revisions. This plan covers the implementation actions for these goals: 1) restore and maintain resilient landscapes, 2) create fire-adapted communities, and 3) improve wildfire response. For more information on the NERAP, please visit: https://northeasternwildfire.net/wp-content/uploads/2019/09/2015_regional_action_plan.pdf.

In March 2019, the NRSC prepared the Northeast Wildfire Preparedness Resource Guide, intended to assist homeowners, neighborhood groups, community leaders, and fire services within the 20 states that make up the Northeast and Midwest United States (NRSC 2019). The Northeast Region has not only the highest concentration of people in the United States but also the largest number of wildfires each year. The guide offers Firewise resources aimed at reducing risk in and around homes by group for residents, homeowner's associations (HOAs), and neighborhoods, civic and community leaders, and fire services (NRSC 2019). Other resources in this guide include financial assistance, national information, state and regional information, a directory for national and state management agencies, and fire science resources. For more information on this guide, please visit: https://www.iowadnr.gov/Portals/idnr/uploads/forestry/Fire/newildfire-prepare.pdf.

AGREEMENTS

The recent passing of House Bill 4599—An Act Promoting Climate Change Adaptation, Environmental and Natural Resource Protection, and Investment in Recreational Assets and Opportunity—emphasized the need for environmental protection throughout the Commonwealth and allocates funds for the purpose of restoring and protecting the environment and natural resources (see Appendix F for more information on funding sources) (Massachusetts State Legislature 2018). Climate change will have significant implications for wildfire risk, and this bill may support future actions to mitigate climate-induced wildfire hazards.

In 2019, the Commonwealth of Massachusetts and the U.S. Forest Service (USFS) signed a shared stewardship framework to commit to collaborative and sustainable forest management and to increase community education as well as land and fiscal sustainability (Commonwealth of Massachusetts and USFS 2019). As part of the agreement, the Commonwealth of Massachusetts and the USFS will use their respective authorities to conduct government-to-government consultation directly with municipalities throughout the state to encourage shared stewardship strategies (Commonwealth of Massachusetts and USFS 2019).

CORE TEAM

In 2021, representatives from various government agencies—along with members of fire departments and local communities—formed a Core Team and participated in decision-making activities that led to the development of the DCCWPP. Stakeholder involvement is critical in producing a meaningful document that includes all collaborators' diverse perspectives. The Core Team drives the planning process in its decision making, data sharing, experience, and communication with community members who are not on the Core Team. The project was kicked off on January 7, 2021; the Core Team met for the first time on February 17, 2021, and convened again on June 28, 2021. While the first Core Team meeting was held remotely due to the COVID-19 pandemic, the second Core Team meeting was held in person with an

option for members to call in remotely. The final Core Team meeting on September 2, 2021, was held via Zoom due to increased COVID-19 cases.

The Core Team contact list is provided in Appendix C.

PROJECT AREA

The project area includes all of Dukes County as delineated by its geographic and political boundaries (Figure 1.2). The project boundary encompasses several municipalities. The largest contiguous area is Martha's Vineyard Island, where over 99% of the County's population resides (Dukes County 2021a). Edgartown, the County seat, in addition to the communities of Tisbury and Oak Bluff, cover 100 square miles of Martha's Vineyard and are known as the "down-island" towns and are densely populated (Dukes County 2021a).

LAND OWNERSHIP

Dukes County has varied land ownership, including large areas of private land and smaller areas of state, municipal, county, federal, and town land (Figure 1.3). In the center of Martha's Vineyard is the Manuel F. Correllus State Forest, shown in green in Figure 1.3. There is significant acreage of conservation lands throughout the County (Table 1.1), the breakdown of which is shown in Figure A.7 in Appendix A. Conservation group involvement will be key to the implementation of recommendations set in this plan.

Table 1.1. Breakdown of Land Ownership in Dukes County

Land Ownership	Acres	Percentage of the County
Other	45,031.72	68.17%
Land Conservation Agency	8,408.73	12.73%
State	5,574.92	8.44%
Unknown	2999.09	4.54%
Municipal	2,420.44	3.66%
Federal	652.83	0.99%
County	499.57	0.76%
Tribal	473.17	0.72%

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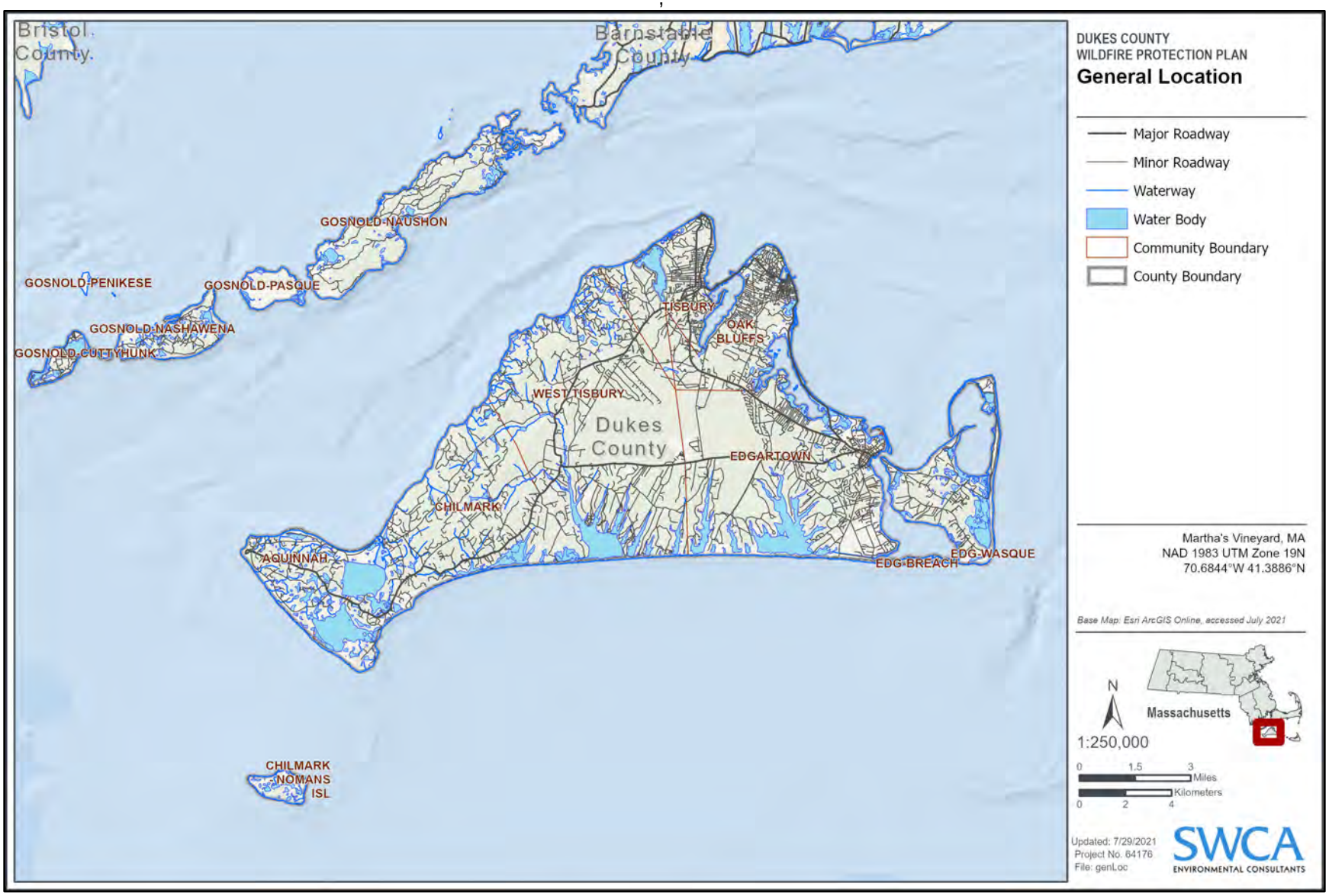


Figure 1.2. DCCWPP general location.

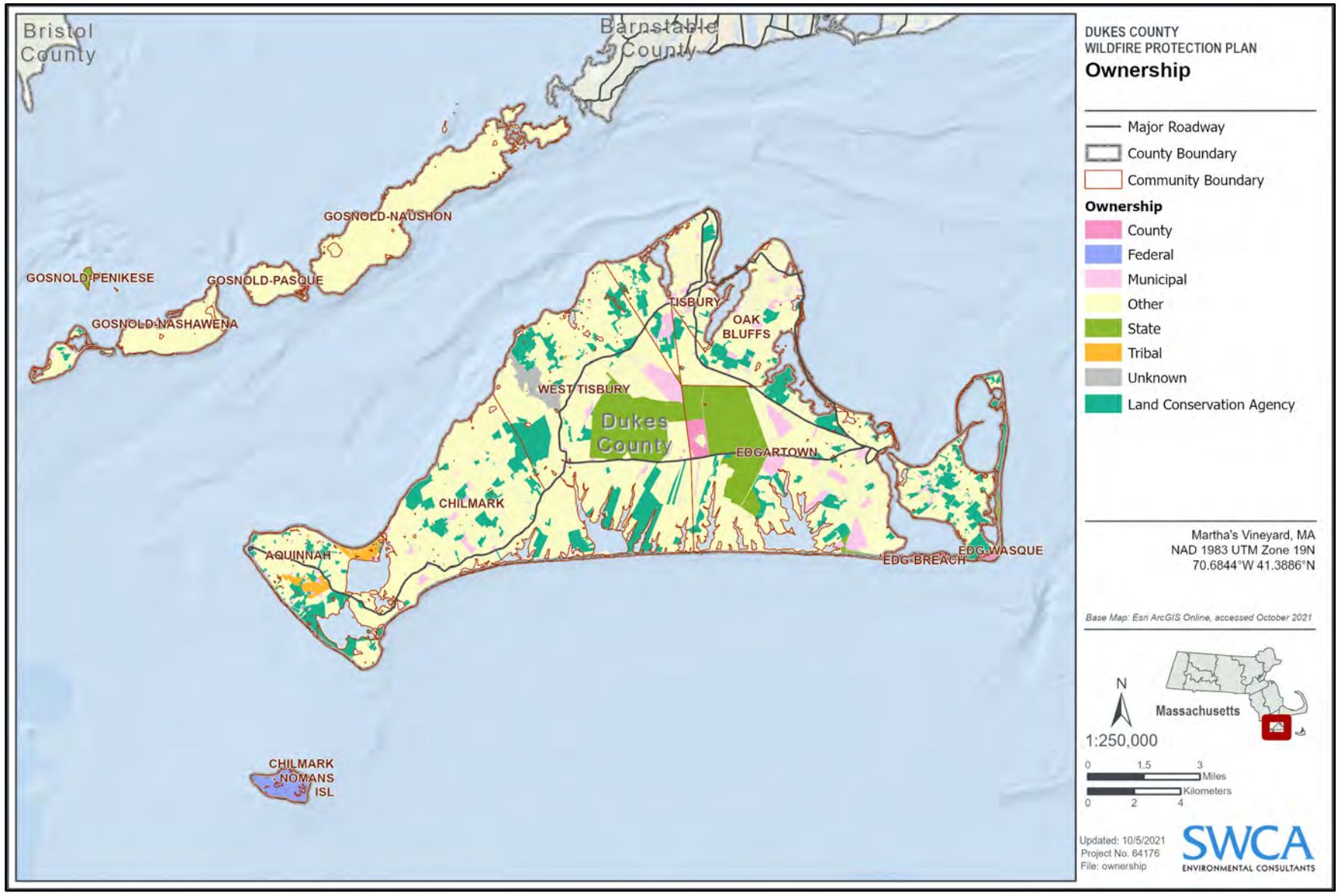


Figure 1.3. Dukes County land ownership.

PUBLIC INVOLVEMENT

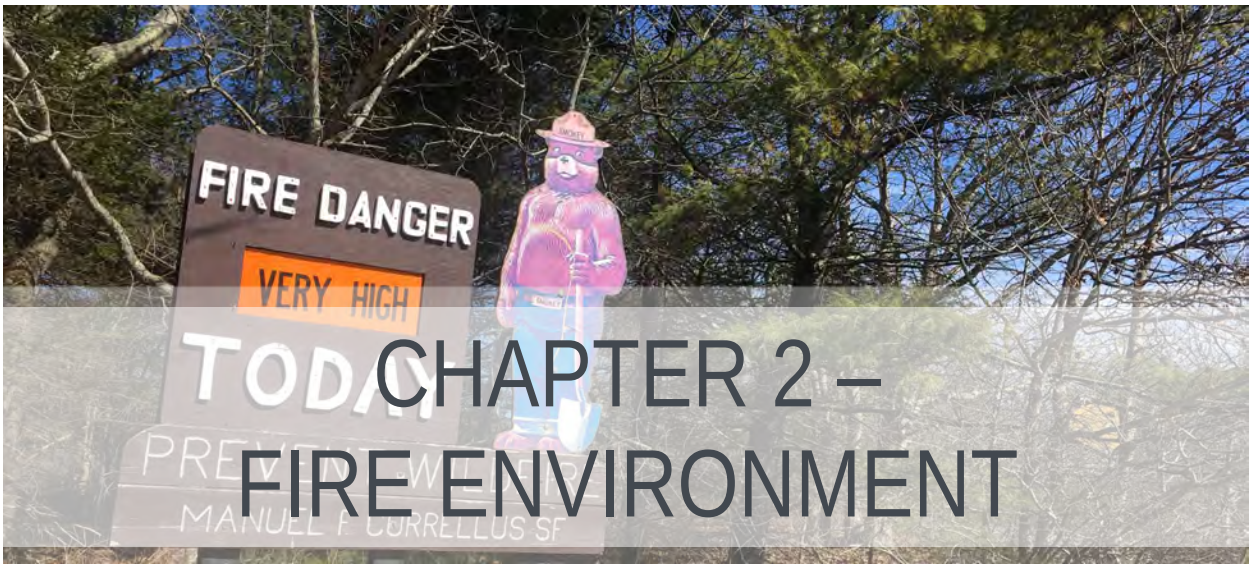
A key element in the CWPP process is the meaningful discussions it generates among community members regarding their priorities for local fire protection and forest management (Society for American Foresters [SAF] 2004).

MVC and the Core Team have met with some of the towns' climate resiliency committees, along with the full spectrum of land conservation organizations across the County to keep them apprised of the planning effort underway. Upon release of the draft report, public information sessions will be held by MVC to solicit comment on the plan's findings and recommendations.

Once the DCCWPP is formally adopted, MVC will create a Story Map to explain some of the report's technical content to the range of stakeholders with a stake in this subject matter. A presentation will be given to the full board at the MVC during one of their public meetings. The Island Climate Action Network has also amassed a sizeable following and is eager to link and showcase the report on its website and in its newsletter. For further exposure, MVC will issue a press release to the local newspapers along with announcements on different social media channels.

Finally, MVC staff intend to circle back with all town climate resiliency committees, while inviting Planning Board members to attend these meetings. Along with the fire chiefs, these will most likely be the committees working directly with roadway associations and HOAs. In addition to the report, the Core Team will leverage the extensive spatial data generated through the Composite Hazard-Risk Assessment to make custom maps at a large scale. These visuals will be paramount in giving stakeholders the hyper-local tools needed to implement key recommendations.

Recommendations for future community engagement and outreach are provided in Table 4.4.



CHAPTER 2 – FIRE ENVIRONMENT

WILDLAND URBAN INTERFACE

A WUI is composed of both interfaced and intermixed communities and is defined as areas where human habitation and development meet or intermix with wildland fuels (U.S. Department of the Interior [USDI] and U.S. Department of Agriculture [USDA] 2001:752–753). Interface areas include housing developments that meet or are in the vicinity of continuous vegetation. Intermix areas are those areas where structures are scattered throughout a wildland area where the cover of continuous vegetation and fuels is often greater than cover by human habitation. The County comprises a mixture of interface and intermix.

The WUI creates an environment in which fire can move readily between structural and vegetative fuels, increasing the potential for wildland fire ignitions and the corresponding potential loss of life and property. Human encroachment upon wildland ecosystems in recent decades is increasing the extent of the WUI throughout the country as a whole, which is having a significant influence on wildland fire management practices. Combined with the collective effects of aggressive suppression policies, resource management practices, land use patterns, climate change, insect and disease infestations, and the expansion of the WUI into areas with high fire risk has created an urgent need to modify fire management practices and policies and to understand and manage fire risk effectively in the WUI (Pyne 2001; Stephens and Ruth 2005). Mitigation techniques for fuels and fire management can be strategically planned and implemented in WUI areas; for example, with the development of defensible space around homes and structures (Figures 2.1 and 2.2).

Many of the County's ecosystems are adapted to fire, which maintains structure and species composition in these natural communities. Complete elimination of fire from the landscape may have a detrimental effect on the natural environment and may fuel more extensive and severe fire events should fire occur. The role of wildfire in the natural environment of the County should be considered when planning fuel treatments, WUI development and expansion, public education, and fire response and management.

A CWPP offers the opportunity for collaboration of land managers to establish a definition and a boundary for the local WUI; to better understand the unique resources, fuels, topography, and climatic and structural characteristics of the area; and to prioritize and plan fuels treatments to mitigate for fire risks. At least 50% of all funds appropriated for projects under the HFRA must be used within the WUI area.

The WUI delineation for the DCCWPP is based on the WUI developed during the Dukes County HMP (MVC et al. 2020) (Figure 2.3). The Dukes County HMP defined a WUI based off of potential for extreme fire behavior (based on fuel type) in conjunction with centers of high population density and values at risk. The DCCWPP Core Team was asked to review and comment on the HMP WUI delineation during Core

Team meetings and identified that the HMP WUI lacked coverage of some residential areas and other valued resources and assets. In addition, the Core Team commented that the HMP WUI failed to incorporate some areas that are known to have high wildfire hazard. As a result, the Core Team requested that the WUI delineation be extended based on analysis of fire behavior and the resultant layer provided a more consolidated WUI area (Figure 2.4).

Figure 2.1. Vegetation in the WUI in Dukes County, example 1.

Figure 2.2. Vegetation in the WUI in Dukes County, example 2.

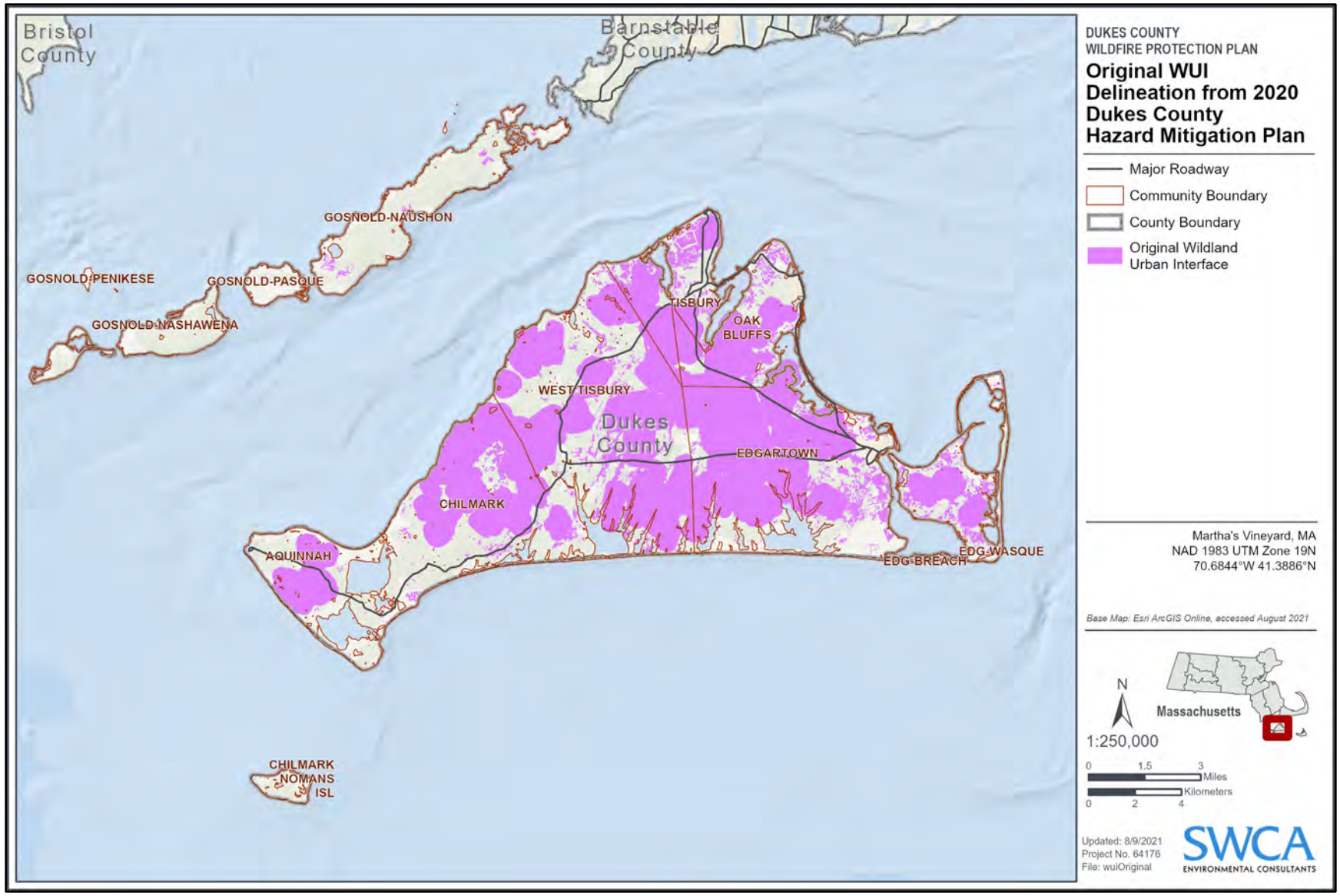


Figure 2.3. Original WUI delineation in the Dukes County HMP.

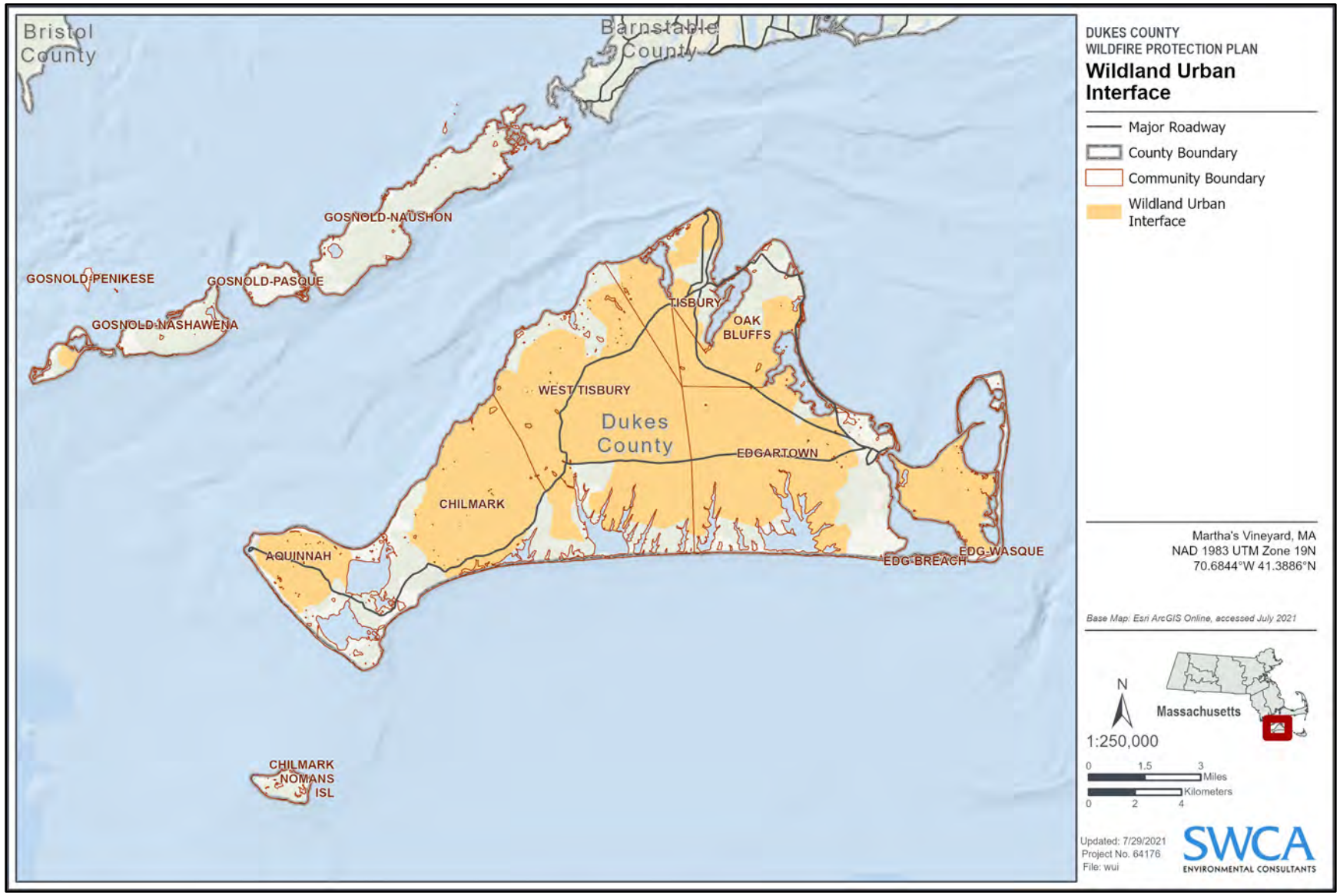


Figure 2.4. Modified WUI delineation for Dukes County.

FIRE HISTORY

Land and Fire History

Massachusetts has a long history of human use and occupation. Prior to European settlement, Native American populations were more reliant on coastal resources. Historical data shows Martha's Vineyard had up to 50 people per square mile, while inland Massachusetts had only four to 10 people per square mile (O'Keefe and Foster 1998). While it is believed the Native American populations on the islands were the source of many fire ignitions, there is no evidence to suggest Native Americans used fire to directly alter forest cover or clear the land of large vegetation (Foster et al. 2003). Rather, evidence suggests Native Americans used fire for actions such as driving game, clearing underbrush, or preparing land for farming (Patterson and Sassaman 1988).

Fire history within Dukes County is limited, but that does not mean fires are not severe. Sixteen fires occurred between 1867 and 1929, each burning more than 1,000 acres (MVC et al. 2020). In 1957, a fire burned 18,000 acres at 53 acres per minute before it met the coast. The fire was not contained by emergency response; rather, it consumed all the fuel possible before going out. The most recent large fire, taking place in 1967, burned 1,200 acres (MVC et al. 2020). While these fires may seem small compared with fire activity in the western United States, it is important to consider these fire sizes in in relation to the size of Dukes County at 66,080 acres (U.S. Census 2020). While the northeast experiences decreased fire frequency, fires can be equally as destructive as the more well-known western fire occurrences.

Most of these historic fires in the County have occurred on Martha's Vineyard in close proximity to roadways, the Manuel F. Correllus State Forest, and more populated areas such as Vineyard Haven. Less populated areas, the Elizabeth Islands and western Martha's Vineyard, in contrast, have received very low numbers of fires over the last century.

Figure 2.5 shows the annual wildfire frequency in Dukes County from 1855 to 2020. According to this figure, there has been a significant increase in wildfire frequency beginning around the year 2000, which in part may be due to the prevalence of drought over this time period. It was reported in September 2020 that drought conditions were worsening and the southeastern region of the state was in "extreme" drought conditions (Sobey 2020). Figures 2.6 through 2.8 show additional data for Dukes County with regard to monthly frequency, size, and cause of wildfires.

Figure 2.9 shows the fire history across the County since 2001. As evident from the figure, a large concentration of past fires and ignitions have occurred in and around the state forest, which has a more continuous fuel load than surrounding areas. In addition, the past fires and ignitions have occurred near highly populated areas such as Tisbury and Oak Bluffs. Human-caused fires account for approximately 82% of the wildfires recorded for the County since 2001 (MVC 2021). These trends highlight the need for greater public education and outreach focused on reducing human-caused fire ignitions.

A current concern of residents in the WUI is these increased human ignitions, particularly with the development and improvement of roads, residences, and recreational opportunities in wildland areas. Although the majority of fires take place during the spring months, human-caused ignitions increase the potential for wildfires throughout the year.

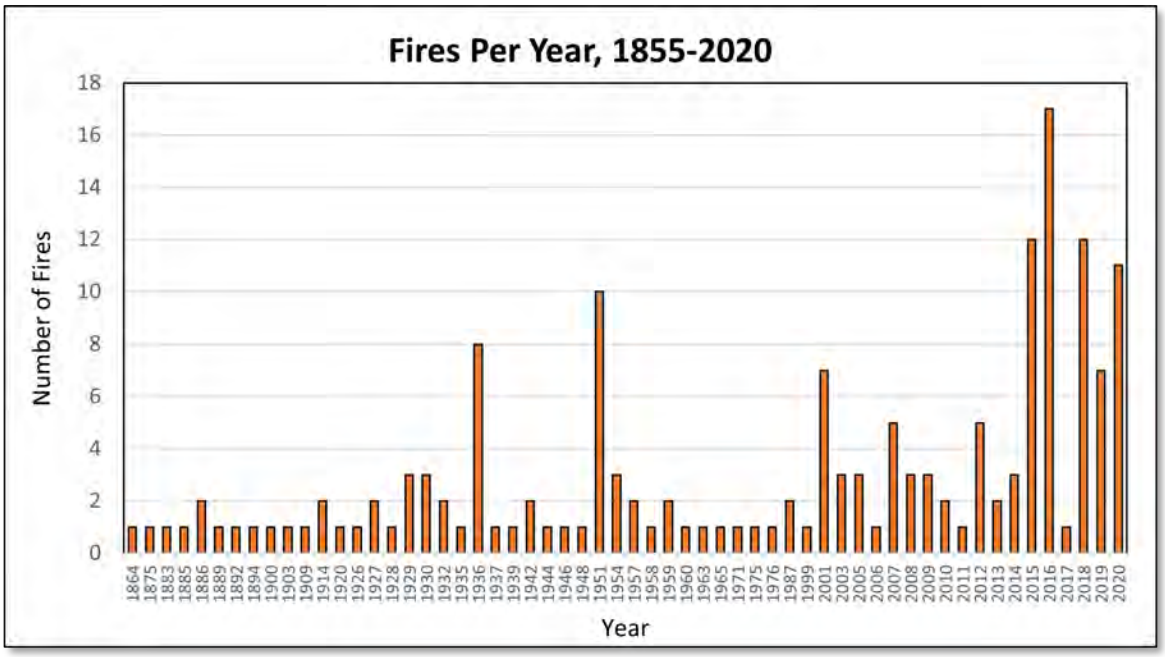


Figure 2.5. Annual wildfire frequency in Dukes County from 1855 through 2020.
Source: MVC (2021)

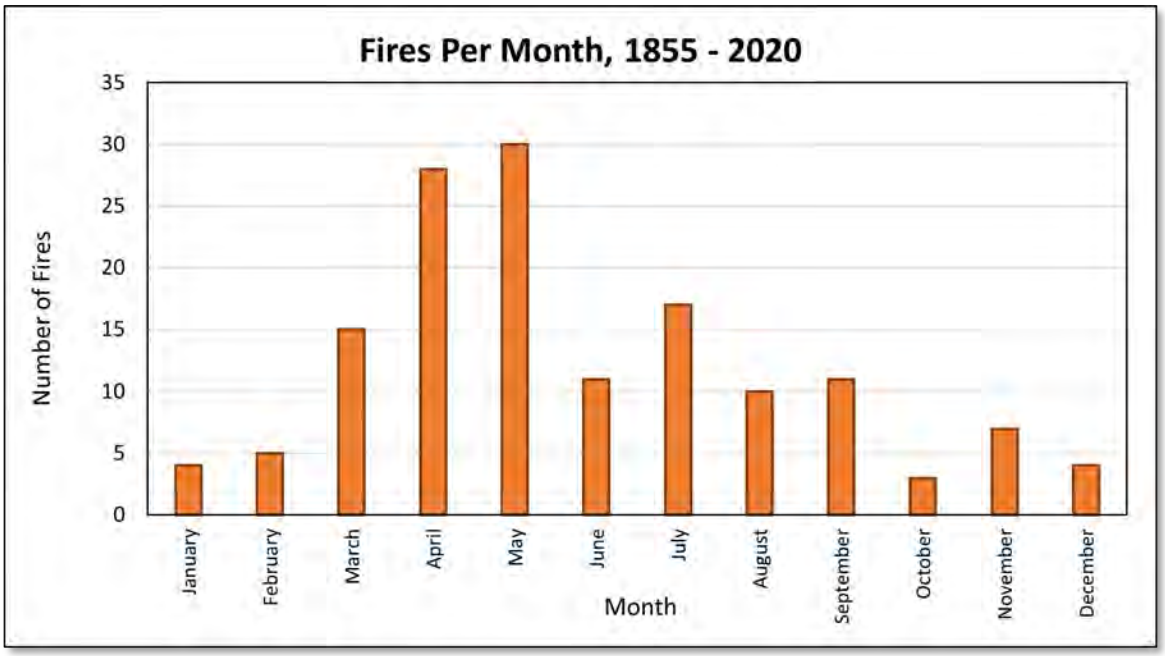


Figure 2.6. Monthly fire frequency in Dukes County based on data from 1855 through 2020.
Source: MVC (2021)

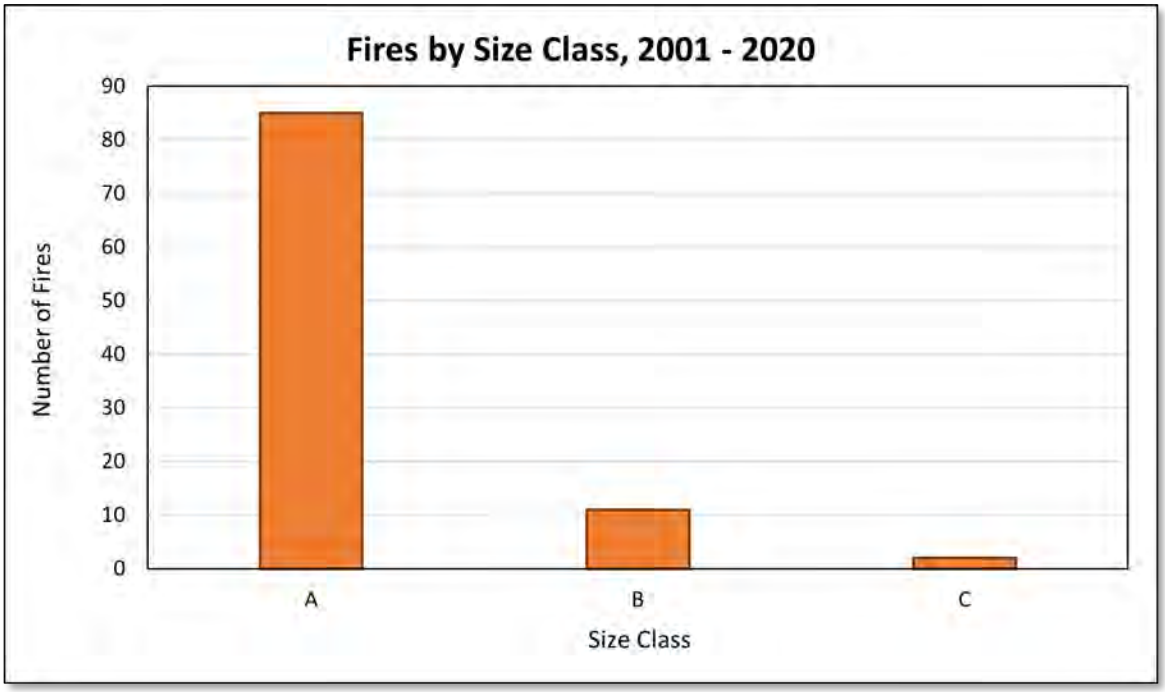


Figure 2.7. Fire size statistics for Dukes County based on fire history data from 2001 through 2020.

Size Class: A = 0.25 acre or less; B = greater than 0.25 to 10 acres; C = 10 to 100 acres; D = 100 to 300 acres; E = 300 to 1,000 acres; F = 1,000+ acres. Source: MVC (2021)

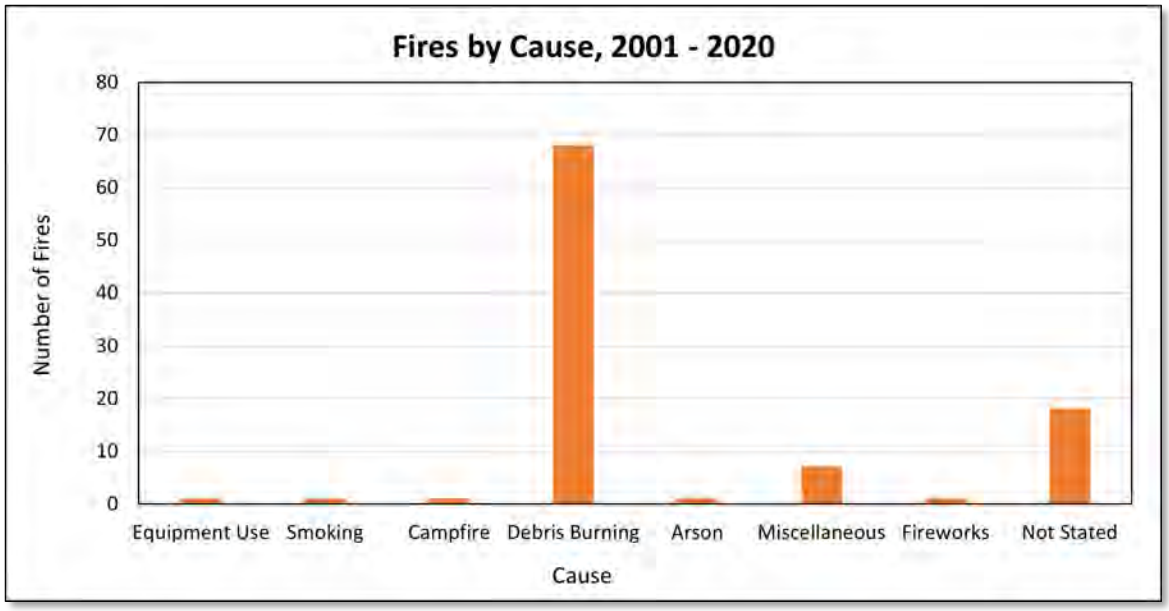


Figure. 2.8. Fire by cause for Dukes County based on available fire history data from 2001 through 2020.

Source: MVC (2021)

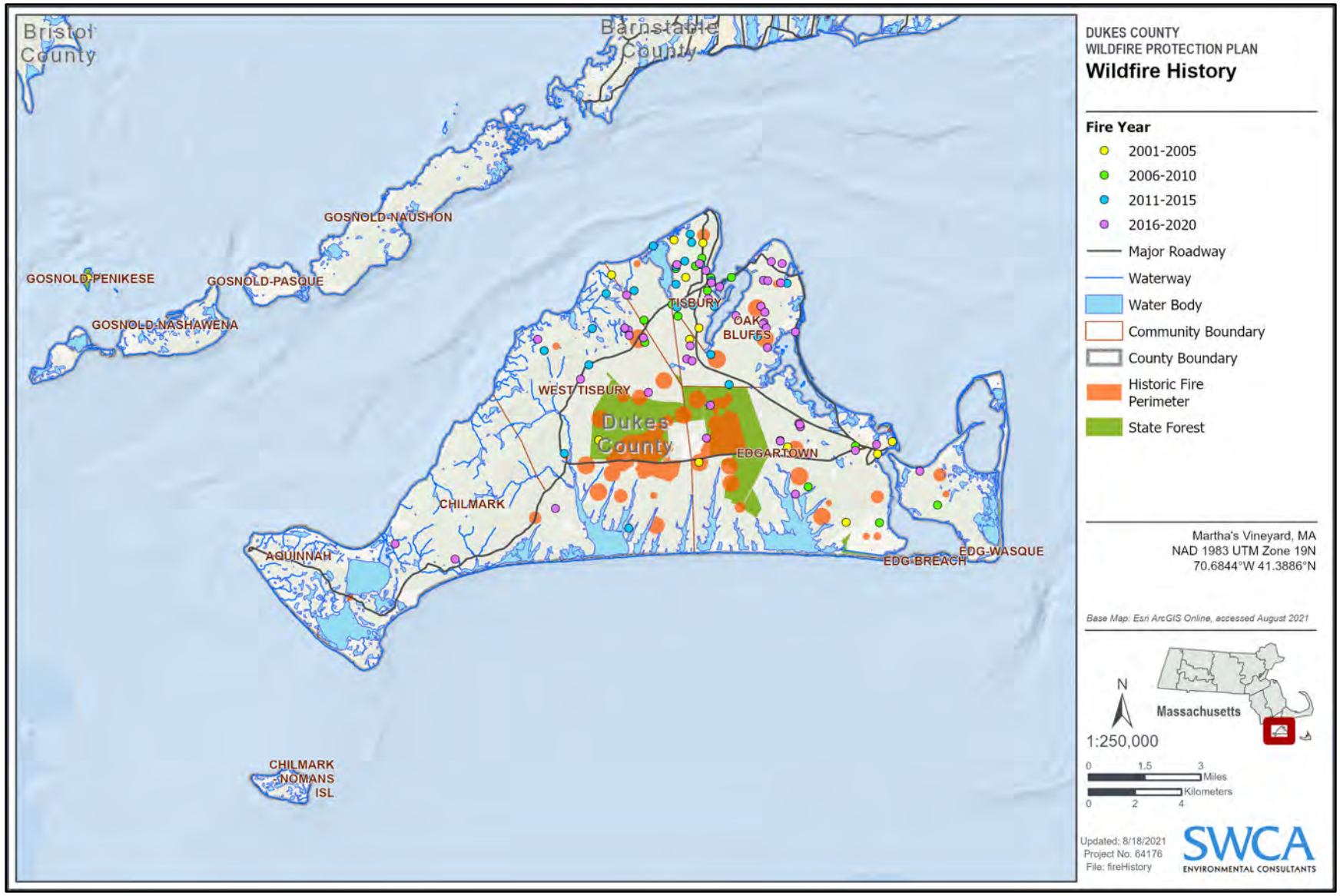


Figure 2.9. Fire history for Dukes County from 2001 through 2020.

Note: historic fire perimeters showing as circular orange areas do not have associated dates and represent approximate fire size and not **exact fire perimeter shape.**

Future Challenges

The planet has experienced significant changes in temperature extremes in recent years. Over 70% of the land area on the planet that was sampled as part of a 2006 study shows a significant decrease in the occurrence of cold nights and a significant increase in the occurrence of warm nights (Alexander et al. 2006). These statistics indicate an increase in daily minimum temperatures globally. Much of this warming has occurred in the twentieth century (Alexander et al. 2006). Under these greater climatic extremes, fire behavior is expected to become more erratic, with larger flame lengths, increased torching and crowning, and more rapid runs and blowups associated with extreme dry conditions (Brown and Mote 2009).

According to the National Interagency Fire Center (NIFC), occurrence of catastrophic wildfires has greatly increased over the last 20 years. Within just the last 10 years, a record number of acreages have burned, and numbers are continually getting larger (NIFC 2021). Exceptional climate extremes are pushing many forest types beyond their disturbance thresholds of sustainability. Interactions between warming trends, drought, insect disease, and extensive and severe wildfire are resulting in increased forest mortality and susceptibility to wildfire.

The WUI is the area where wildfire impacts are the most profound. The County has finite space for development, so the WUI areas are becoming increasingly developed. This is a concerning trend as increased human activity in the wildlands can lead to more wildfire ignitions

Fires in coastal New England were common previous to the last five decades, when efforts to suppress fires became effective in this region. Current fire regimes are characterized by small, infrequent fires with return intervals of over a decade. These shifts from frequent to infrequent fire have resulted in a shift from oak shrublands to oak woodlands, which is a less flammable fuel source. Furthermore, conifer plantations were established during the early to mid-twentieth century in the Manuel F. Correllus State Forest at the center of Martha's Vineyard. While many of these planted stands support native understory communities, nonnative and invasive species have established where this soil disturbance occurred in the past.

Although fire suppression is still aggressively practiced throughout the United States, fire management techniques are continually adapting and improving, especially in light of changing climate. Management of fire for specific resource objectives is an option for land managers in Dukes County. Due to developments and values (residential and commercial structures, historic and natural values) throughout the WUI, suppression in WUI areas remains a management priority. However, the use of prescribed fire in addition to ecological restoration techniques has proven to help entities throughout Massachusetts move toward pre-European settlement fire regimes and reduce the potential for catastrophic wildfires. The use of prescribed fire on private land is a decision to be made by the landowner, and it is acknowledged that such a management technique may not always be feasible in the County due to the dense population and intermixed nature of the WUI.

FIRE RESPONSE CAPABILITIES

Planning and Decision Support

As wildfires have continued to grow in size and severity over the last decade, it is necessary for fire managers to institute more robust pre-fire planning as well as adapt and improve decision-making tools in order to reduce risk to fire responders and the public and assess impacts on ecological processes.

A primary decision tool utilized by fire managers across all agencies is the Wildland Fire Decision Support System (WFDSS), a system that assists fire managers and analysts in making strategic and tactical decisions for fire incidents (WFDSS 2015). WFDSS combines desktop applications for fire modeling into one web-based system. It provides a risk-informed decision process and documentation system for all wildland fires, and it also introduces economic principles into the fire decision process in order to improve efficiencies while also ensuring safe and effective wildfire response.

One intent of WFDSS is to ensure that when fire response decisions are made, they fall in line with agency land and resource management plans. Agencies have recently been moving away from the traditional written fire management plans and instead are developing spatial fire management plans that

can be housed within WFDSS (WFDSS 2015). Although WFDSS is not currently employed throughout the County (due to the lack of federal land), the platform would be a good addition to the toolbox of state and local land managers and fire responders.

Fire response is heavily dictated by availability of local resources, fire location, and characteristics of the fire. The following sections outline resources across multiple jurisdictions. Map 6 in Appendix B shows fire response buffers based purely on distance from department. Actual mapping of fire response times is beyond the scope of this DCCWPP but should be integrated into future planning.

Fire Resources

The availability of resources is dictated by the state and federal wildland fire season. Open burning is allowed only from January 15 to May 1 in the state of Massachusetts and only when issued a permit. The fire season in the County typically peaks during dry, windy periods in the spring or periods of summer or fall drought. Spring months see the greatest rates of spread, creating concerns for fire response times. Under moderate conditions, wildfire risk is also usually moderated, but under dry conditions or following periods of prolonged drought, the potential for extreme wildfire is high and exacerbated by slow response times.

Local Fire Response

Fire Departments

Volunteer and career firefighters at the County and community level have similar capabilities throughout the entire year, while state and federal responders are affected by fire season. In spite of the continuous level of capabilities, ebbs and flows occur within the volunteer service. Recruiting and retaining volunteers is challenging due to people's lifestyles and the training requirements one must follow to be a volunteer firefighter. Although several volunteer firefighters are present in the County, not all are available to respond to every fire.

There are eight fire departments within Dukes County: Aquinnah, Chilmark, Edgartown, Gosnold, KMVY Airport, Oak Bluffs, Tisbury, and West Tisbury.

- The Aquinnah Fire Department is manned by 13 volunteer firefighters and operates out of one station. The department owns one Type-1 engine, one port-a-tank, and one portable pump.
- The Chilmark Fire Department is manned by one full-time employee and 32 volunteer firefighters. The department operates out of two stations, North Road station and Cross Road station. This department has two 1,000-gallon Class A pumpers, one 2,600-gallon tanker, two Type-1 engines, one Type-2 engine, one Type-5 engine, one brush breaker, and one utility vehicle (Chilmark 2021).
- The Edgartown Fire Department is manned by one full-time and 31 on-call firefighters. The department operates out of two stations, Edgartown station and Chappaquiddick station, with four Type-1 engines, two Type-6 engines, and one Type-3 tender. In addition, the department owns one port-a-tank and one portable pump.
- The Gosnold Fire Department is manned by eight volunteer firefighters. The department operates out of one station on Cuttyhunk with one Type-1 engine and one Type-2 engine, which is a brush breaker with four-wheel drive.
- The KMVY Airport is manned by nine full-time firefighters, and the department has three Type-2 tenders.
- The Oak Bluffs Fire Department is manned by 36 volunteer firefighters. The department operates out of one station with four Type-1 engines (Oak Bluffs Fire-EMS Dept. 2021).
- The Tisbury Fire Department is manned by two full-time and 34 volunteer firefighters. The department operates out of one station with three Type-4 engines and one Type-6 engine.

- The West Tisbury Fire Department is manned by one full-time employee and 28 volunteers. The department operates out of two stations with two Type-1 engines, two Type-4 engines, one Type-7 engine, and two Type-2 tenders. In addition, the department owns three port-a-tanks, one portable pump, two brush breakers, one rescue boat, and one UTV (West Tisbury 2021).

In addition to these primary fire departments, there are three fire storage facilities: DCR Garage, Naushon Garage, and Cuttyhunk Garage.

Because of the varied conditions throughout the County, equipment and apparatus needs are highly contingent on access limitations and road surfaces. Fire department equipment acquisitions typically include careful consideration of required agility and access.

State Response

Manuel F. Correllus State Forest

The forest is managed by the Massachusetts DCR. The Massachusetts Bureau of Forest Fire Control provides public education, firefighter training, fire and emergency response, and fire prevention services for the forest (Commonwealth of Massachusetts 2021c). Initial attack response within the forest is the responsibility of the Edgartown and West Tisbury Fire Departments. Beyond initial attack, all fire departments on the island are responsible via mutual aid agreements (Northeast Forest and Fire Management 2020).

Dukes County

Dukes County falls under Massachusetts Fire District 1, which is within Region 2, the southeast fire region. Initial attack upon ignition is provided by local fire departments via mutual aid and is coordinated through the Dukes County Sheriff's Office Regional Emergency Communications Center (Dukes County Sheriff's Office 2021). Once local response efforts and resources have been exhausted, including mutual aid, response will be escalated to the state level. State-level response is coordinated through the Barnstable County Emergency Communication Center, which is the designated District 1 control center (Commonwealth of Massachusetts 2019). The lead agency responsible for fire response on state land is the Massachusetts Department of Fire Services. District 1 prioritizes the use of run cards, which dictate the appropriate task force for various emergencies: https://www.mass.gov/doc/district-01-run-cards/download. Each district is appointed a District Coordinator who is responsible for maintaining an up-to-date list of all fire response resources (Commonwealth of Massachusetts 2019).

Federal Resources

Bureau of Indian Affairs

The Eastern Bureau of Indian Affairs operates throughout the eastern United States, from Louisiana north to Missouri, across Illinois, Indiana, and Ohio, all the way north to Maine and back down the coast to Florida.

The Wampanoag Tribe have a fire management plan (Clark and Patterson 2002) that directs fire management, prescribed fire, and fire response for tribal lands. For fire management purposes, the tribal lands are divided into five "representative locations" based on areas that share similar fuels, resource values, fire management strategies, or other operational factors. The tribe has limited resources (personnel, equipment etc.) for fire suppression and prescribed burning, but has been working on increasing capacity. The tribe has a long-standing cooperative relationship with the Town of Aquinnah through a formalized cooperative agreement. If the plan has not been updated since 2002, the tribe should consider reviewing and revising sections as needed.

Mutual Aid

The wildland fire community is well known for its development of mutual aid agreements at the federal, state, and local levels. Such automatic aid agreements allow for the closest forces to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted.

Massachusetts holds an intrastate voluntary mutual aid program. Within this program, those who decide to participate can request or donate emergency response serves to any participating community. The details of the agreement can be found in MGL 40, Section 4K. Approximately half of Dukes County participates in this program. Barnstable, Edgartown, and Oak Bluffs do not participate in the agreement (Commonwealth of Massachusetts 2021d).

EVACUATION RESOURCES

Emergency alerts are sent via the CodeRED alert system for all towns within Dukes County. The County's Emergency Notification and Information web page provides support resources, volunteer agencies, and local contacts such as news and radio. In addition, the page provides an overview of the Martha's Vineyard Disaster Animal Response Team (MV DART). To learn more, please visit the webpage: https://www.dukescounty.org/emergency-management/pages/emergency-notifications-and-information-resources.

To learn more about shelter preparedness and view an emergency supplies check list, see the Dukes County Evacuation Shelter Preparedness page: https://www.dukescounty.org/emergency-management/pages/evacuation-shelter-preparedness.

Road Systems

Much of Dukes County is accessible via surfaced roads; however, many communities are accessed only via unsurfaced roads (Figure 2.10), which are often narrow and windy with many dead-ends (Figure 2.11). These routes may prove hazardous during emergency evacuation, especially where they are adjacent to forested land with vegetation close to or overhanging the road. Fuel treatment may be needed along some roads where vegetation is overhanging and could prevent safe evacuation of residents or safe access by emergency responders. Some rural roads and driveways may also have narrow bridges with weight limits (see Figure 2.11) that may impact access with large emergency apparatus.

Figure 2.10. Example of an unsurfaced road.

Figure 2.11. Example of a narrow unsurfaced road.

Livestock and Pets

Many homes within the County have pets, and horses or other livestock are common throughout the County as well. In the event of a wildfire, it is important that residents and fire responders have a plan for evacuation of pets and livestock. Evacuation planning often neglects to describe how animals will be

evacuated and where they will be taken. The loading of horses, for example, during a fire and smoke situation and transport of stock vehicles down narrow roads under stressful situations can be very difficult. Public education could emphasize the need to practice loading horses quickly, for example.

There is also a need to pre-identify where large and small animals can be taken.

A plan for livestock evacuation and shelter has been developed by MV DART: https://www.edgartown-ma.us/Home/ShowDocument?id=6776.

WATER AVAILABILITY AND SUPPLY

Water supply is variable around the County and is provided by hydrants, wells, and ponds. Hydrants are largely concentrated in certain areas of the towns of Edgartown, Vineyard Haven, and Oak Bluffs. There is generally a lack of consistent, fast, and reliable water sources throughout Martha's Vineyard and even fewer still in Gosnold. Even areas that have well-placed water tanks will need to actively pump and shuttle water. Many rural and unincorporated communities lack water for fire suppression. Additional water storage is needed in many areas.

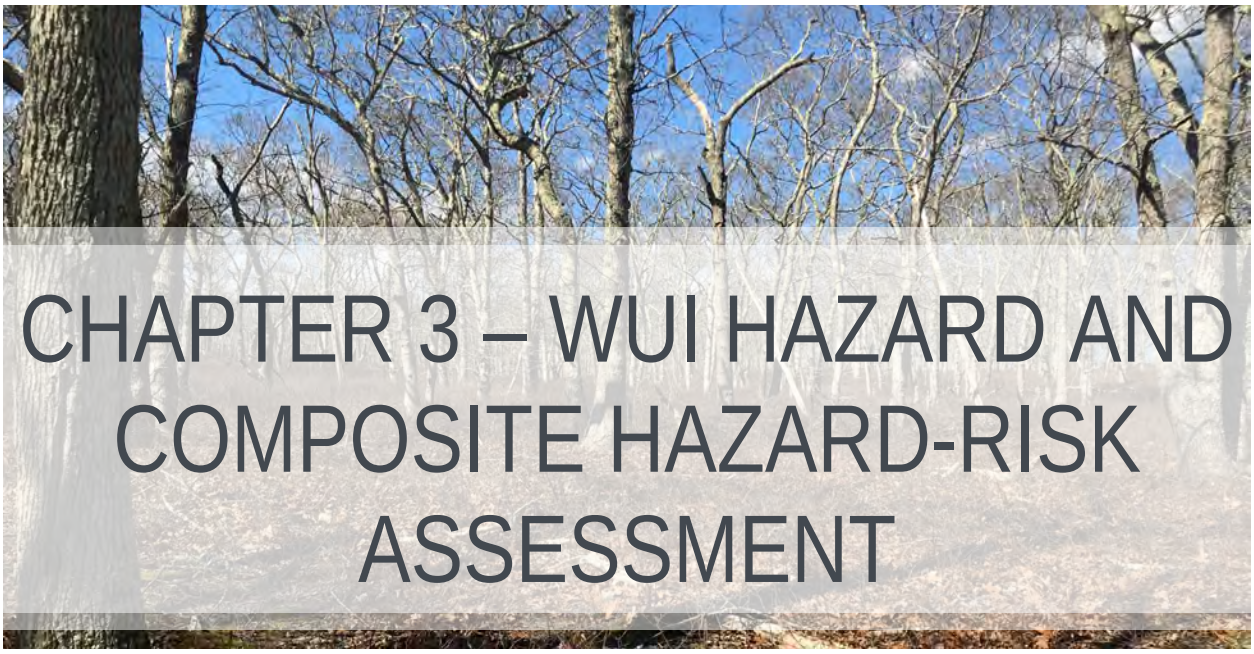
Ponds and rivers could also provide alternative sources for suppression, but suitable drafting sources are not always known or mapped. In Aquinnah, where the water table is generally higher than the rest of the island, there are many areas of standing water from which to draft. There is also the ability to pull from homeowners' swimming pools, as is the case across much of Martha's Vineyard. However, not all homeowners maintain the infrastructure (hose attachments, etc.) to facilitate drafting by firefighters.

Proper equipment and land management is needed to access many of these sources. Most fire stations have portable pumps to pull from these sources if needed, but new and more mobile equipment is needed in many cases. Tactical tankers may be needed for water shuttling in some areas, or side-by-side UTVs can be equipped with a slip-on pump system allowing them to serve as a Type-7 engine in hard-to-reach areas.

Limited water supply can impact International Standards Organization (ISO) ratings for fire departments, so improvements to water infrastructure have been identified as a priority for this DCCWPP. In addition, a competitive ISO rating often reduces premiums for homeowners' insurance. The hydrant location dataset for the County is incomplete, and therefore, additional water source mapping is identified as a needed project in this DCCWPP.

PUBLIC EDUCATION AND OUTREACH PROGRAMS

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue. Detailed information on these programs is provided in Appendix A.



CHAPTER 3 – WUI HAZARD AND COMPOSITE HAZARD-RISK ASSESSMENT

PURPOSE

The purpose of developing the Composite Hazard-Risk Assessment model described here is to create a unique tool for evaluating the risk of wildland fires to communities within the WUI areas of Dukes County. Although many definitions exist for hazard and risk, for the purpose of this document, the definitions follow those used by the firefighting community:

> ***Hazard*** is a fuel complex defined by kind, arrangement, volume, condition, and location that forms a special threat of ignition and resistance to control.
>
> ***Risk*** is defined as the chance of a fire starting as determined by the presence and activity of causative agents (National Wildfire Coordinating Group [NWCG] 1998) .

The hazard and Composite Hazard-Risk Assessment is twofold and combines a geographic information system (GIS) model of hazard based on fire behavior and fuels modeling technology (composite risk/hazard assessment) and an assessment of on-the-ground community hazards and values at risk.

From these assessments, land use managers, fire officials, planners, and others can begin to prepare strategies and methods for reducing the threat of wildfire, as well as work with community members to educate them about methods for reducing the damaging consequences of fire. The fuels reduction treatments can be implemented on both private and public land, so community members have the opportunity to actively apply the treatments on their properties, as well as recommend treatments on public land that they use or care about.

FIRE BEHAVIOR MODEL

OVERVIEW

The wildland fire environment consists of three factors that influence the spread of wildfire: fuels, topography, and weather. Understanding how these factors interact to produce a range of fire behavior is fundamental to determining treatment strategies and priorities in the WUI. In the wildland environment, vegetation is synonymous with fuels. When sufficient fuels for continued combustion are present, the level of risk for those residing in the WUI is heightened. Fire spreads in three ways: 1) surface fire

spread—the flaming front remains on the ground surface (in grasses, shrubs, small trees, etc.) and resistance to control is comparatively low; 2) crown fire—the surface fire "ladders" up into the upper levels of the forest canopy and spreads through the tops (or crowns) independent of or along with the surface fire, and when sustained is often beyond the capabilities of suppression resources; and 3) spotting—embers are lifted and carried with the wind ahead of the main fire and ignite in receptive fuels; if embers are plentiful and/or long range (>0.5 mile), resistance to control can be very high. Crown fire and spotting activity has been a concern for fire managers, particularly under extreme weather conditions. In areas where homes are situated close to timber fuels and/or denser shrubs and trees, potential spotting from woody fuels to adjacent fuels should always be acknowledged.

Treating fuels in the WUI can lessen the risk of intense or extreme fire behavior (Martinson and Omi 2013). Studies and observations of fires burning in areas where fuel treatments have occurred have shown that the fire either remains on or drops to the surface, thus avoiding destructive crown fire, as long as activity fuels are treated or removed (Graham et al 2004; Pollet and Omi 2002; Prichard et al. 2010; Safford et al. 2012). Fuel mitigation efforts therefore should be focused specifically where these critical conditions could develop in or near communities.

For this plan, an assessment of fire behavior has been carried out using well-established fire behavior models: FARSITE, FlamMap, BehavePlus, and FireFamily Plus housed within the Interagency Fuel Treatment Decision Support System (IFTDSS), as well as ArcGIS Spatial Analyst tools. Data used in the composite risk/hazard assessment is largely obtained from LANDFIRE.

COMPOSITE HAZARD-RISK ASSESSMENT COMPONENTS

Fire Behavior Models

LANDFIRE

LANDFIRE is a national remote sensing project that provides land managers a data source for all inputs needed for FARSITE, FlamMap, and other fire behavior models. The database is managed by the USFS and the USDI and is widely used throughout the United States for land management planning. More information can be obtained from http://www.landfire.gov.

FARSITE

FARSITE is a computer model based on Rothermel's spread equations (Rothermel 1983); the model also incorporates crown fire models. FARSITE uses spatial data on fuels, canopy cover, crown bulk density, canopy base height, canopy height, aspect, slope, elevation, wind, and weather to model fire behavior across a landscape. FARSITE is a spatial and temporal fire behavior model. FARSITE is used to generate fuel moisture and landscape files as inputs for FlamMap. Information on fire behavior models can be obtained from http://www.fire.org.

FlamMap

Like FARSITE, FlamMap uses a spatial component for its inputs but only provides fire behavior predictions for a single set of weather inputs. In essence, FlamMap gives fire behavior predictions across a landscape for a snapshot of time; however, FlamMap does not predict fire spread across the landscape. FlamMap has been used for the DCCWPP to predict fire behavior across the landscape under extreme (97% worst case) weather scenarios. For this CWPP assessment, the model was run within the IFTDSS modeling platform.

Fire Behavior Model Inputs

Fuels

The fuels in the planning area are classified using Scott and Burgan's (2005) Standard Fire Behavior Fuel Model classification system. This classification system is based on the Rothermel surface fire spread equations, and each vegetation and litter type is broken down into 40 fuel models. The fuel data set was calibrated to known fuel conditions on the ground, with the aid of the Core Team and local fuels specialists.

The general classification of fuels is by fire-carrying fuel type (Scott and Burgan 2005):

- (NB) Non-burnable
- (GR) Grass
- (GS) Grass-Shrub
- (SH) Shrub
- (TU) Timber-Understory
- (TL) Timber Litter
- (SB) Slash-Blowdown

Figure 3.1 illustrates the fuels classification throughout the planning area. Table 3.1 provides a description of each fuel type. The numbers associated with each fuel type increase as their fire-carrying capacity increases.

The Fuel Model included in the DCCWPP Composite Hazard-Risk Assessment is the most recent (2016) Scott and Burgan Fuel Model, which is much more accurate to the existing fuel types in Dukes County than past models due to recent collaboration with local stakeholders and fire experts.

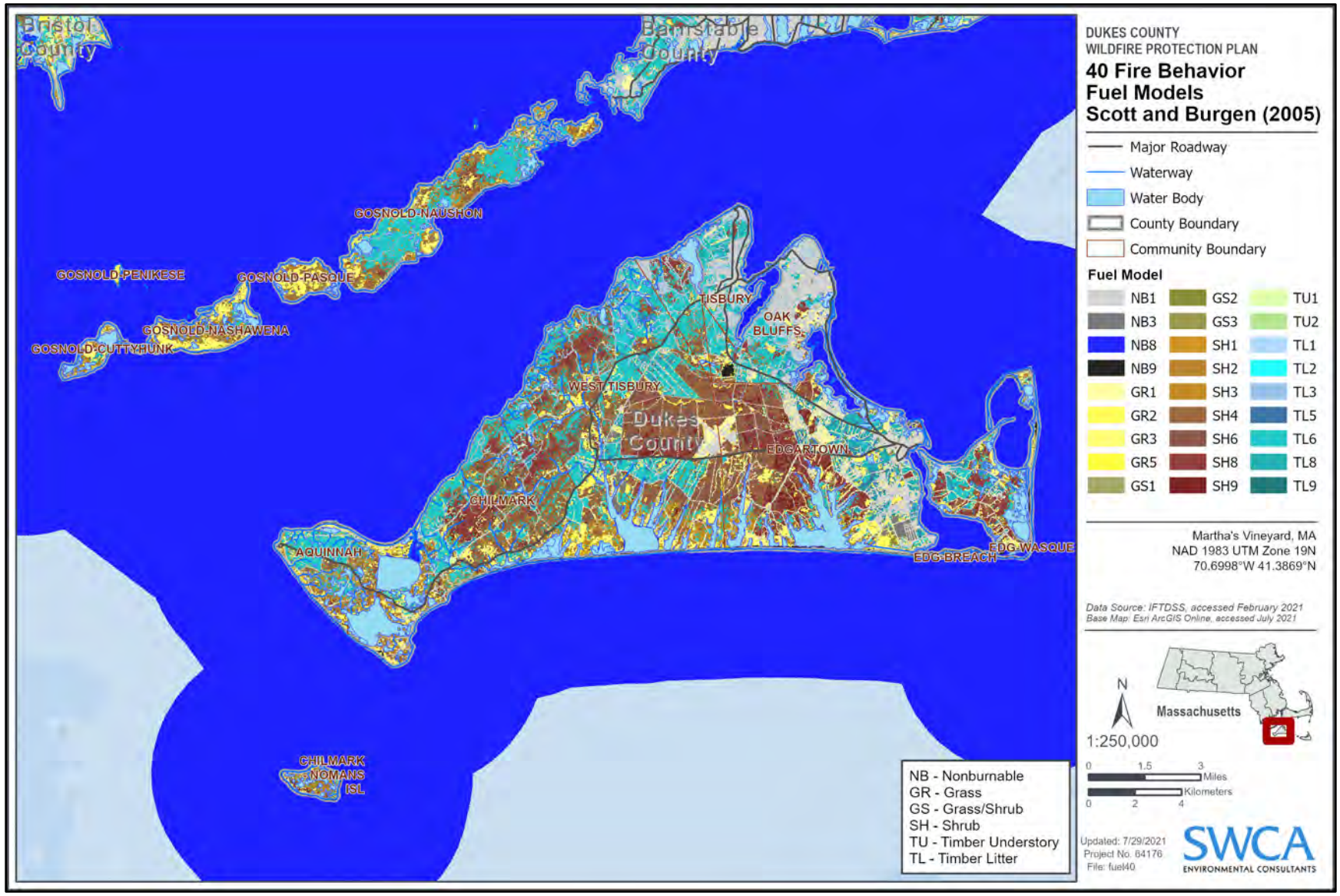


Figure 3.1. Scott and Burgan 40 Fire Behavior Fuel Models.

Table 3.1. Fuel Model Classification for DCCWPP Planning Area

1.	**Nearly pure grass and/or forb type (Grass)**
i.	**GR1:** Grass is short, patchy, and possibly heavily grazed. Spread rate is moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (0.40 ton/acre).
ii.	**GR2:** Moderately coarse continuous grass, average depth about 1 foot. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (1.10 tons/acre).
iii.	**GR3:** Very coarse grass, average depth 2 feet. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
iv.	**GR5:** Dense coarse continuous grass, average depth 1-2 feet. Spread rate very high (50–150 chains/hour); flame length high (8–12 feet).
2.	**Mixture of grass and shrub, up to about 50% shrub cover (Grass-Shrub)**
i.	**GS1:** Shrubs are about 1 foot high, low grass load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet); fine fuel load (1.35 tons/acre).
ii.	**GS2:** Shrubs are 1–3 feet high, moderate grass load. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet); fine fuel load (2.1 tons/acre).
iii.	**GS3:** Moderate grass and shrub load, average depth less than 2 feet. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
3.	**Shrubs cover at least 50% of the site; grass sparse to non-existent (Shrub)**
i.	**SH1:** Low fuel load, depth about 1 foot, some grass fuels present. Spread rate very low (0–2 chains/hour); flame length very low (0–1 feet).
ii.	**SH2:** Moderate fuel load (higher than SH1), depth about 1 foot, no grass fuels present. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load (5.2 tons/acre).
iii.	**SH3:** Moderate shrub load. Fuel bed depth 2–3 feet. Spread rate low (2–5 chains/hour), flame length low (1–4 feet).
iv.	**SH4:** Low to moderate shrub and litter load, possibly with pine overstory. Fuel bed depth about 3 feet. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
v.	**SH6:** Dense shrubs, little to no herb fuels. Fuel bed depth about 2 feet. Spread rate high (20–50 chains/hour).
vi.	**SH8:** Dense shrubs, little to no herb. Fuel bed depth about 3 feet. Spread rate high (20–50 chains/hour); flame length high (8–12 feet).
vii.	**SH9:** Dense shrubs, significant fine fuel. Fuel bed depth 4-6 feet. Spread rate high (20–50 chains/hour); flame length very high (12–25 feet).
4.	**Grass or shrubs mixed with litter from forest canopy (Timber-Understory)**
i.	**TU1:** Fuel bed is low load of grass and/or shrub with litter. Spread rate low (2–5 chains/hour); flame length low (1–4 feet); fine fuel load (1.3 tons/acre).
ii.	**TU2:** Fuel bed moderate litter load with shrub component. Spread rate moderate (5–20 chains/hour); flame length low (0–4 feet).

5.	**Dead and downed woody fuel (litter) beneath a forest canopy (Timber Litter)**
i.	**TL1:** Low to moderate load, fuels 1–2 inches deep. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
ii.	**TL2:** Low load, compact. Spread rate very low (0–2 chains/hour); flame length very low (0–1 foot).
iii.	**TL3:** Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 feet); fine fuel load (0.5 ton/acre).
iv.	**TL5:** High load conifer litter; light slash or mortality fuel. Spread rate is low (2–5 chains/hour); flame length low (1–4 feet).
v.	**TL6:** Moderate load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
vi.	**TL8:** Moderate load long needle pine litter. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
vii.	**TL9:** Very high load fluffy dead and downed fuel littler. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 feet).
6.	**Insufficient wildland fuel to carry wildland fire under any condition (Non-burnable)**
i.	**NB1:** Urban or suburban development; insufficient wildland fuel to carry wildland fire.
ii.	**NB3:** Agricultural field, maintained in non-burnable condition.
iii.	**NB8:** Open water.
iv.	**NB9:** Bare ground.

Note: Based on Scott and Burgan's (2005) 40 Fuel Model System.

Vegetation and Fuels

The most common fuels and associated vegetation in the planning area are listed in Table 3.2 in descending order of acreage.

Table 3.2. Dominant Fuels in the County

Fuel	Area (acres)	Vegetation Type
TL6	13,066.43	Contiguous mixed woodland
NB1	9,147.932	Developed land – irrigated yards
SH4	8,282.257	Shrub – timber mix
SH8	4,613.717	Dense scrub oak; pitch pine with scrub oak understory
SH3	4,488.545	Heathland; mowed scrub oak
SH6	4,137.489	Open scrub oak, coastal shrublands
GR3	3,716.136	Salt marsh; dune grass
GR2	2,554.435	Sparse dune grass
GR1	2,212.097	Golf course, heavily mowed grass
NB8	2,171.611	Open water
TL3	1,327.220	Mixed forest
TL8	1,288.643	Deciduous forest

All of Dukes County is classified as Atlantic Coastal Pine Barrens. Because soils in this ecoregion are sandy, acidic, and extremely porous, the soil loses moisture rapidly (U.S. Geological Survey 2003). Under certain conditions, these vegetation communities can support extreme fire behavior. Within Pine Barren systems, the overstory is dominated by pitch pine (*Pinus rigida*), while the understory is composed of scrub oak (*Quercus ilicifolia)* woodlands, shrublands, and heath species. Other common species within this ecoregion including ericaceous shrubs such as huckleberry (*Gaylussacia* spp.) and blueberry (*Vaccinium* spp.), which produce volatile substances from leaves and stems. This increases flammability and contributes to fire spread. The combination of xeric vegetation and ladder fuels, such as scrub oak, can lead to crown fires. The presence of pitch pine in shrub oak communities increases the potential for extreme fire behavior and spotting. In addition, fuels created from xeric vegetation increase flammability as they dry rapidly. A lack of prescribed fire to manage fuel levels can lead to a buildup of highly flammable fuel and increase the chances of a catastrophic wildfire. In addition, open heathlands and grasslands are not uncommon within this ecoregion (Northeast Forest and Fire Management 2012).

The Manuel F. Correllus State Forest is filled with globally uncommon sandplain communities (Foster and Motzkin 1999), of which nearly 4,000 acres of barren vegetation are listed as critical habitat for rare species. Most of the rare species are rooted in culturally maintained grasslands. Both sandplains and barrens can support extreme fire behavior with wind, dry conditions, and fuel loading being the largest contributing factors. Scrub oak stands produce large amounts of litter, fuel loads, and fuel depths, and are highly flammable. In comparison, pitch pine and oak woodland stands produce lower levels of surface fuel loads and fuel depths. In addition, while oak woodlands are less flammable, scrub oak and pitch pine stands support extreme fire behavior (Patterson et al. 2005). Core Team members report that pre-treatment pitch pine and scrub oak stands can support flame lengths greater than 8 feet. Pre-treated oak woodlands, however, experience flame lengths closer to 4 feet. After treatment, Core Team members report that flame lengths in all oak-dominated communities are often reduced to below 2 feet.

Coastal and maritime shrublands are similar in species composition to scrub oak shrublands, but with increased cover of eastern red cedar (*Juniperus virginiana*), bayberry (*Morella caroliniensis*), beach plum (*Prunus maritima*), shadbush (*Amelanchier* spp.), black cherry (*Prunus serotina*), and sumac (*Rhus* spp.). High fire behavior is possible in areas abundant with eastern red cedar or following disturbance from high winds, salt spray, or frost (Patterson et al. 2005). Areas impacted by sustained frost (frost bottoms) are more susceptible to intense fire behavior due to higher fuel loading and higher temperatures during fire season.

Native grassland and heathland vegetation are composed of a mixture of native grasses intermixed with ericaceous shrubs, blueberries, and huckleberries. Native grasslands support potentially high fire behavior, especially exhibiting rapid rates of spread. Active vegetation management is typically required in order to minimize wildfire risk in these fine fuel types.

Areas dominated by common reeds can support extreme fire behavior, especially during drought conditions.

Topography

Topography is important in determining fire behavior. Steepness of slope, aspect (direction the slope faces), elevation, and landscape features can all affect fuels, local weather (by channeling winds and affecting local temperatures), and rate of spread of wildfire. There are some steep slopes in Dukes County that would influence fire behavior and spread.

Weather

Of the three fire behavior components, weather is the most likely to fluctuate. Accurately predicting fire weather remains a challenge for forecasters. As winds and rising temperatures dry fuels in the spring and summer, conditions can deteriorate rapidly, creating an environment that is susceptible to wildland fire. Fine fuels (grass and leaf litter) can cure rapidly, making them highly flammable in as little as 1 hour following light precipitation. Low live fuel moistures of shrubs and trees can significantly contribute to fire behavior in the form of crowning and torching. With a high wind, grass fires can spread rapidly, engulfing communities, often with limited warning for evacuation. The creation of defensible space is of vital

importance in protecting communities from this type of fire. For instance, a carefully constructed fuel break placed in an appropriate location could protect homes or possibly an entire community from fire. This type of defensible space can also provide safer conditions for firefighters, improving their ability to suppress fire and protect life and property. The County lies within the prevailing westerlies, with the predominant wind direction from west to east.

One of the critical inputs for FlamMap is fuel moisture files. In order to model fire behavior under extreme conditions, dead and live fuel moistures were selected based on conditions observed during the 1957 Plymouth wildfire, which is one of the largest fires in Massachusetts history (Table 3.3). Table 3.3 describes the moisture conditions of fuels, or weather conditions, that contribute to fire behavior modeling.
For explanations of technical terms used in this table, please see the National Wildfire Coordination Group Glossary.

Table 3.3. Weather Parameters Used in the Fire Behavior Model

Parameter	Parameter Condition
1-hour fuel moisture	5%
10-hour fuel moisture	8%
100-hour fuel moisture	12%
Herbaceous fuel moisture	30%
Woody fuel moisture	60%
Foliar fuel moisture	100%
20-foot wind speed	25 mph
Wind direction	SW

The average wind speed from data captured at the Martha's Vineyard Airport is 11 miles per hour (mph), with gusts up to 27 mph. Prevailing wind direction is WSW (Figure 3.2), average daytime temperature is 55°F, and average nighttime temperature is 50°F.

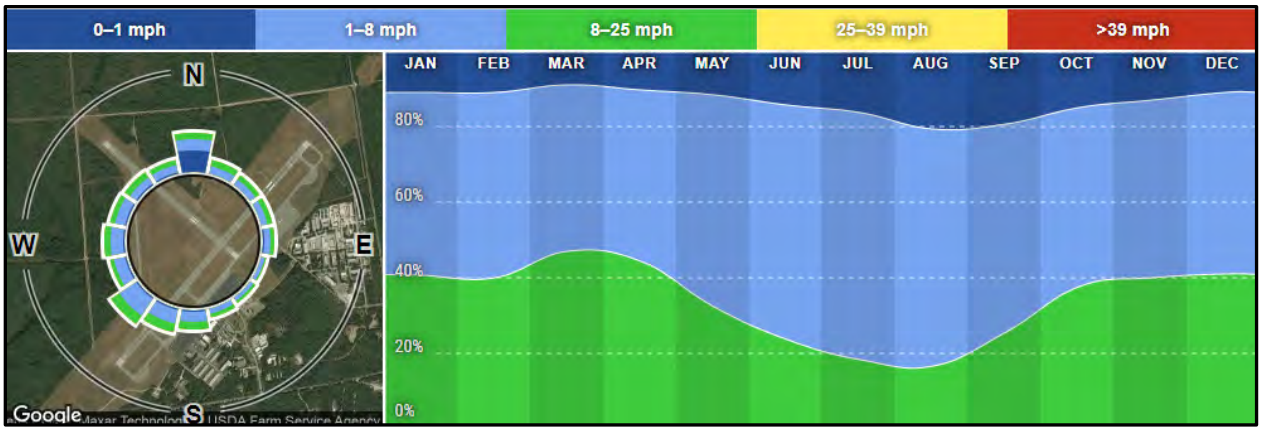


Figure 3.2. Wind statistics for Martha's Vineyard Airport from data recorded from 2007 through 2021.

Source: WindFinder (2021)

FIRE BEHAVIOR MODEL OUTPUTS

The following is a discussion of the fire behavior outputs from FlamMap.

Flame Length

Map 1 in Appendix B illustrates the flame length classifications for the planning area. Flame lengths are determined by fuels, weather, and topography. Flame length is a particularly important component of the Composite Hazard-Risk Assessment because it relates to potential crown fire (particularly important in timber areas) and suppression tactics. Direct attack by hand lines is usually limited to flame lengths less than 4 feet. In excess of 4 feet, indirect suppression (a method of suppression in which the control line is located a considerable distance away from the fire's active edge [NWCG 2021]) is the dominant tactic. Suppression using engines and heavy equipment will move from direct to indirect with flame lengths in excess of 8 feet.

Flame lengths across the planning area range from 0 to more than 25 feet. The highest flame lengths are associated with the shrub fuels that are found across the County, including the scrub-oak-pitch pine communities that are known to exhibit extreme fire behavior.

Fireline Intensity

Map 2 in Appendix B illustrates the predicted fireline intensity throughout the planning area. Fireline intensity describes the rate of energy released by the flaming front and is measured in British thermal units per foot per second (Btu/ft/sec). This is a good measure of intensity and is used for planning suppression activities. The expected fireline intensity throughout the planning area is similar in pattern to predicted flame length, as fireline intensity is a function of flame length. The pattern for fireline intensity is similar to flame length in that intensities range from low (less than 100 Btu/ft/sec) through moderate (100–1000 Btu/ft/sec), high (1000 – 6,175 Btu/ft/sec), and extreme (greater than 6,175 Btu/ft/sec); extreme intensities tend to be associated with areas dominated by tall shrub and timber fuel loads.

Rate of Spread

Map 3 in Appendix B illustrates the rate of spread classifications for the planning area. Rates of spread are measured in chains; one chain is equal to 66 feet. The rates of spread in the planning area range from 0 to 5 chains/hour to over 150 chains/hour. Low rates of spread are associated with timber-dominated areas, while moderate and high rates of spread are associated with grass and shrub fuels.

Crown Fire Potential

Map 4 in Appendix B illustrates the range of crown fire activity from surface fire (in grass-dominated areas) to passive and active crown fire (in timber and shrub with overstory-dominated fuels).

Fire Occurrence/Density of Starts

Map 5 in Appendix B illustrates the fire occurrence density for the planning area. Fire occurrence density has been determined by performing a density analysis on fire start locations with ArcGIS Spatial Analyst. These locations have been provided by DRC, MVC, and the various local fire departments, and when combined, the points show the location of fire starts within the planning area from 2001 through present. The density analysis has been performed as a kernel density, using a 2,500-meter search radius. The density of previous fire starts is used to determine the risk of ignition of a fire. Map 5 in Appendix B reveals a cluster pattern of fires in the north-central part of the County, associated with greater human activity. Some fire occurrence clusters are at intersections and along highways.

The fire occurrence maps are used to provide information on areas where human-ignited fires are prevalent and hence could be more prone to fire in the future.

FINAL COMPOSITE HAZARD-RISK ASSESSMENT

The Composite Hazard-Risk Assessment modeling approach utilizes a weighted sum model, which “stacks” geographically aligned datasets and evaluates an output value derived from each cell value of the overlaid dataset in combination with the weighted assessment. In a weighted sum model, the

weighted values of each pixel from each parameter dataset are added together so that the resulting dataset contains pixels with summed values of all the parameters. This method ensures that the model resolution is maintained in the results and thus provides finer detail and range of values for denoting fire risk.

In order to utilize the most up to date fuel model, SWCA conducted a manual risk and hazard assessment process. The 2016 Scott and Burgan Fuel Model was first downloaded directly from LANDFIRE and loaded into FlamMap. Here, SWCA created initial landscape files, in concert with ArcFUels10 software. Landscape files were then updated and finalized as needed and fire behavior outputs were run in FlamMap. These figures were reviewed for quality assurance by SWCA's lead fire ecologist and finalized.

Figure 3.3 illustrates the individual datasets and the relative weights assigned within the modeling framework.

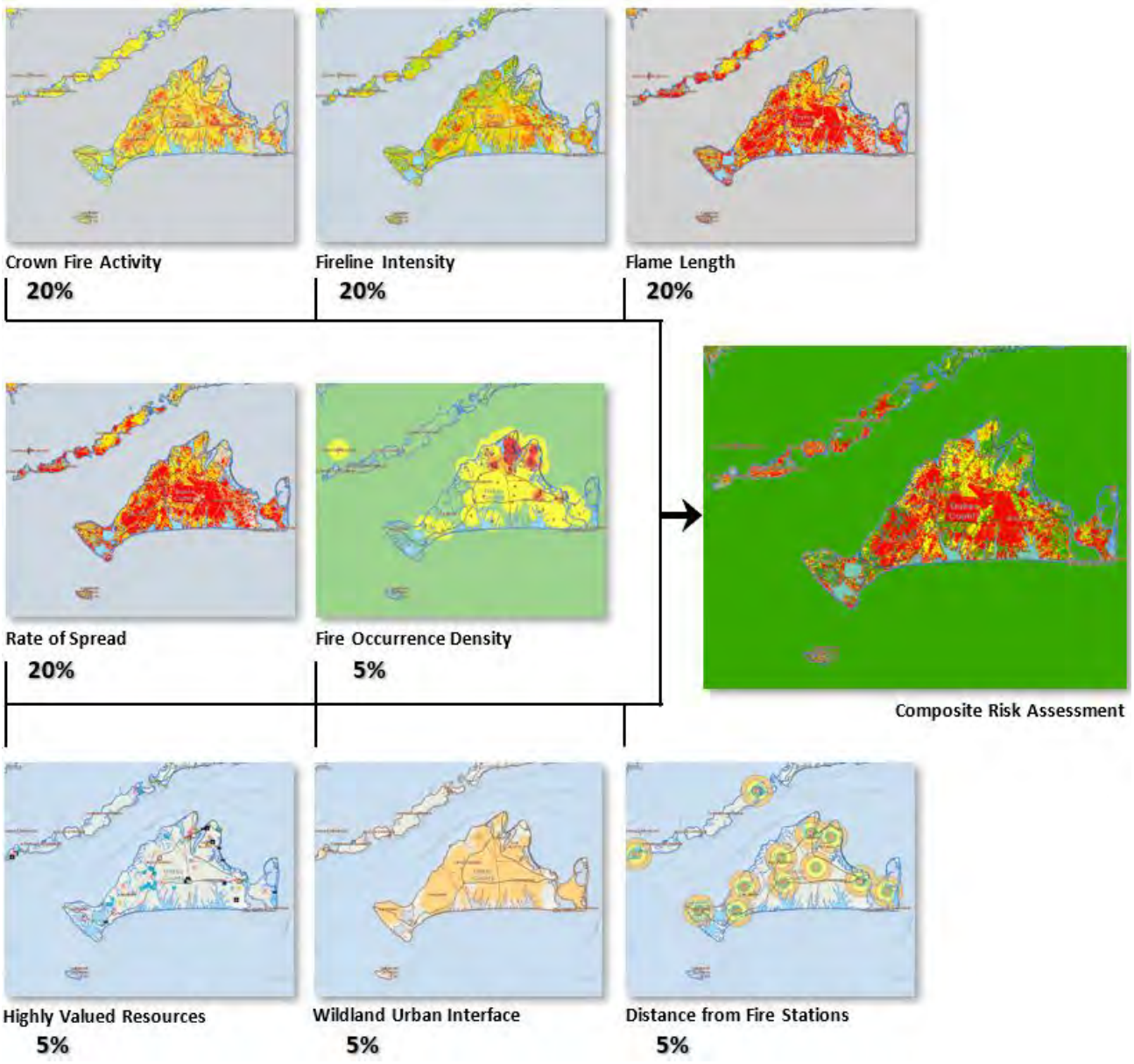


Figure 3.3. Composite Hazard-Risk overlay process.

Figure 3.4 is the Composite Hazard-Risk Assessment for the planning area; it combines all the fire behavior parameters described above. The Composite Hazard-Risk Assessment classifies the planning area into low, moderate, high, and extreme risk categories.

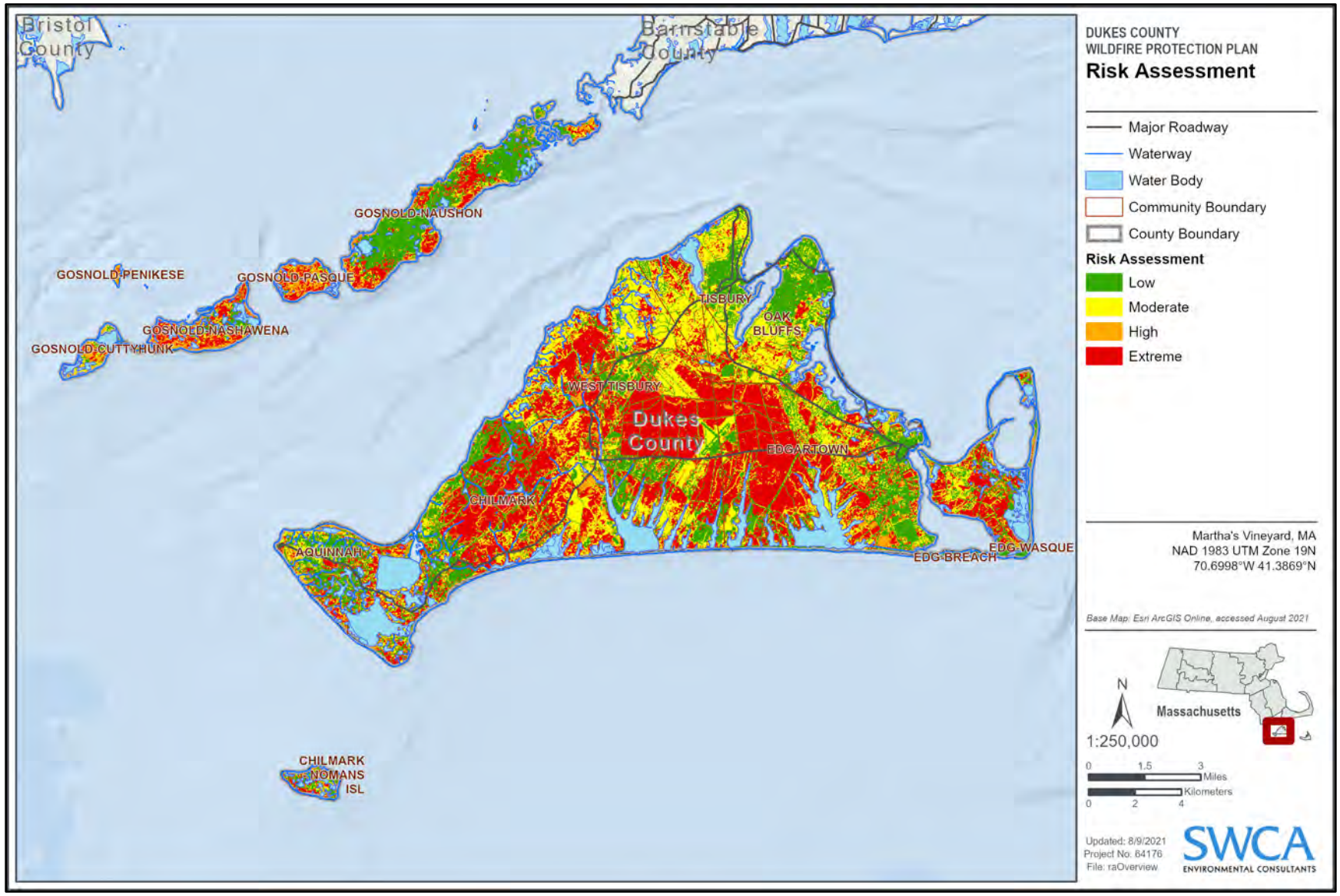


Figure 3.4. Composite Hazard-Risk Assessment.

COMMUNITY HAZARD ASSESSMENTS

The assessment was conducted in spring 2021 using the NFPA Wildland Fire Risk and Hazard Severity Form 1144 (Appendix E). This form is based on the NFPA Standard for Reducing Structure Ignition Hazards from Wildland Fire, 2013 edition. The NFPA standard focuses on individual structure hazards and requires a spatial approach to assessing and mitigating wildfire hazards around existing structures. It also includes ignition-resistant requirements for new construction and is used by planners and developers in areas that are threatened by wildfire and is commonly applied in the development of Firewise Communities (for more information, see www.firewise.org).

Each area was rated based on conditions within the community and immediately surrounding structures, including access, adjacent vegetation (fuels), defensible space, adjacent topography, roof and building characteristics, available fire protection, and placement of utilities. Each score was given a corresponding adjective rating of low, moderate, or high. Higher scores indicate increased risk in a community. An example of the assessment form used in this plan is in Appendix E. The purpose of the community WUI assessment and subsequent hazard ratings is to identify fire hazard and risks and prioritize areas requiring mitigation and more detailed planning. These assessments should not be seen as tactical pre-suppression or triage plans.

The community assessment helps to drive the recommendations for mitigation of structural ignitability, community preparedness, and public education. The assessment also helps to prioritize areas for fuels treatment based on the hazard rating.

The hazard ratings from the community assessment are provided in Table 3.4. This table also includes a summary of the positive and negative attributes of a community as they relate to wildfire risk. Full community descriptions are provided in Appendix D.

Table 3.4. WUI Community Assessment Summary

Fire Department	Community	Rating (based on NFPA 1144)	Positive	Negative
Aquinnah Fire Department	Aquinnah	High	• Water sources: good • Station location: good access to fire response	• Road width: narrow • Fire access: limited turnarounds • Defensible space: limited • Siding and decking materials: combustible
Chilmark Fire Department	Chilmark	High	• Ingress/egress: good access to inland communities • Water sources: good	• Ingress/egress: slow access to coastal communities • Understory and forest fuel type: combustible fuels • Defensible space: limited • Roof, building, decking, and fencing materials: combustible • Placement of gas and electric utilities: aboveground
Edgartown Fire Department	Edgartown	High	• Signage: present but not reflective • Topographic features: relatively flat • Water sources: good for east Edgartown and state forest	• Ingress/Egress: narrow roads and slow travel time to Chappaquiddick and south Edgartown) • Fuels: heavy fuel load and fuel type for Chappaquiddick, south Edgartown, and state forest • Building, fencing, and decking materials: combustible • Water sources: limited for Chappaquiddick and south Edgartown
Oak Bluffs Fire Department	Oak Bluffs	High	• Road conditions: good • Ingress/egress: number of access points • Fire access: good turnarounds • Topography: relatively flat • Water sources: good	• Defensible space: limited • Building, fencing, and decking materials: combustible
Tisbury Fire Department	Tisbury	High	• Road conditions: primary roads are good • Fuel/vegetation type for Tisbury: open • Topography: relatively flat • Fire history: limited • Water sources: Tisbury Airport and lagoon pond	• Ingress/egress: limited for Tashmoo • Water access: limited for Tashmoo • Road width: narrow • Building, fencing, and decking materials: combustible
West Tisbury Fire Department	West Tisbury	High	• Vegetation management plans/history: hazard fuel reduction • Topography: relatively flat • Water source: along primary access	• Ingress/egress: slow and narrow • Fuel/vegetation type and load: heavy • Fire history: history of higher occurrence • Building, fencing, and decking materials: combustible • Water sources: limited • Placement of gas and electric utilities: both aboveground

COMMUNITY VALUES AT RISK

Earlier compilation of the critical infrastructure (see Map 10 in Appendix B) in the planning area, coupled with the community assessments and Core Team input, has helped in the development of a list of community values at risk (CVARs) from wildland fire. These data are also supplemented with highly valued resources and assets (HVRA) data, which is a dataset that is gathered nationwide and available through IFTDSS. In addition to critical infrastructure, CVARs can include natural, social, and cultural resources. The public is encouraged to provide additional CVARs during future public outreach. Based on feedback provided, this section and the associated mapping will be revised.

In addition to critical infrastructure, CVARs can also include natural, social, and cultural resources (see Maps 7–9 in Appendix B). It is important to note that although an identification of CVARs can inform treatment recommendations, a number of factors must be considered in order to fully prioritize areas for treatment; these factors include appropriateness of treatment, land ownership constraints, locations of ongoing projects, available resources, and other physical, social, or ecological barriers to treatment.

The scope of this DCCWPP does not allow determination of the absolute natural, socioeconomic, and cultural values that could be impacted by wildfire in the planning area. In terms of socioeconomic values, the impact due to wildfire would cross many scales and sectors of the economy and call upon resources locally, regionally, and nationally.

NATURAL COMMUNITY VALUES AT RISK

The DCCWPP planning area has a variety of natural resources of particular concern to land managers, such as rare habitats and listed plant and wildlife species. The County has emphasized the importance of natural/ecological values to the general public. Examples of natural values identified by the Core Team include the following:

- State land
- Trail systems
- Viewsheds and open land (Figure 3.5)
- Wildlife habitat

Figure 3.5. Example of a natural CVAR, scenic vistas, and open land.

SOCIOECONOMIC COMMUNITY VALUES AT RISK

Social values include population, recreation, infrastructure, agriculture, and the built environment. Much of the built environment in the planning area falls within the WUI zones. Examples include the following:

- Tourism
- Schools
- Fire departments
- Churches
- Care homes, senior housing, day care, and other group homes
- Water storage

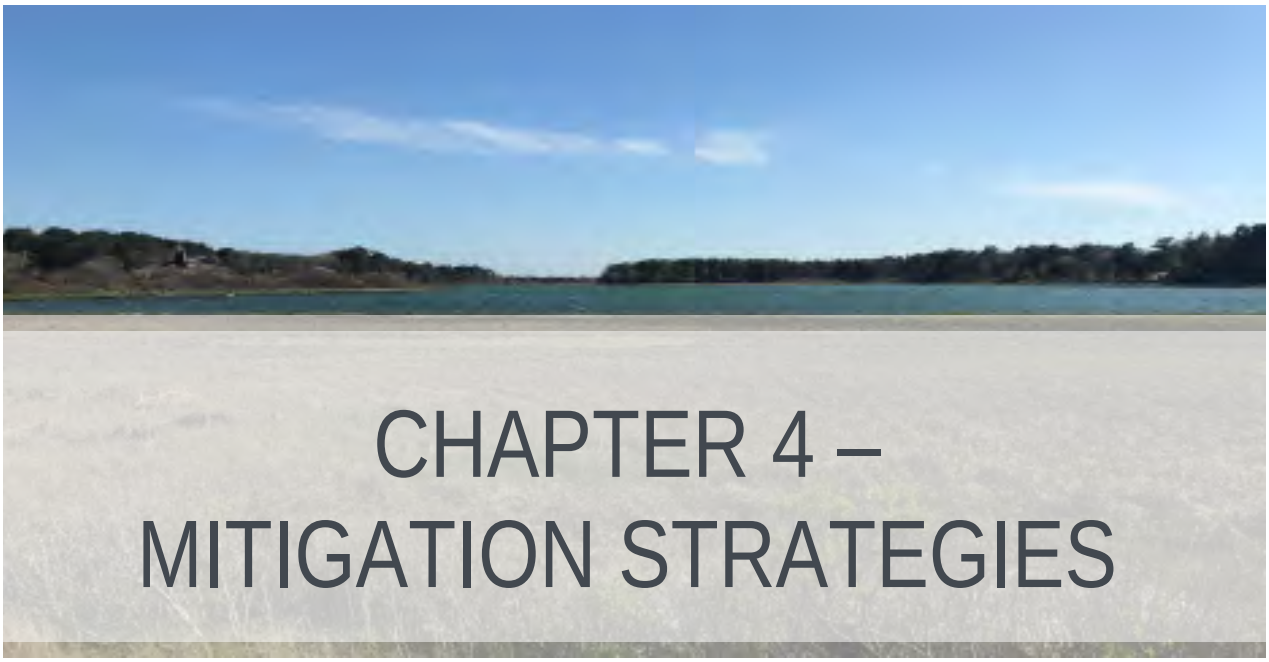
Figure 3.6. Example of a socioeconomic CVAR, a recreation site.

CULTURAL COMMUNITY VALUES AT RISK

Many historical landmarks are scattered throughout Dukes County. Particular CVARs that have been identified by the Core Team in the DCCWPP planning area are the following:

- Historic properties
- Landmarks (Figure 3.7)
- Sites of tribal and cultural significance

Figure 3.7. Example of a cultural CVAR, the Gayhead Cliffs Landmark.



CHAPTER 4 – MITIGATION STRATEGIES

As part of the 2021 DCCWPP process, this plan has been aligned with the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy) and its Phase III NERAP by adhering to the nationwide goal "*To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire*." (NRSC 2015).

In order to do this, the DCCWPP recommendations have been structured around the three main goals of the Cohesive Strategy: restoring and maintaining landscapes, fire-adapted communities, and wildfire response.

This chapter provides guidance for implementing recommendations under each Cohesive Strategy goal. Many of these community-specific recommendations can be implemented at the homeowner or community level. Projects requiring large-scale support can be prioritized based on the community hazard and Composite Hazard-Risk Assessment.

Recommendation matrices are used throughout this chapter to serve as an action plan for implementation. Recommendations have been aligned with the strategies in the MSFAP (DCR 2020) wherever possible.

COHESIVE STRATEGY GOAL 1: RESTORE AND MAINTAIN LANDSCAPES

Goal 1 of the Cohesive Strategy and the NERAP (NRSC 2015) is Restore and Maintain Landscapes: Landscapes across all jurisdictions are resilient to fire and other disturbances in accordance with management objectives. Management options for Goal 1, as outlined in the Phase III NERAP (NRSC 2015:10), include the following:

- Regional Option 1A: Expand the use of prescribed fire as an integral tool to meet management objectives in the Northeast.
- Regional Option 1B: Actively manage and increase the extent of fire-dependent[1] ecosystems.
    - It is important to remember that wildfire, when managed properly, is a critical ecosystem function that supports environmental health.

[1] Fire Dependent: ecosystems that need wildfire to maintain appropriate function and health

- Regional Option 1C: Focus on mitigating "event" fuels through mechanical treatments and utilizing markets for biomass products to clean up and reduce the potential fire hazard from blowdowns, ice storms, and other forest-damaging events.

In this DCCWPP, recommendations to restore and maintain landscapes focus on vegetation management and hazardous fuels reduction.

RECOMMENDATIONS FOR HAZARDOUS FUEL REDUCTION

Fuels management of public and private land in the WUI is key to the survival of homes during a wildfire event, as well as the means to meet the criteria of Goal 1. Research has shown how fuel treatments in the WUI can change fire behavior to support suppression activities and protect homes (Evans et al. 2015). The importance of fuels management is reflected in policy at the federal level, with the HFRA requiring that federal land management agencies spend at least 50% of their fuels reduction funds on projects in the WUI. One of the major goals of the HMP is to expand vegetation management and excess fuel reduction activities (MVC et al. 2020). The effectiveness of fuel treatments will depend upon application of treatments synergistically, emphasizing the importance of collaboration across borders.

Fuels should be modified with a strategic approach across the County to reduce the threat that high-intensity wildfires pose to lives, property, and other values. Pursuant to these objectives, recommendations have been developed in the context of existing and planned fuels management projects. This section provides information on fuel treatment methodologies that can be applied, firstly, to protect structures (defensible space), then near community boundaries (fuel breaks, cleanup of adjacent open spaces), and finally in the wildlands beyond community boundaries (larger-scale forest health and restoration treatments).

As shown in the Composite Hazard-Risk Assessment map (Figure 3.4), some of the areas of greatest risk in the County are private land surrounding the state forest and land making up the intermix of most of the central communities in the County, within, but not limited to, the interior communities of Chilmark, West Tisbury, Edgartown, and Chappaquiddick.

In the early twentieth century, the wildfire risk posed from the state forest to adjoining private property was recognized, and a series of firebreaks/fuel breaks were installed around the forest. In the past, these fuel breaks have been created and widened using harrows to clear away native vegetation, a procedure that has created "fire lanes" dominated by grasses and forbs (Patterson et al. 2005). Studies have occurred over the years that look at how to maintain these fuel breaks to support native vegetation while still containing potential fire originating on the state forest and preventing it from spreading into neighboring communities (Patterson et al. 2005).

Based on literature (Patterson et al. 2005), a series of treatment types are recommended for hazardous fuels mitigation in scrub oak-pitch pine and similar shrubland communities found in the County:

- Mowing pitch pine and scrub oak using a brush cutter can reduce hazardous shrub fuel loads that contribute to rapid rates of spread and extreme flame lengths.
- Grazing can be used to maintain mowed shrub areas and increase effectiveness of treatments.
- Pile burning following mowing can be used to remove slash in treated areas.
- Mulching tractors can be used for cutting dense scrub oak shrubland.
- Tracked excavators with mulching heads can be used for treating pitch pine.
- Using a mosaic of treatment types to create variable stand depths can be effective at reducing hazardous fuels.
- Treatments implemented during the growing season are found to deplete root reserves and slow fuel load recovery.
- Annual re-entry is suggested to eliminate species like huckleberry from oak woodlands.

- Thinning of pitch pine stands and increasing distance between crowns can increase the wind speeds needed to sustain crown fire spread in oak-pitch pine mixed woodlands.
- The use of feller bunchers may cause detrimental soil compaction under some conditions.
- Oak coppices can be preserved using cutting of stems near the base, followed by prescribed fire.
- Repeated mowing of existing fuel breaks can support rare plant species.
- Harrowing of fuel breaks (to remove deep organic matter) can provide habitat for rare plant species (including state endangered nut-sedge [*Scleria pauciflora*]), especially when seed sources are located adjacent to treatment areas.
- Increased establishment of invasive species in fuel breaks was associated with harrowing and grazing.
- Thinning, mowing, grazing, and burning of pitch pin-scrub oak communities, when applied in a mosaic across the landscape, can support multiple rare insect species.
- A fuel break management strategy that maximizes diversity in the seasonal timing and areal extent of treatments, in order to create spatial and temporal heterogeneity in fuel beds, can minimize the development and spread of wildfires, while facilitating the conservation of rare species.

Table 4.1 summarizes the types of treatments recommended throughout the planning area. The majority of the treatments are focused on higher risk areas or higher risk fuel types, as defined by the Composite Hazard-Risk Assessment and Core Team input. Many of these treatment recommendations are general across the communities because similar conditions and concerns were raised by fire responders for all communities that border wildland areas. Table 4.1 also addresses the requirement for an action plan and assessment strategy by providing monitoring guidelines and a timeline for implementation. This timeline is obviously dependent on available funding and resources.

The treatment list is by no means exhaustive and should be considered purely a sample of required projects for the future management of the planning area. Many projects may be eligible for grant funds available from federal and/or state sources. For an additional list of funding sources, please refer to Appendix F.

Each land management agency has a different set of policies governing the planning and implementation of fuels reduction projects. A thorough assessment of current fuel loading is an important prerequisite for any fuels prescription, and all treatment recommendations should be based on the best possible science. When possible, simultaneously planning for the management of multiple resources while reducing fuels will ensure that the land remains viable for multiple uses in the long term. The effectiveness of any fuels reduction treatment depends on the degree of maintenance and monitoring that is employed. Monitoring will also ensure that objectives are being met in a cost-effective manner.

Fire management cannot be a one-size-fits-all endeavor; this plan is designed to be flexible. Treatment approaches and methods will be site-specific and should be adapted to best meet the needs of the landowner and the resources available. Moreover, each treatment recommendation should address protection of values at risk, particularly the protection of sensitive species.

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Focus on mitigation measures within areas of high exposure potential †	Island-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	State and Local MVC Conservation Orgs	Utilize the fire behavior modeling completed for the CWPP to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire responders could more safely suppress future wildfire. Focus on following treatments: -Remove ladder fuels in pitch pine/scrub oak areas to reduce extreme fire behavior, intensity, and rates of spread. -Carryout understory vegetation management to minimize surface to canopy continuity. -Treat small patches of state and other conservation land tucked into residential areas. -In appropriate vegetation types (Grass and Scrub) create mosaic of vegetation types and stand ages to reduce vertical continuity of vegetation to limit fire spread. -Prepare to treat fine fuels that establish in areas of insect mortality and defoliation. Scrub oak shrublands are vulnerable to defoliation by the fall cankerworm. Defoliation occurs in spring when fire hazard is already high. Fine fuels in the understory dry out rapidly because of defoliation and increased sunlight to the understory. -Preferentially treat hazardous fuel types first- e.g., pitch pines. -Treat areas impacted by frost (frost bottoms) to reduce potential for intense fire behavior due to high fuel loading and high temps during fire season.	Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential. Consider a full tool kit of mitigation measures.	Within 2 years	H	Carry out a 2-year review of accomplishments in reducing hazardous fuels. Calibrate fuel model based on treatment effectiveness at altering fuel loading. Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.	Pre-disaster Mitigation Grant Program Urban and Community Forestry Program The National Fire Plan Forest Stewardship Program and Community Forest Stewardship Implementation Grant MassWildlife Habitat Management Grant Program

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Enhance existing firebreaks and potential fire-containment features †	Island-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	State and Local (State Forest) Private Land Conservation Entities (trail systems, etc.) HOAs	Increase the number of firebreaks to double as access on edges/within state forest/difficult to access areas and look for opportunities to widen some trails to better serve as fuel breaks/fire access roads. Encourage clearance of an additional width to accommodate UTV (at a minimum). Create additional turnout/buffer zones between existing development and the forest, ensuring fire suppression access. Maintain existing firebreaks and turnouts/buffers. Utilize appropriate treatment techniques based on forest patch sizes. Avoid prescribed fire on smaller, narrower sections (Appendix B, Map 11 and Table B.1.). Strategic placement of fuel breaks will help to limit the spread of wildland fire and increase access to difficult areas. Fuel break prescriptions should be site specific depending on the fuel type, topography, soils, and adjacent land management practices. The prescriptions will incorporate the use of best management practices for habitat protection (i.e., protection of vulnerable species and habitat and prevention of invasive species). Data available to help with this include the highest risk fire areas, but a follow-up assessment of site conditions will likely be needed to decide exactly where these should be located. Work with local landowners and non-governmental organizations (NGOs) to develop internal capacity to help enhance fire access through road and trail improvements on those lands	Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. Create a fuel arrangement unlikely to support crown fire Ensure the protection of vulnerable ecosystems and values at risk.	Within 2 years	H	Regular maintenance needed to ensure the fuel break remains clear of vegetation. Monitor for invasive species. Continued management of firebreaks maintained by grazing, brush breaking, controlled burns.	Pre-disaster Mitigation Grant Program Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program Forest and Woodlands Resource Management Grant Hazard Mitigation Grant National Fire Plan (NFP) Grants MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants National Association of State Foresters Grants

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Increase road maintenance and develop strategic road turnouts/ buffers †	Prioritize roadways that abut high and extreme risk areas, as identified in the Composite Hazard-Risk Assessment.	State, Town(s), Planning Board(s), etc. Roadway and HOAs Joint Transportation Committee MVC	<u>Roadway improvements:</u> While increasing roadway width is not feasible in many locations, create passing areas where possible should be prioritized Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing) <u>Road right-of-way (ROW) vegetation improvements:</u> Annual spring maintenance of ROW Treat surface fuels for a minimum of 10-foot turnout/buffer and up to 30 feet where possible. Follow local municipal planning guidelines where applicable and develop guidance/bylaw where not already in place. Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles Control for invasive species that may contribute to rapid fire spread (i.e., common reed). Promote native grasses like switchgrass where they won't create wildfire hazard).	Provides for safe and effective wildfire response capabilities Creates a strategic fuel break along roadways to create potential firebreak	Spring 2022	H	Regular maintenance needed to ensure the roads are drivable for emergency response vehicles	Pre-disaster Mitigation Grant Program Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program Forest and Woodlands Resource Management Grant Hazard Mitigation Grant MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants State Farm Good Neighbor Citizenship Grants

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Increase capacity to complete and maintain needed hazardous fuels projects across multiple jurisdictions	Island-wide (where private land interfaces with public)	State and Local MVC Conservation Orgs	Collaboratively identify vegetation and fuels management needs based on the Composite Hazard-Risk Assessment. Develop equipment needs to accomplish work (including maintenance) and seek funding for purchase. Create an educational tool for land /property owners re: various methods, techniques, and cost for various fuel treatments. Engage with DCR Forest Fire Control Programs, North Atlantic Fire Science Exchange partners, or consultants to develop tool. Cultivate and support partnerships with NGOs and volunteer groups to support implementation of projects. (*Aligns with Goal 10 of the MSFAP: Cultivate and support partnerships with forestry and conservation stakeholders.*)	Create resilient landscapes and address potential for extreme wildfire behavior in and around communities. Create and maintain accountability with local landowners.	Within 2 years	H	Set up a standing multi-agency meeting every fall to review accomplishments and address future needs.	Pre-disaster Mitigation Grant Program Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program Forest and Woodlands Resource Management Grant Hazard Mitigation Grant National Fire Plan (NFP) Grants MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants National Association of State Foresters Grants

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Protect rare species habitats	Island-wide (with a focus on public and private conservation lands)	State (NHESP/Mass Wildlife) Local Land Conservation Orgs	Review landscape designations of the State Forest to match current land use needs and wildfire risk. Review Management Plan to ensure vegetation management constraints are not putting undue restrictions on hazardous fuels treatment actions that could enhance public safety. (Appendix B, Map 8) *(Aligns with 2020 MFSAP Strategy 18: Protect rare species habitats within the context of a resilient landscape.)*	Balance the reduction of hazardous fuels with the protection of highly sensitive resources.	Within 1 year	H	Monitor accomplishments in addressing species protections while reducing wildfire risk.	MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants Conservation Innovation Grants (CIG) Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program
Increase efforts to eradicate *Phragmites australis* from high-risk areas	Island-wide (with a focus on public and private conservation lands)	State and Town(s) Conservation Commissions Conservation Orgs HOAs	Phragmites management is often a concern in wetland resource areas. State, local, and private lands often propose invasive plant management plants to control and/or eradicate invasive phragmites. The Towns and Conservation Commissions should coordinate to determine their preferred method of phragmites management and streamline these projects in permitting. Methods include prescribed burning, herbicide application, excavation. Manual management techniques are ineffective for phragmites control. Integrated management (burning, mowing and herbicide application) is the most effective means of management and help avoid exacerbation of fuel loads. Incorporate restoration activities to discourage reestablishment of phragmites and develop list of priority projects.	Eliminate an aggressive invasive plant that continues to impact the wetland resources of Dukes County displacing native species that contribute lower wildfire hazard.	Within 5 years	H	Monitor success of management efforts and adapt approach where necessary. Continue to follow-up on new project areas and collaborate efforts across the island(s)	MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants CIG Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Work with local HOAs to develop fuel break measures and associated access improvements for increased community protection.	Island-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	Local Towns MVC Private Landowners Conservation Orgs	To ensure defensible space in WUI will be maintained require property owners to establish sufficient structure clearance around all structures. (Important to include local land conservation organizations here for support for educational initiative) Consider incorporation of defensible space measures into bylaws, especially for areas predicted to be at extreme risk as identified in the Composite Hazard-Risk Assessment. Focus on key measurements that would have the greatest impact on risk (for example treatment of fuels within the first 30ft from a structure), instead of overwhelming with too many restrictions.	Create resilient landscapes and address potential for extreme wildfire behavior in and around communities. Create and maintain accountability with local landowners.	Within 2 years	H	Carry out a 2-year review of accomplishments in improving defensible space across the island. Repeat NFPA 1144 assessments every 5 years to document improvements in defensible space.	Pre-disaster Mitigation Grant Program Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program Forest and Woodlands Resource Management Grant Hazard Mitigation Grant National Fire Plan (NFP) Grants MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants National Association of State Foresters Grants
Increase participation in prescribed burning	Island-wide (Primary focus on public lands)	State (DCR, EEA) Local Legislators MVC Conservation Orgs	Convene a prescribed burn council to provide oversight and increase opportunities for burning. Initiate monthly meeting cadence. Tasks for Council would include: 1) Develop a County-wide burn plan. • Utilize prescribed burn planning that follows agency and regulator protocols, including securing appropriate permits.	Protect communities and infrastructure by reducing fuel loads.	Within 5 years	M	Annual review of tasks of a prescribed burn council.	Pre-disaster Mitigation Grant Program Funding for Fire Departments and First Responders Volunteer Fire Assistance Program

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Increase participation in prescribed burning (*Continued*)			2) Identify prescribed burn practitioners: • Seek a private vendor to conduct prescribed burns on private land (work with State Forest Fire Warden). • Explore the possibility of MOUs/MOAs between state agencies and island entities which would enable state-contracted burn bosses or burn bosses on staff at state agencies to oversee prescribed burns on non-governmental organization lands. 3) Determine viability of a full time burn boss if there is NGO-wide commitment to implementing prescribed burns on a methodical basis; Identify liability insurance needs and barriers. Consider outreach to HOAs to determine HOA contributions toward insurance premiums. • A complete assessment of resources and commitment is needed to adequately implement the number of prescribed burns recommended to meaningfully reduce wildfire hazard given numerous constraints (deficit of personnel and optimal burn days, transportation issues, competition in other parts of the state, etc.) 4) Prepare and implement: • Utilize prescribed burn program to provide training for local fire department personnel and volunteers. Look to recruit wildfire volunteers from staff of conservation organizations. • Develop a dedicated on-island fire cache that would allow prescribed fire teams to respond on very short notice and conduct preventative prescribed burns. • Plan and prepare for future prescribed fire in WUI areas by implementing needed mechanical pre-treatments.	Increase capacity and training for fire departments.			Carry out inventory each year of number and acreage of prescribed fire completed. Collaboratively set goals for upcoming year through a prescribed burn council. Establish training needs and funding. Petition state to allow DCR and other State agencies	Forest and Woodlands Resource Management Grant Hazard Mitigation Grant Assistance to Firefighters Grants (AFG) MassWildlife Habitat Management Grant Program (MHMGP)

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Increase participation in prescribed burning (*Continued*)			5) Work with DCR on petitioning state legislation to allow state entities (DCR) to perform prescribed burns on private and NGO properties (*Aligns with 2020 Dukes County HMP.*) *Aligns with 2020 MSFAP Strategy 64.**					
Integrate wildfire management with other resource area management objectives	Island-wide (Primary focus on public lands)	State and Local MVC	Leverage the information from the development of the CWPP and the HMP to combine fuel reduction and habitat restoration projects. Maximize funding sources through integrating fuel projects with other land management goals, including ecological restoration, habitat improvements (i.e., restoring native forest cover types), and recreation. Incorporate existing *Phragmites australis* management programs with fuel reduction goals. (*Aligns with 2020 MSFAP Strategy 16: Conduct ecological restoration of degraded land through various methods including timber harvesting, invasive species management, and prescribed fire.*)	Restore degraded landscapes to build a more resilient fire environment.	Within 5 years	H	Carry out a 2-year review of accomplishments in reducing hazardous fuels and success at meeting other resource management objectives.	Pre-disaster Mitigation Grant Program Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program Forest and Woodlands Resource Management Grant Hazard Mitigation Grant MassWildlife Habitat Management Grant Program (MHMGP) Urban and Community Forestry Challenge Grants

Table 4.1. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Firewise treatments on individual properties/ structures	All communities Island-wide	Towns	Conduct Firewise Community-based assessments of individual homes. The professional assessment would help identify the most critical actions that an individual could take. Assessments could also include marking trees and shrubs suggested for removal. Utilize NFPA 1144 curriculum for assessments. Consider a train-the-trainer approach, utilizing the fire departments and local community "spark plugs" when possible.	Reduce risk of home ignitions. Empower homeowners to take the most effective actions. Allow funding to address a larger number of homes.	Within 2 years	H	Conduct on-site inspections with owners; identify and mark trees or shrubs for removal within the 100-foot safety zone. Develop a community task force to carry out assessments of properties.	Forest Stewardship Program and Community Forest Stewardship Implementation Grant Public Assistance Grant Program Hazard Mitigation Grant National Fire Plan (NFP) Grants

Notes: All agencies listed as "Land Ownership/Lead Agency" must take the lead on their respective properties; however, collaboration is key to the completion of this plan.

† = highest priority

* = Strategy 64: provide a strong prescribed fire program that supports both hazard fuels mitigation, while at the same time providing a tool for ecosystem restoration in fire dependent ecosystems.

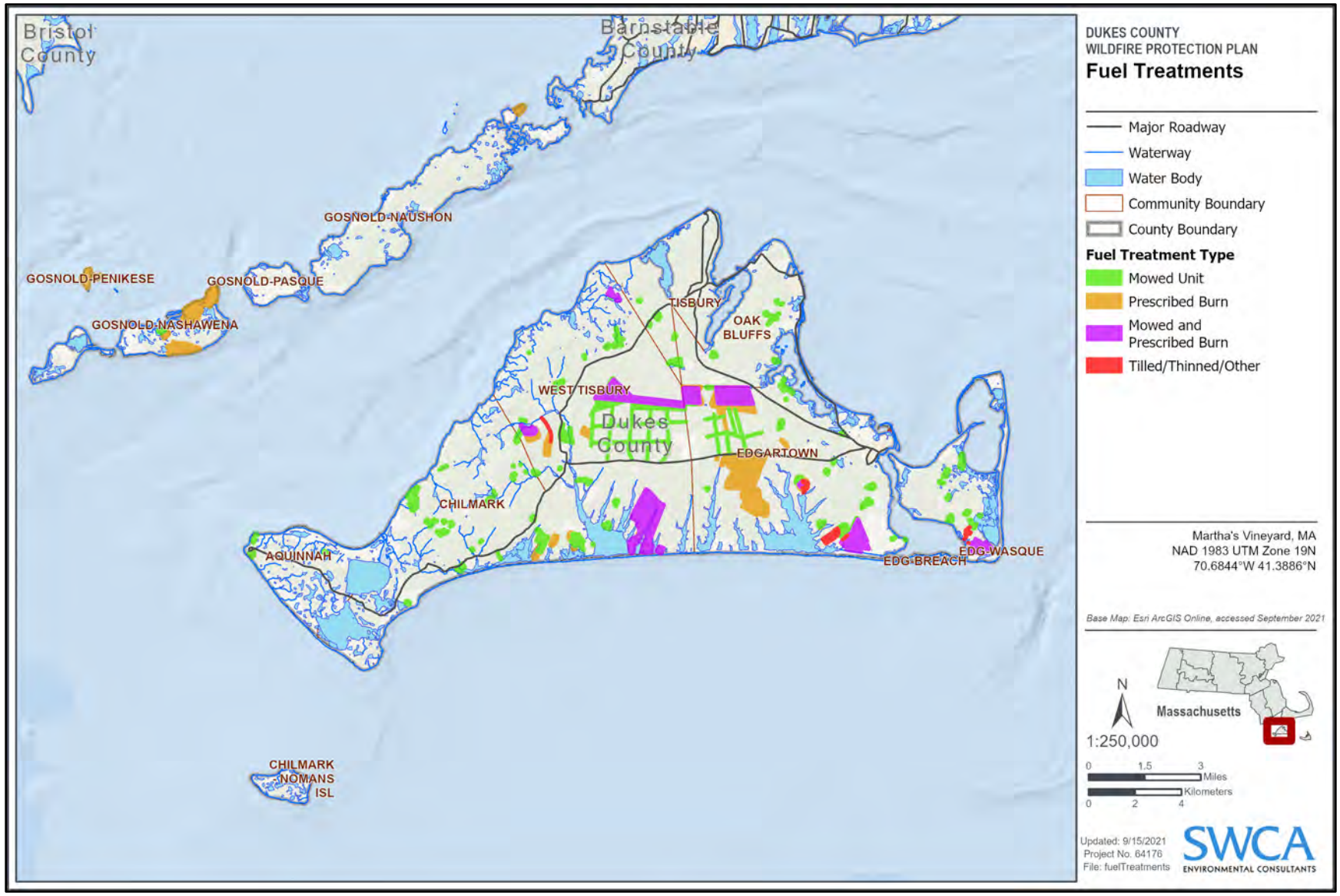


Figure 4.1. Existing and planned fuel treatments across all jurisdictions.

Source: MVC (2021)

Fuels Treatment Scales

Defensible Space

Defensible space is perhaps the fastest, most cost-effective, and most efficacious means of reducing the risk of loss of life and property. Although fire agencies can be valuable in providing guidance and assistance, creating defensible space is the responsibility of the individual homeowner (Figure 4.2).

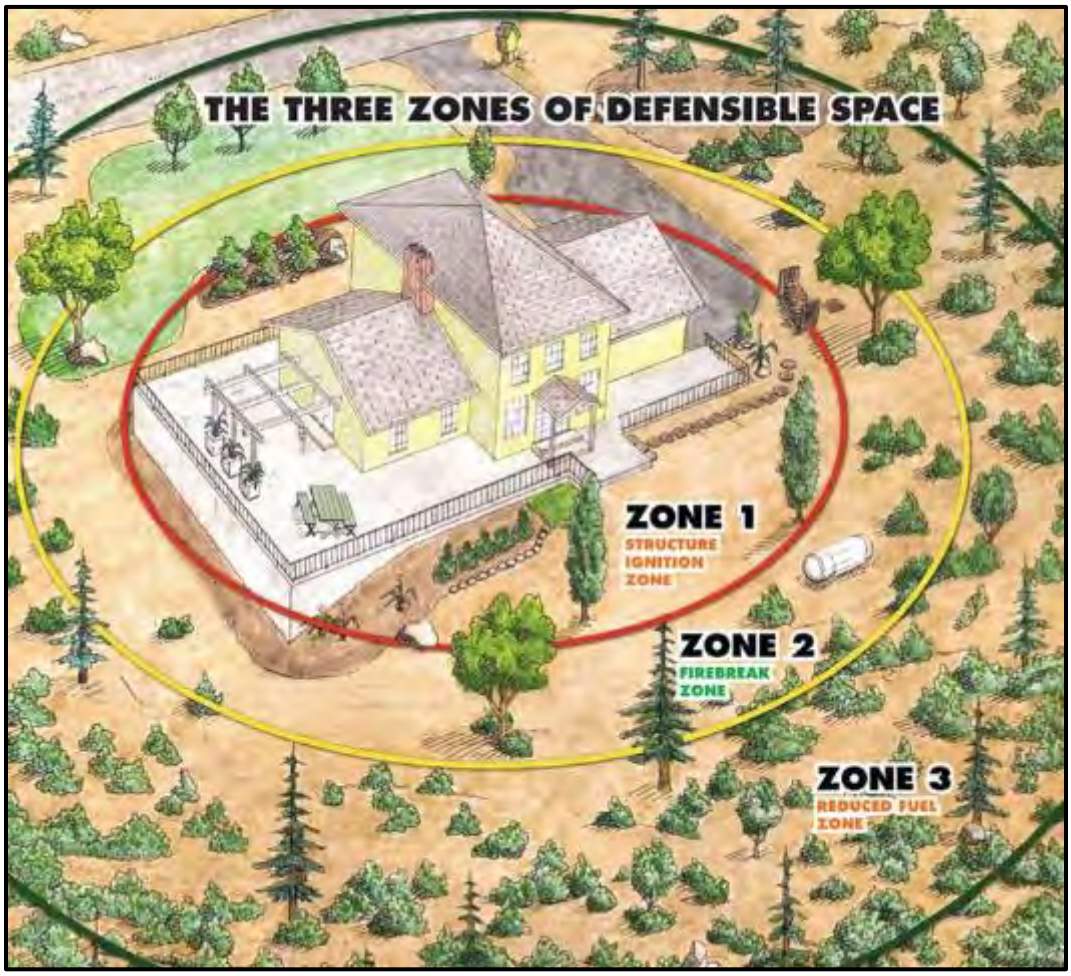


Figure 4.2. Defensible space providing clearance between a structure and adjacent woodland or forest fuels.

Source: Firewise.org.

Effective defensible space consists of creating an essentially fire-free zone adjacent to the home, a treated secondary zone that is thinned and cleaned of surface fuels, and (if the parcel is large enough) a transitional third zone that is basically a managed forest area. These components work together in a proven and predictable manner. Zone 1 keeps fire from burning directly to the home; Zone 2 reduces the adjacent fire intensity and the likelihood of torching, crown fire, and ember production; and Zone 3 does the same at a broader scale, keeping the fire intensity lower by maintaining a more natural, historic condition (Figures 4.2 and 4.3).

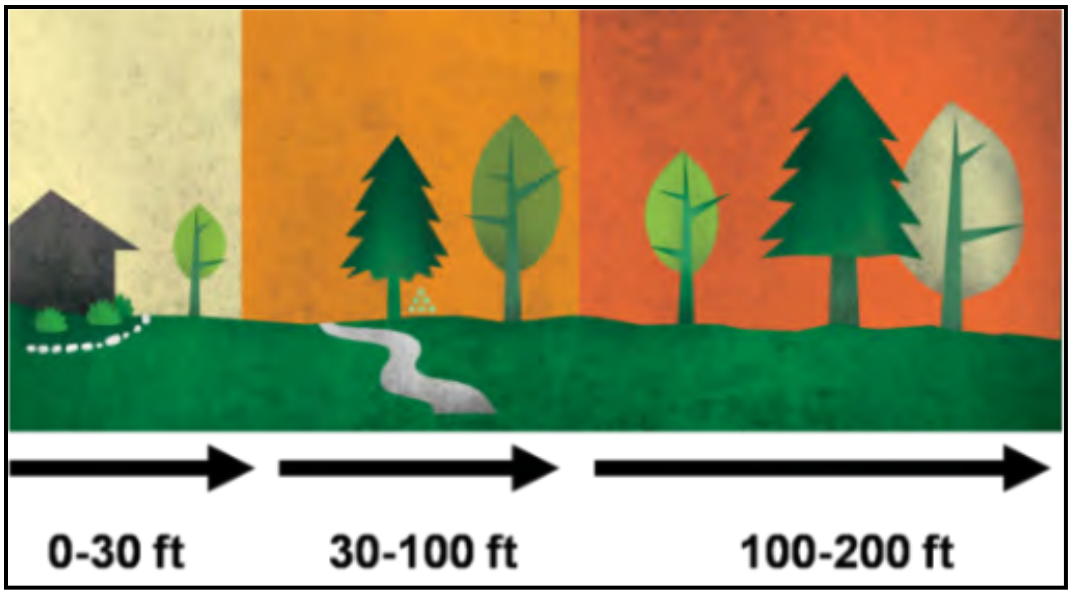


Figure 4.3. Defensible space zones.

Source: www.firewise.org.

It should be emphasized that defensible space is just that—an area that allows firefighters to work effectively and with some degree of safety to defend structures. While defensible space may increase a home's chance of surviving a fire on its own, a structure's survival is not guaranteed, with or without firefighter protection. Nevertheless, when these principles are consistently applied across a neighborhood, everyone benefits.

Specific recommendations should be based on the hazards adjacent to a structure, such as slope steepness and fuel type. Firewise guidelines and the Homeowner's Guide (Appendix G) are excellent resources. Creating defensible space does not have to be an overwhelming process. Assisting neighbors may be essential in many cases. Homeowners should consider assisting the elderly, sharing ladders for gutter cleaning, and assisting neighbors with large thinning needs. Homeowner actions have also been found to motivate neighbors to act, increasing the scope of the wildfire mitigation across a community (Evans et al. 2015). Adopting a phased approach can make the process more manageable and encourage maintenance (Table 4.2).

Table 4.2. Example of a Phased Approach to Mitigating Home Ignitability

Year	Project	Actions
1	Basic yard cleanup (annual)	Dispose of clutter in the yard and under porches. Remove dead branches from yard. Mow and rake. Clean off roofs and gutters. Remove combustible vegetation near structures. Coordinate disposal as a neighborhood or community. Post 4-inch reflective address numbers visible from road.

Year	Project	Actions
2	Understory thinning near structures	Repeat basic yard cleanup. Limb trees up to 6–10 feet. Trim branches back 15 feet from chimneys. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
3	Understory thinning on private property along roads and drainages	Limb trees up to 6–10 feet. Trim or cut down brush. Remove young trees that can carry fire into forest canopy. Coordinate disposal as a neighborhood or community.
4	Overstory treatments on private property	Evaluate the need to thin mature or diseased trees. Prioritize and coordinate tree removal within neighborhoods to increase cost effectiveness.
5	Restart defensible space treatment cycle	Continue the annual basic yard cleanup. Evaluate need to revisit past efforts or catch those that were bypassed.

Fuel Breaks and Open Space Cleanup

The next location priority for fuels treatments should be where the community meets the wildland. This may be the outer margins of a town or an area adjacent to occluded open spaces such as a park. Fuel breaks (also known as shaded fuel breaks) are strips of land where fuel (for example, living trees and brush, and dead branches, leaves, or downed logs) has been modified or reduced to limit a fire's ability to spread rapidly. Fuel breaks should not be confused with firebreaks, which are areas where vegetation and organic matter is removed down to mineral soil. Shaded fuel breaks may be created to provide options for suppression resources or to provide opportunities to introduce prescribed fire. In many cases, shaded fuel breaks may be created by thinning along roads. This provides access for mitigation resources and firefighters, as well as enhancing the safety of evacuation routes.

Larger-scale Treatments

Farther away from WUI communities, the emphasis of treatments often becomes broader. While reducing the buildup of hazardous fuels remains important, other objectives are often included, such as forest health and resiliency to catastrophic wildfire and climate change considerations. Wildfires frequently burn across jurisdictional boundaries, sometimes on landscape scales. As such, these larger treatments need to be coordinated on a strategic level. This requires coordination between projects and jurisdictions, as is currently occurring.

Land managers have carried out numerous forest management projects across Dukes County and have ongoing projects planned on public land that are designed to reduce hazardous fuels to protect communities and resources. Figure 4.1 shows existing fuel treatments that have been completed or planned across the County. This information was provided by MVC in 2021.

Public support for landscape projects can often be mixed because some individuals or communities do not perceive the treatments to be effective (Evans et al. 2015). Building public trust is therefore important, and this includes ensuring that the community is engaged early and often in the planning process and that science is used to support fuel treatment planning and management decisions.

Fuel Treatment Methods

Since specifics of the treatments are not provided in detail in Table 4.1, different fuels reduction methods are outlined in the following narrative.

Several treatment methods are commonly used, including manual treatments, mechanized treatments, and prescribed fire (Table 4.3). This brief synopsis of treatment options is provided for general knowledge; specific projects will require further planning. The appropriate treatment method and cost will vary depending on factors such as the following:

- Diameter of materials
- Proximity to structures
- Acreage of project
- Fuel costs
- Steepness of slope
- Area accessibility
- Density of fuels
- Project objectives

It is imperative that long-term monitoring and maintenance of all treatments is implemented. Post-treatment rehabilitation such as seeding with native plants and erosion control may be necessary.

Table 4.3. Summary of Fuels Treatment Methods

Treatment	Comments
Machine mowing	Appropriate for large, flat, grassy areas on relatively flat terrain.
Prescribed fire	Can be very cost effective. Ecologically beneficial. Can be used as training opportunities for firefighters. May require manual or mechanical pretreatment. Carries risk of escape, which may be unacceptable in some WUI areas. Unreliable scheduling due to weather and smoke management constraints.
Brush mastication	Brush species tend to re-sprout vigorously after mechanical treatment. Frequent maintenance of treatments are typically necessary. Mastication tends to be less expensive than manual (chainsaw) treatment and eliminates disposal issues.
Timber mastication	Materials up to 10 inches in diameter and slopes up to 30% can be treated. Eliminates disposal issues. Environmental impact of residue being left on-site is still being studied.
Manual treatment with chipping or pile burning	Requires chipping, hauling, and pile burning of slash in cases where lop and scatter is inappropriate. Pile burning must comply with smoke management policy.
Feller buncher	Mechanical treatment on steeper slopes and larger tree diameters may require a feller buncher rather than a masticator. Costs tend to be considerably higher than those of a masticator.

The following fuel treatment costs have been outlined in the literature for the County (Patterson et al. 2005) in treatment cost per acre:

- Mowing with brush hog and tractor: $200
  - Updated cost: $450 in Terminal Moraine
- Grazing: $900
- Pile burning: $200
- Thinning pitch pine: $1,500
- Harrowing: $200–$500
- Mowing with standard mower: $8
- Prescribed burning: $200–$300

Manual Treatment

Manual treatment refers to crew-implemented cutting with chainsaws. Although it can be more expensive than mechanized treatment, crews can access areas that would otherwise be inaccessible with machines. Treatments can often be implemented with more precision than prescribed fire or mechanized methods allow. Merchantable materials and firewood can be removed, while non-merchantable materials are often lopped and scattered, chipped, or piled and burned on-site. Care should be exercised to not increase the fire hazard by failing to remove or treat discarded material in a site-appropriate manner.

Strategic timing and placement of fuels treatments is critical for effective fuels management practices and should be prescribed based on the conditions of each particular treatment area. Some examples of this would be to place fuel breaks in areas where the fuels are heavier and in the path of prevailing winds and to mow grasses just before they cure and become flammable. Also, burning during the hotter end of the prescription is important since hotter fires are typically more effective at reducing heavy fuels and shrub growth. In areas where the vegetation is sparse and not continuous, fuels treatments may not be necessary to create a defensible area where firefighters can work. In this situation, where the amount of fuel to carry a fire is minimal, it is best to leave the site in its current condition to avoid the introduction of exotic species.

Mechanized Treatments

Mechanized treatments include mowing, mastication (grinding timber into small pieces), and whole tree felling. These treatments allow for more precision than prescribed fire and are often more cost-effective than manual treatment.

Mowing, including ATV and tractor-pulled mower decks, can effectively reduce grass fuels adjacent to structures and along highway rights-of-way and fence lines. For heavier fuels, several different masticating machines can be used, including drum- or blade-type masticating heads mounted on machines and ranging in size from a small skid-steer to large front-end loaders. Some masticators can grind standing timber up to 10 inches in diameter. Other masticators are more effective for use in brush or surface fuels. Mowing and mastication do not actually reduce the amount of on-site biomass but alter the fuel arrangement to a less combustible profile.

In existing fuel break areas, especially in areas of encroaching shrubs or trees, maintenance is crucial. In extreme risk areas, more intensive fuels treatments may be necessary to keep the fire on the ground surface and reduce flame lengths. Within the fuel break, shrubs should be removed, and the branches of trees should be pruned from the ground surface to a height of 4 to 8 feet, depending on the height of the fuel below the canopy, and thinned with a spacing of at least two to three times the height of the trees to avoid movement of an active fire into the canopy.

Mechanical shears mounted on feller bunchers are used for whole tree removal. The stems are typically hauled off-site for utilization, while the limbs are discarded. The discarded material may be masticated, chipped, or burned in order to reduce the wildfire hazard and to speed the recycling of nutrients.

Prescribed Burning

Prescribed burning is also a useful tool to reduce the threat of extreme fire behavior by removing excessive standing plant material, litter, and woody debris while limiting the encroachment of shrubby vegetation. Where possible, prescribed fire could occur on public land within fire-adapted vegetation communities.

All prescribed fire operations would need to be conducted in accordance with federal and state laws and regulations. Public safety would be the primary consideration in the design of any prescribed burn plan so as to not negatively impact the WUI. The areas to be burned should occur within fuel breaks or appropriate fire lines. Agency use of prescribed fire on public land would be carried out within the confines of the agency's fire management planning documents and would require individual prescribed burn plans that are developed for specific burn units and consider smoke management concerns and sensitive receptors within the WUI. Smoke monitors could be placed in areas where smoke concerns have been raised in the past. Effects of smoke can be managed by burning on days when smoke will blow away from smoke-sensitive areas. Precautions are taken when burning near populated areas, highways, airports, and other smoke-sensitive areas. Any smoke impact downwind is considered before lighting a fire. Smoke management is a significant component of all prescribed burn plans. Other mitigating actions include alerting the public of upcoming burning activities, including the purpose, best conditions for ensuring good smoke dispersal, duration, size, and location of projects. Local radio, newspapers, social media, and TV can provide broad coverage for alerts. Land management agencies in the project area consistently work with concerned citizens regarding smoke management and attempt to provide solutions such as the placement of smoke monitors at sensitive sites.

Due to current limitations on the use of prescribed fire throughout the County, especially on non-governmental lands, a recommendation in the DCCWPP is to explore the possibility of Memoranda of Understanding (MOUs)/Memoranda of Agreement (MOAs) between state agencies and island entities which would enable state-contracted burn bosses or burn bosses on staff at state agencies to oversee prescribed burns on non-governmental organization lands.

The National Wildfire Coordinating Group (NWCG) released the NWCG Smoke Management Guide for Prescribed Fire in 2020 (NWCG 2020). This plan is designed to act as a guide to all those who use prescribed fire. Smoke management techniques, air quality regulations, public perception of prescribed fire, foundational science behind prescribed fire, modeling, smoke tools, air quality impacts, and more are all discussed in this plan. The document is meant to pair with NWCG's Interagency Prescribed Fire Planning and Implementation Procedures Guide for planning and addressing smoke when prescribed fie is used (NWCG 2020). To view the plan, please visit: https://www.nwcg.gov/sites/default/files/publications/pms420-3.pdf.

To learn more about prescribed fire and firing techniques, visit the EFIRE Fire Techniques webpage: https://efire.cnr.ncsu.edu/efire/fire-techniques/.

Following any type of fuels reduction treatment, post-treatment monitoring should continue to ensure that management actions continue to be effective throughout the fire season. The vegetation within this ecosystem can change rapidly in response to drought or moisture from year to year and during the course of the season, so fuels treatments should be adjusted accordingly.

Several re-entries may be needed to meet full resource management objectives, so a solid maintenance plan is needed to ensure success.

Impacts of Prescribed Fire on Communities

Managing smoke from prescribed fires is an important part of planning for prescribed burning. The Massachusetts Division of Fisheries and Wildlife developed a Prescribed Fire Management

Handbook to set standards for prescribed fire and protect the health and welfare of Massachusetts residents from the impacts of smoke (Massachusetts Division of Fisheries and Wildlife 2017). During a burn, lighting patterns can be altered to change how smoke is generated. Generally, the impacts of smoke from prescribed burning are far less than those from wildfire events. Prescribed burns aid in reducing the potential smoke impacts of high-intensity, extensive wildfires.

In addition to the Prescribed Fire Management Handbook, in 2020, the NWCG published the NWCG Smoke Management Guide for Prescribed Fire. The guide provides an overview of prescribed fire and associated forest health impacts, smoke exposure impacts, smoke management regulations and programs, smoke management techniques and tools, and prescribed fire preparation. To learn more, view the guide here: https://www.nwcg.gov/sites/default/files/publications/pms420-3.pdf.

Prescribed fires can have impacts on air quality that may impact local communities. Impacts on a regional scale are typically only acute when many acres are burned on the same day, which is rare in this region. Local problems are occasionally acute due to the large quantities of smoke that can be produced in a given area during a short period of time. Residents with respiratory problems may be impacted during these burning periods since smoke consists of small particles of ash, partly consumed fuel, and liquid droplets that are considered air pollutants. Other combustion products include invisible gases such as carbon monoxide, carbon dioxide, hydrocarbons, and small quantities of nitrogen oxides. Oxides of nitrogen are usually produced at temperatures only reached in piled or windrowed slash or in very intense wildfires that are uncommon in the region. In general, prescribed fires produce inconsequential amounts of these gases.

Effects of smoke can be managed by burning on days when smoke will blow away from smoke-sensitive areas. Precautions are taken when burning near populated areas, highways, airports, and other smoke-sensitive areas. Any smoke impact downwind is considered before lighting a fire. Smoke management is a significant component of all prescribed burn plans. Other mitigating actions include alerting the public of upcoming burning activities, including the purpose, best conditions for ensuring good smoke dispersal, duration, size, and location of projects. Local radio, newspapers, social media, and TV can provide broad coverage for alerts. Land management agencies in the project area consistently work with concerned citizens regarding smoke management and attempt to provide solutions such as the placement of smoke monitors at sensitive sites.

For more information on wildfire smoke, see the Environmental Protection Agency's Smoke-Ready Toolbox for Wildfires: https://www.epa.gov/smoke-ready-toolbox-wildfires.

Thinning and Prescribed Fire Combined

Combining thinning and prescribed fire can be the most effective treatment (Graham et al. 2004). In forests where fire exclusion or disease has created a buildup of hazardous fuels, prescribed fire cannot be safely applied, and pre-burn thinning is required. The subsequent use of fire can further reduce residual fuels and reintroduce this ecologically imperative process.

Management of Non-native Plants

The USDA maintains a list of noxious weeds rated from A to C based on the current degree of infestation of the species and the potential for eradication (USDA 2010). Fuel treatment approaches should always consider the potential for introduction or proliferation of invasive non-native species as a result of management actions. To learn more about how fire impacts various species, visit the USFS Fire Effects Information System here: https://www.fs.usda.gov/rmrs/tools/fire-effects-information-system-feis.

Fuel Breaks

Fire behavior in the DCCWPP planning area has been modeled using IFTDSS. This assessment provides estimates of flame length and rate of spread; the information should be used by land managers when prescribing treatments. Land managers are cautioned, however, that fuel breaks will not always stop a fire under extreme fire behavior or strong winds; these should only be seen as a mitigating measure and not a fail-safe method for fire containment. Furthermore, fuel break utility is contingent upon regular

maintenance, as regrowth in a fuel break can quickly reduce its effectiveness and vegetation in this ecosystem is known to quickly re-sprout and reestablish. Maintenance of existing breaks could be more cost efficient than installation of new features.

It is not possible to provide a standard treatment prescription for the entire landscape because fuel break dimensions should be based on the local fuel conditions and prevailing weather patterns. For example, in some areas, clearing an area too wide could open the landscape to strong winds that could generate more intense fire behavior and/or create wind throw.

Strategic placement of fuel breaks is critical to prevent fire from moving from wildland fuels into adjacent neighborhoods. For effective management of most fuels, fuel breaks should be prescribed based on the conditions in each treatment area. Some examples of this would be to place fuel breaks in areas where fuels are heavier or in areas with easy access for fire crews. In areas where the vegetation is discontinuous, fuel treatments may not be necessary. In this situation, it is best to leave the site in its current condition to avoid the introduction of more flammable, exotic species that may respond readily following disturbance.

Well-managed fuels reduction projects often result in ecological benefits to wildlife and watershed health. Simultaneously, planning and resource management efforts should occur when possible while reducing fuels to ensure that the land remains viable for multiple uses in the long term. The effectiveness of any fuels reduction treatment will increase over time with a maintenance and monitoring plan. Monitoring will also ensure that objectives are being met in a cost-effective manner.

COHESIVE STRATEGY GOAL 2: FIRE-ADAPTED COMMUNITIES

Goal 2 of the Cohesive Strategy and the NERAP (NRSC 2015) is Fire-Adapted Communities: Human populations and infrastructure can withstand a wildfire without loss of life and property. Management options for Goal 2, as outlined in the NERAP (NRSC 2015:11) include the following:

- Regional Option 2A: Focus on promoting and supporting local adaptation activities to be taken by communities such as increasing capacity of volunteer fire departments, passing ordinances, developing CWPPs, and joining Firewise Communities or other similar programs.
- Regional Option 2B: Focus on directing hazardous fuel treatments in the WUI. Focusing treatment efforts within the WUI should provide a broader area of effective protection and reduced risk when compared with focusing treatments on areas outside of the WUI.
- Regional Option 2C: Focus on promoting and supporting prevention programs and activities (targeting them toward reducing when and where fires occur).

In this DCCWPP, recommendations for fire-adapted communities include public education and outreach actions, as well as actions to reduce structural ignitability.

RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Just as environmental hazards require mitigation to reduce the risk of fire loss, so do the human hazards. Lack of knowledge, lack of positive actions, and negative actions all contribute to increased risk of loss in the WUI.

Many Dukes County residents do not understand the risk that wildfire poses to their communities. It is important to continually engage the community as a partner in order to expand wildfire mitigation options across land ownership (McCaffrey 2004, 2020; McCaffrey and Olsen 2012; Winter and Fried 2000). Table 4.4 lists recommendations for creating fire-adapted communities (structural ignitability and public education and outreach).

Two communities in Dukes County are already Firewise certified: Cuttyhunk and Hopps Farm Road Association (in West Tisbury) (NFPA 2021). In order to expand this throughout the County, residents would benefit from greater exposure to the Firewise Communities concept (https://www.nfpa.org/), fire-

adapted communities (https://fireadapted.org/), and Ready, Set, Go! Programs (https://www.wildlandfirersg.org/s/?language=en_US).

Firewise programs have been found to motivate residents to carry out defensible space and other actions within their community, empower residents to take control of addressing wildfire risk, improve community cohesion through collective actions, and encourage coordination of outside agencies (Evans et al. 2015). Continuing enthusiasm over long periods is difficult, however, particularly if a community "spark plug" or active coordinator leaves or steps down (Evans et al. 2015). Measures to improve sustainability of mitigation actions are included in Table 4.4.

Other methods to improve public education could include increasing awareness about fire department response and fire department resource needs; providing workshops at demonstration sites showing Firewise Communities landscaping techniques or fuels treatment projects; organizing community cleanups to remove green waste; publicizing availability of government funds for thinning and prescribed burning on private land; and, most importantly, improving communication between homeowners and local land management agencies to improve and build trust, particularly since the implementation of fuel treatments and better maintenance of existing treatments needs to occur in the interface between public and private lands.

RECOMMENDATIONS FOR REDUCING STRUCTURAL IGNITABILITY

Table 4.4 also provides a list of community-based recommendations to reduce structural ignitability that should be implemented throughout the DCCWPP planning area. Reduction of structural ignitability depends largely on public education that provides homeowners the information they need to take responsibility for protecting their own properties. A list of action items that individual homeowners can follow can be found below. Carrying out fuels reduction treatments on public land may only be effective in reducing fire risk to some communities; however, if homeowners have failed to provide mitigation efforts on their own land, the risk of home ignition remains high, and firefighter lives are put at risk when they carry out structural defense.

Preparing for wildland fire by creating defensible space around the home is an effective strategy for reducing structural ignitability. Studies have shown that burning vegetation beyond 120 feet of a structure is unlikely to ignite that property through radiant heat (Butler and Cohen 1996), but fire brands that travel independently of the flaming front have been known to destroy houses that had not been impacted by direct flame impingement. Hardening the home to ignition from embers, including maintaining vent coverings and other openings are strongly advised as measures to protect a home from structural ignitability. Education about managing the landscape around a structure, such as removing weeds and debris within a 30-foot radius and keeping the roof and gutters of a home clean, are two maintenance measures proven to limit combustible materials that could provide an ember bed and ignite the structure. Educating people about the benefits of proper maintenance of their property, includes pruning and trimming trees and shrubs and, where warranted, the removal of trees and other vegetation, and using Firewise Communities landscaping methods on their property, is also essential for successful household protection. Eastern-specific Firewise planting is described and supported on the Fire Performance Plant Selector webpage: http://www.fire.sref.info/.

It is important to note that no two properties are the same. Homeowners and communities are encouraged to research which treatments would have the most effect for their properties. Owners of properties on steep slopes, for example, should be aware that when constructing defensible space, they must factor in slope and topography, which would require extensions to the conventional 30-foot recommendations. More detailed information on reducing structural ignitability can also be found in Appendix G (Homeowner's Guide).

Table 4.4 lists public education and outreach and structural ignitability projects recommended for implementation in the County.

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Firewise/Ready Set Go! Workshops †	County-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	State and local MVC HOAs Fire Depts Towns DCR Conservation Orgs	Offer hands-on workshops to highlight individual home vulnerabilities and how-to techniques to reduce ignitability of common structural elements. Examples include: -Installing metal flashing between house and fence or deck -Installing wire mesh over eaves, vents, and under decks Initiate neighborhood wide home assessments that include groups of neighbors participating with the assessor to learn from each other's homes. Homeowners get a better understanding of home hardening by viewing a home other than their own and often feel more comfortable asking questions as a group. Utilize a train-the-trainer model. Develop a team of trained citizens that could perform hazard assessments within their community. Seek funding to pay volunteer fire departments to assist with the train-the-trainer concept or consider hiring a contractor to provide training. Focus workshops on known hazards associated with property types in the County, e.g., addressing shake shingles roofing and siding. Provide realistic solutions to homeowners to maintain cultural landscape while addressing needed fire hazard mitigation. Encourage participation by towns in Firewise activities (*Aligns with the 2020 Dukes County HMP*).	Empower homeowners to take the most effective action to reduce structural ignitability	Within the next year	H	Annual review of number of workshops or home assessments completed. Set goals for following year.	Firewise Communities Programs Hazard Mitigation Grant www.nfpa.org, Ready, Set, Go! Grants Fire Prevention and Safety grants SAFER grants National Fire Protection Association Agency budgets

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Increase scope of outreach and face to face opportunities with the general public to highlight the "real" risk of wildfire and mitigation measures. †	County-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	MVC State and Local	Review existing programs (Ready, Set, Go!, Firewise) for suitability of existing fire prevention materials and where necessary fund development of unique adapted materials and presentations to highlight how a fire might affect particular groups within the community while promoting the fire-adapted community framework. Promote the Fire Adapted Communities Learning Network (https://fireadaptednetwork.org/about/). Highlight the fact that fire is impacting protection of values at risk and sensitive environmental concerns like habitat management. The potential to hire a communications officer for the Island who should pursue continuous and repeat interactions with residents to generate greater mitigation actions. Utilize local events, like the Martha's Vineyard Agricultural Fair for outreach on wildfire mitigation. Have a staffed display at the fair, along with a brush-breaking truck, and some photographs, videos, and examples of the types of work being proposed and being accomplished. Utilize Smokey Bear to engage families. This can be repeated annually. Increase community education and outreach about climate change hazards, emergency preparedness and sheltering options. Establish a Dukes County Citizens Academy for education of wildfire mitigation, response, and other emergency preparedness (*Aligns with the 2020 Dukes County HMP*). (*Aligns with 2020 MSFAP Strategy 34: Provide leadership for public programs, such as Firewise, Tree Campus USA, Tree City USA, and Tree Line USA.*)	Educate public about the environmental benefits of habitat management and fuels reduction Engage a broad cross-section of the population instead of attracting only those residents who are already engaged in fire prevention and risk reduction activities. Social science has shown that face-to-face engagement is the most effective way to generate action. Deliver a clear and consistent message that impacts of wildfire are far-reaching and that it is in the best interest of a diverse set of stakeholders to become involved in planning and preparing for fire.	Within the next 5 years.	M	Developing a regular meeting cadence.	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants National Fire Protection Association EPA Environmental Education Grants Agency budgets National Fire Plan (NFP) Grants

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Carry out public outreach to introduce and build engagement in implementation of the CWPP †	County-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	MVC State and Local Conservation Orgs	Implement public meeting program across the island. Develop online content- develop a CWPP Story Map to share content, increase transparency and serve as a one-stop-shop for all wildfire mitigation activities. (*Aligns with 2020 MSFAP Strategy 28: Create and support dynamic multimedia approaches to communicate information with stakeholders and the public.*) Attend public events and share Composite Hazard-Risk Assessment information and gather input. (*Aligns with 2020 MSFAP Strategy 6: Increase community participation in fire adapted community programs in high-risk areas.*)	Increase public understanding of wildfire risk and promotes the use of the plan to address that risk.	Summer 2022	H	Annual review documenting number of events held. Assessment of use of online content (Story Map)	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants EPA Environmental Education Grants National Fire Protection Association National Fire Plan (NFP) Grants Agency budgets
Establish Community-Lead Wildfire Composite Hazard-Risk Assessment Training	County-wide	Town Boards and Commissions Residents HOAs	Encourage community members and leaders to complete the online Community Wildfire Composite Hazard-Risk Assessment training https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Firewise-USA/Online-learning-opportunities/Community-Wildfire-Risk-Assessment-Tutorial This is a 30-minute online training that will teach community members how to: - Identify environmental features that impact ignition resistance in a wildfire - Record finding in the Firewise USA Wildfire Community Composite Hazard-Risk Assessment template using environmental observations Use recorded findings to draft a multi-year action plan to reduce site risk from wildfire	Empower homeowners to reduce structural ignitability, understand community risk levels, and plan for wildfire prevention	Within the next year	H	Annual review of training completion and action plan	N/A – Free training

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Adopt common defensible space standards throughout the county.	County-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	Town Boards and Commissions MVC HOAs	Requires planning board level policy change to develop at least a standard of practice. Work with towns to revise local subdivision and building regulations to require fire-proof materials in areas at risk from wildfire (*Aligns with the 2020 Dukes County HMP*). Increase education directly to towns and HOAs on the benefit of defensible space. Look to propose alternative materials (*Aligns with the 2020 Dukes County HMP*). Initiate defensible space cost-sharing programs. Work with the local conservation commissions, planning boards, zoning boards, etc. to create bylaws that create defensible space codes and ordinances. Provide property tax incentives for defensible space actions. Work with insurance companies to determine the potential to provide incentives for defensible space associated with reduced insurance premiums. Work with local NGOs and other groups to coordinate and increase capacity for green waste pick-up including feasibility of use for compost or landscaping (*Aligns with the 2020 Dukes County HMP*).	Reduce significant hazard related to poor defensible space across the county.	Within the next 5 years.	H	Annual review to determine achievement in creating standards. Identify hurdles and work to overcome.	EPA Environmental Education Grants Firewise Communities Programs National Fire Plan (NFP) Grants
Mitigate hazards associated with seasonal properties	County-wide Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment.	Seasonal property owners, HOAs	Initiate a campaign that encourages the following: -Stay active in preparing for wildland fire when absent. -Plan to have someone maintain property when absent. -Speak with neighbors to develop an action plan in the event of a fire. -Establish phone trees	Reduce the contribution that poorly maintained seasonal properties could have on increasing wildfire hazard.	Within the next 5 years.	M	Annual review to determine achievement in creating standards. Identify hurdles and work collaboratively to overcome.	Forest Stewardship Program and Community Forest Stewardship Implementation Grant National Fire Plan (NFP) Grants

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Provide printed list of mitigation measures to homeowners with different scales of actions.	All residents would be encouraged to participate. Specific effort to be focused on seasonal residents	MVC DCR	Utilize Ready, Set, Go! and other literature developed by the DCR where possible. Utilize list of action items broken down by cost (see list, pages 69 and 70)	Educate homeowners on the actions that they can take to be proactive with fire safety.	Summer 2022	H	Annual review-report on how many residents have been reached. Complete NFPA 1144 assessments every 5 years to quantify reduction in risk associated with construction material mitigations.	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants EPA Environmental Education Grants Agency budgets
Homeowner's guide	County-wide	MVC DCR	Develop a handbook that gives locally relevant and detailed information to help residents be more prepared for wildfire, including a defensible space checklist specific to local structural and wildland fuel considerations. Appendix G provides an editable guide that can be tailored to needs across the island.	Give residents detailed and locally specific tools that they can use to improve preparedness	Within the next 5 years.	M	Annual review documenting how many guides have been distributed. Update guide every 5 years to incorporate the latest guidelines, policy and science.	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants National Fire Protection Association EPA Environmental Education Grants Agency budgets
Firewise Outreach	County-wide	Local fire departments MVC DCR Conservation Orgs	Provide communities and residents a laundry list of Firewise mitigation measures that could be applied to reduce risk. Strive towards meeting some of the goals of Firewise. Look for opportunities for certification of more Firewise communities. Have conservation organizations include relevant guidelines in their newsletters and other communications.	Builds capacity for fire adapted communities.	Within the next 5 years.	M	Document the number of new Firewise communities.	Firewise Communities Programs

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Accurately represent fire response capability	County-wide	Local fire departments	Greater transparency and facts are needed regarding fire dept capacity to respond to a large fire on the island. The resources have not yet been tested. Pre-planning and mock incidents need to be used to test and report back to the public.	Communicate an accurate assessment of fire response capacity	Within the next 2 years	M	Document the number of mock incidents carried out.	Funding for Fire Departments and First Responders Volunteer Fire Assistance Program Staffing for Adequate Fire and Emergency Response (SAFER) Staffing for Adequate Fire and Emergency Response (SAFER)
Centralize communications of wildfire risk and mitigation.	County-wide	MVC DCR	Hire an outreach and communications person on Martha's Vineyard to provide wildfire mitigation outreach to groups outside of fire season and to be available as a public information officer during incidents. (Ensure Portuguese translations are available.) This individual should pursue continuous and repeat interactions with residents to generate greater mitigation actions and continuity of messaging.	Enhance public outreach to improve adoption of fire adapted community philosophy.	Within the next 2 years	M	Review position description and roles annually to adjust role as needed.	Pre-disaster Mitigation Grant Program Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants National Fire Protection Association EPA Environmental Education Grants National Fire Plan (NFP) Grants Agency budgets

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Media Involvement	County-wide	MVC Private Landowners Conservation Orgs	Develop a local newspaper column that provides fire safety information, promotional information for VFDs, fire announcements, and emergency planning.	Protect communities and infrastructure through increasing public awareness and providing a channel for information regarding emergency fire response.	Monthly column year-round	M	Revisit need annually as community becomes more educated on fire mitigation and risk.	Firewise Communities Programs Ready, Set, Go! Grants Agency budgets
Increase signage/replace or augment existing signage	County-wide	MVC DCR Conservation Orgs	Utilize existing signage to spread fire prevention message along highways and in public open space areas (trailheads, info kiosks) to reduce human ignitions. Promote the use of existing signs at firehouses and other locales to display fire prevention information, safety messages and fire danger rating. Utilize National Fire Danger Rating System ratings (Smokey Bear sign). Ensure all signage is available in duplicate Portuguese translation. Display signage on kiosks at various conservation properties.	Protect communities and infrastructure by raising awareness of local citizens and those visiting the island about actions that can prevent fire.	Summer 2023	H	Document number of signs installed annually. Implement annual maintenance regime.	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants National Association of State Foresters Grants Agency Budgets
Improve and enhance visibility of address markers	County-wide Prioritize areas identified in the NFPA assessment as having poor signage	MVC DCR	There is a need to educate homeowners on the law regarding maintaining good visibility of address markers. Implement program to replace existing house number markers with reflective markers that meet consistent standard. Education on proper placement and maintenance of address markers.	Improves fire response times and assists out-of-town responders who are not familiar with the local area, especially at night. Would need funding to implement program. Could consider private contributions.	Summer 2023	M	Document number of house markers distributed. Complete NFPA 1144 assessments after 2 years to determine change in behavior.	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants National Fire Protection Association EPA Environmental Education Grants

Table 4.4. Recommendations for Creating Fire-Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Raise awareness of fire prevention at a young age	County-wide	MVC VFDs Town/ County DCR	Introduce wildfire prevention into school curriculum. Work with fire departments, school board and Public Information Officers to organize kid-focused travelling workshops.	Protect communities and infrastructure through increased awareness.	Within 5 years	M	Document number of workshops held on an annual basis. Revise curriculum every 5 years to align with new policy/ guidance.	Firewise Communities Programs Ready, Set, Go! Grants Fire Prevention and Safety grants Student Awareness of Fire Education (S.A.F.E.) and Senior SAFE

† = Highest priority

Action Items for Homeowners to Reduce Structural Ignitability

Low or No Cost Investment (<$50)	Regularly check fire extinguishers and have a 100-foot hose available to wet perimeter.
	Maintain defensible space for 30 feet around home. Work with neighbors to provide adequate fuels mitigation in the event of overlapping property boundaries.
	Make every effort to keep lawn mowed and green during fire season.
	Screen vents with non-combustible meshing with mesh opening not to exceed nominal ¼-inch size.
	Ensure that house numbers are easily viewed from the street.
	Keep wooden fence perimeters free of dry leaves and combustible materials. If possible, non-combustible material should link the house and the fence.
	Keep gutters free of vegetative litter. Gutters can act as collecting points for fire brands and ashes.
	Store combustible materials (firewood, propane tanks, grills) away from the house; in shed, if available.
	Clear out materials from under decks and/or stacked against the structure. Stack firewood at least 30 feet from the home, if possible.
	Reduce your workload by considering local weather patterns. Because prevailing winds in the area are often from the west-southwest, consider mitigating hazards on the west corner of your property first, then work around to cover the entire area.
	Seal up any gaps in roofing material and enclose gaps that could allow fire brands to enter under the roof tiles or shingles.
	Remove flammable materials from around propane tanks.
Minimal Investment (<$250)	When landscaping in the home ignition zone (HIZ) (approximately 30 feet around the property), select non-combustible plants, lawn furniture, and landscaping material. Combustible plant material like junipers and ornamental conifers should be pruned and kept away from siding. If possible, trees should be planted in islands and no closer than 10 feet to the house. Tree crowns should have a spacing of at least 18 feet when within the HIZ. Vegetation at the greatest distance from the structure and closest to wildland fuels should be carefully trimmed and pruned to reduce ladder fuels, and density should be reduced with approximately 6-foot spacing between trees crowns.
	Box in eaves, attic ventilation, and crawl spaces with non-combustible material.
	Work on mitigating hazards on adjoining structures. Sheds, garages, barns, etc., can act as ignition points to your home.
	Enclose open space underneath permanently located manufactured homes using non-combustible skirting.
	Clear and thin vegetation along driveways and access roads so they can act as a safe evacuation route and allow emergency responders to access the home.
	Purchase or use a National Oceanic and Atmospheric Administration weather alert radio to hear fire weather announcements.

Moderate to High Investment (>$250)	Construct a non-combustible wall or barrier between your property and wildland fuels. This could be particularly effective at mitigating the effect of radiant heat and fire spread where 30 feet of defensible space is not available around the structure.
	Construct or retrofit overhanging projections with heavy timber that is less combustible.
	Replace exterior windows and skylights with tempered glass or multilayered glazed panels.
	Invest in updating your roof to non-combustible construction. Look for materials that have been treated and given a fire-resistant roof classification of Class A. Wood materials are highly combustible unless they have gone through a pressure-impregnation fire-retardant process.
	Construct a gravel turnaround in your driveway to improve access and mobilization of fire responders.
	Treat construction materials with fire-retardant chemicals.
	Install a roof irrigation system.
	Replace wood or vinyl siding with nonflammable materials.
	Relocate propane tanks underground.

COHESIVE STRATEGY GOAL 3: WILDFIRE RESPONSE

Goal 3 of the Cohesive Strategy and the NERAP is Wildfire Response: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions. Management options for Goal 3, as outlined in the NERAP (NRSC 2015:11) include the following:

- Regional Option 3A: Improve the organizational efficiency and effectiveness of the wildland fire community (pre-suppression and preplanning, administration). Areas to address include:
  - Developing MOUs and MOAs
  - Standardizing and streamlining training
  - Radio compatibility and interoperability
  - Appropriate suppression and detection responsibilities regardless of land ownership through agreements or contracts
  - Sharing of personnel (co-funding or contracting)
- Regional Option 3B: Increase the local response capacity for initial attack of wildfires.
- Regional Option 3C: Further develop shared response capacity for extended attack and managing wildfire incidents with long-duration fire potential.

This section provides recommended actions that jurisdictions within Dukes County could undertake to improve wildfire response, such as improving fire department resources, addressing ingress and egress concerns and enhancing access to water supply.

RECOMMENDATIONS FOR IMPROVING FIRE RESPONSE CAPABILITIES

Educating the public so they can reduce its dependence on fire departments is essential because these resources are often stretched thin due to limited personnel.

Table 4.5 provides recommendations for improving firefighting capabilities. Many of these recommendations are general in nature.

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Develop a coordinated approach between fire jurisdictions and water supply agencies to identify needed improvements to the water distribution system, initially focusing on areas of highest wildfire hazard as determined in the Composite Hazard-Risk Assessment and areas with limited or no existing water supply.†	County-wide, prioritizing: -Aquinnah -Chilmark -West Tisbury (no water supply) -Edgartown (almost no water supply) -Oak Bluffs -Tisbury	Towns and County Conservation Orgs	Initiate a detailed study of feasible locations for water development improvements. Install dry hydrants to pump pond water for firefighting. If there is no pond nearby, install a water source. Install hand pumps or other methods independent of the grid for accessing private well water. Coordinate with conservation organizations to strategically locate water supply sources in different areas. (*Aligns with the 2020 Dukes County HMP.*)	Improve fire-fighting response if water is more readily available or closest locations could be identified on a GIS map on a tablet/computer. Alleviates public and agency concern for limited water supply in remote areas	Within 2 years	H	Convene annually Document number of meetings held Document number of actions taken	Funding for Fire Departments and First Responders Volunteer Fire Assistance (VFA) Program Catalog of Federal Funding Sources; Water Resources Agency Budgets
Address emergency access and evacuation concerns related to narrow road widths. †	County-wide	Town governments/ HOAs	Address existing regulations on road maintenance to improve emergency access and evacuation. Overcome obstacles to road maintenance by convening a working group to work with HOAs on restrictions to road maintenance measures. Work with town managers to identify bylaws that favor emergency access provisions. Work with towns to improve road width issues and create pull-outs in areas of single road width that would impede access by emergency vehicles.	Reduce fire response times and enhance safe egress by residents	Spring 2022	H	Annual review of progress made on addressing restrictive measures.	Agency Budgets Pre-disaster Mitigation Grant Program Catalog of Federal Funding Sources; Land Resources

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Bolster fire department capacity with centralized support. †	County-wide	Town governments MVC County	Hire a full-time emergency response planner, to help coordinate among the towns and to reduce vulnerability from current dependence on volunteer responders. Task with leading assessment of town/county wide emergency communications. (*Aligns with the 2020 Dukes County HMP.*)	Enhance wildfire response	Spring 2022	H	NA	Funding for Fire Departments and First Responders Volunteer Fire Assistance (VFA) Program National Fire Plan (NFP) Grants Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) GSA-Federal Excess Personal Property
Conduct research to investigate better means of utilizing salt water for fire suppression purposes.	County-wide	DCR State	There is a need to learn about the potential to use salt water for fire suppression activities where freshwater availability is restricted. While salt water is already used when needed, there may be better systems that would reduce the salt stress on vegetation, need for thorough cleaning of equipment, etc. Investigate suitable equipment and maintenance requirements. Complete a cost-benefit analysis for more regular use of salt water.	Alleviates public and agency concern for limited water supply in remote areas thereby improving fire-fighting capability. Enhances firefighter safety. Enhances protection of life and property.	Within 5 years	M	NA	Funding for Fire Departments and First Responders Volunteer Fire Assistance (VFA) Program Catalog of Federal Funding Sources; Water Resources Agency Budgets

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Identify vulnerable populations who may require assistance during a wildfire or assistance in effectively mitigating wildfire risk around their homes/ businesses (i.e., critical facilities – daycare, medical facilities, school, mass care center, elderly housing)	County-wide, with a focus on environmental justice (EJ) communities.	MVC, State (EEA) Towns Tribes	Convene a working group to collectively identify and document vulnerable populations (elderly, disabled, low income, indigenous populations) who may need additional help to mitigate home hazards. Seek grant opportunities to support assistance for vulnerable populations. Coordinate with the EEA on funding opportunities, updated EJ data, strategies, etc. (*Aligns with 2020 MSFAP Strategy 38: Support programs that engage underserved communities and increase diversity, equity, and accessibility in forestry and urban forestry.*)	Aids in safe evacuation of residents, those with evacuation assistance needs and addresses a need to assist vulnerable populations across the State.	Summer 2022	H	Document number of meetings held to address these issues.	Student Awareness of Fire Education (S.A.F.E.) and Senior SAFE Agency Budgets
In order to reduce the impacts of drought and wildfire, install new public water supplies and water supply lines within the State Forest	State Forest	DCR in conjunction with Towns/water utilities	Work with local water utility authority to conduct a feasibility study on adding in public water supply lines within the state forest.	Alleviates public and agency concern for limited water supply in remote areas	Within 5 years	M	NA	Catalog of Federal Funding Sources; Water Resources National Association of State Foresters Grants Agency Budgets

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Purchase smaller vehicles and additional corresponding mobile equipment to access narrow roads	County-wide, prioritizing: -West Tisbury -Aquinnah -Chilmark -Edgartown	Fire Depts	Develop a list of the vehicles needed to increase the safety and capacity. Towns should show the cost-benefit analysis of creating turnouts vs. purchasing smaller vehicles when approaching HOAs/Roadwday Association	Improve fire-fighting response if smaller more agile vehicles are available to navigate the narrow unimproved roads	Within 2 years	H	NA	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) GSA-Federal Excess Personal Property

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Solidify a coordination plan for all fire departments	County-wide fire departments	Collaborative effort across all Fire Departments and DCR	Utilize and build upon (as needed) an inventory of existing wildland equipment across all Fire Departments Identify roles and responsibilities across all Fire Departments to optimize available equipment, training, and qualifications and identify areas where joint investment and maintenance of critical equipment and infrastructure would be mutually beneficial amongst departments. Working collaboratively, the departments would be able to serve individual roles on a fire, utilizing the equipment they have. Identify minimum equipment and apparatus needs to ensure that each department can maintain a certain level of self-sufficiency for initial attack. Look into assigning coordination tasks to a new regional emergency manager position. Stay on top of potential radio upgrades that will facilitate communications across departments and agencies. (*Aligns with 2020 MSFAP Strategy 62 - Work with federal and state agencies, tribal entities, and partners to promote training programs and qualification opportunities for wildland fire resources in Massachusetts*)	Helps identify gaps of equipment needs, identifies redundancy in apparatus, ensure self-sufficiency while optimizing resources through collaboration. Facilitates communication and collaboration between the fire departments.	Summer 2022	H	Initiate a standing annual review and annual meetings of departments.	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) Agency Budgets

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Initiate an annual pre-fire coordinated training/wildland fire drills to improve communication between departments and ensure all personnel are familiar and competent using all equipment	County-wide	All Fire Departments	Develop WUI pre-plans and accompanying evacuation plans for high-risk communities as identified in the Composite Hazard-Risk Assessment. Implement mock evacuations on communities identified as high risk. Develop protocols to address weaknesses.	Helps to identify resource needs. Helps to enhance fire response.	Spring 2022	H	At annual training set goals and review goals on a 6-month basis.	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) Agency Budgets

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Increase the number of "red-carded" individuals in each fire department	County-wide	All Fire Departments	NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. Recruit from conservation organizations. Use online forum to facilitate scheduling. Work with State and federal agencies to develop evening and weekend courses for volunteers. Pursue online training programs and have trainees work with an in-house trained mentor to complete training. Facilitate Annual refresher participation by having in-house refreshers available or convene departments to have a Duke County wide refresher. Utilize available funds for volunteers to participate in annual Wildfire Academy. Educate fire departments on the availability of volunteer fire assistance grants that could be used to purchase equipment and support training	Add more capacity to the local fire departments and provide for safe and effective wildfire response	Spring 2022	H	Annual review of training opportunities and barriers to attendance	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) Agency Budgets

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Provide minimum wildland personal protective equipment (PPE) for all firefighters in each department	County-wide	All Fire Departments	Seek grant money to be spent on acquisition of PPE. Task a member of each department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by island fire departments.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) Agency Budgets GSA-Federal Excess Personal Property
Identify opportunities for NGO volunteer pool to aid fire departments.	County-wide	NGOs Fire departments	Develop a list of resources including capable staff from Island NGOs that can be included in a volunteer pool. Volunteers could be utilized for office tasks and fire-fighting tasks, if trained and qualified (i.e., fire reporting, paperwork, grant applications and outreach to public).	Enhance fire response by reducing administrative load of fire departments.	Spring 2022	H	Annual meeting to assess success of program and establish additional roles.	Volunteer
Require that all forest/land management plans for NGOs include a fire mitigation and response section.	County-wide	All agencies	Convene meeting to identify fire mitigation and response needs to be addressed. Determine agency requirements. Establish outline/template and draft directions for completion of those sections. Provide a QA/QC group for review and approval.	Improve communication between NGOs, the towns, and fire departments, that could be built into management plans.	Within the next 5 years.	M	Annual meeting to assess success of initiative and overcome obstacles.	Agency Budgets

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Develop and coordinate an Island/County wide comprehensive emergency preparedness, response, and recovery plan.	County-wide	Collaborative effort, led by MVC	Create an online dashboard for use by emergency management agency decision support. Dashboard would be created in a Story Map or "Hub" format and would include: -Break dashboard into sections of the emergency management cycle: preparedness, response, recovery -Identify roles and responsibilities for each agency/partner under each section of the cycle -Include best management practices for each section of the cycle -Include coordination plan for interagency communications before, during and after an event -Include a tracking module to track actions needed and status -include a funding matrix to support implementation of actions -align actions as closely as possible with the County and State HMP	Improve fire response and readiness across the island. Could be used to initiate an assessment of the Island-wide emergency management protocols. Could be used to help meet 2020 HMP goal of establishing a regional center for emergency information collection, reception, dissemination before, during and after fire.	Summer 2022	H	Would be an active and live platform, updated in real time and reviewed on an annual basis	Pre-disaster Mitigation Grant Program Specific EPA Grant Programs Catalog of Federal Funding Sources; Land Resources Forest Stewardship Program and Community Forest Stewardship Implementation Grant

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Optimize on-island resources to combat potential slow response times for off-island mutual aid resources	County-wide	Collaborative effort	Convene a working group tasked with the following: -Inventory apparatus to identify equipment needs to improve initial attack. -Utilize pre-season planning to identify roles for departments to address initial attack. -Draft up scenarios and contingencies in the event of slow response by off-island resources.	Improve public and firefighter safety	Spring 2022	H	Annual Meeting to review progress and report back on weaknesses.	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG) Agency Budgets GSA-Federal Excess Personal Property
Improve situational awareness for fire detection and response	County-wide Aligns with MSFAP	Collaborative effort DCR	Convene a working group tasked with the following: -Strengthen fire tower detection program (*Aligns with 2020 MSFAP Strategy 19***). -Enhance fire weather and fuels intelligence by ensuring the optimum data sources are being used in modeling and decisions. -Utilize available technology and national platforms for projecting fire danger ratings. -Train operations staff on use of wildland fire decision support tools (WFDSS). -Use fire weather outlooks to match fire preparedness with fire danger needs. (*Aligns with 2020 MSFAP Strategy 61**)	Improve public and firefighter safety	Spring 2022	H	Annual Meeting to review progress and report back on weaknesses.	Volunteer Fire Assistance (VFA) Program Staffing for Adequate Fire and Emergency Response (SAFER) The Fire Prevention and Safety Grants (FP&S) Assistance to Firefighters Grants (AFG)

Table 4.5. Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/ Maintenance Requirements	Funding Sources
Reduce reliance on electrical grid and communications towers.	County-wide	Town governments	Develop micro-grid(s) and communications backup such as batteries for DAS communications and stationing a C.O.W (communications on wheels) on Martha's Vineyard (*Aligns with the 2020 Dukes County HMP*)	Enhance wildfire response and adequately address potential communication technology failures.	Spring 2022	H	NA	Pre-disaster Mitigation Grant Program Agency Budgets
Be proactive in addressing future wildfire challenges with climate change.	County-wide	Town governments MVC County	Convene a working group tasked with the following: • Assess impact of climate change on wildfire potential through modeling of fire behavior under various climate scenarios. • Establish fuel treatment plans to mitigate climate related influences on wildfire risk in existing vegetation communities. • Establish plans and build infrastructure for water supply needs to alleviate future drought emergencies. Establish data gathering, analysis and consensus building to establish an Island-wide comprehensive plan for adaptations to climate change. (*Aligns with the 2020 Dukes County HMP and in forthcoming MV & Gosnold Climate Action Plan*).	Enhance wildfire response as conditions change.	Spring 2022	M	Meet annually to review plans and assess status of wildfire risk. Re-run the fire behavior analysis to determine change in wildfire risk.	Pre-disaster Mitigation Grant Program Specific EPA Grant Programs Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program

† = Highest priority; EEA = Massachusetts Executive Office of Energy and Environmental Affairs

*Support municipal fire agencies across the state with quality assistance in the form of detection, suppression, prevention, intelligence sharing and grants;

**Maintain a strong fire tower detection program, providing suppression ground resources and facilitating helicopter operations, providing sound fire weather and fuels intelligence data, and assisting fire officers with wildfire management tactics

POST-FIRE RESPONSE AND REHABILITATION

Federal, state, and local post-fire response is often overlooked during the wildfire planning process. Dukes County has been fortunate to avoid catastrophic wildfire in recent years.

There are many facets to post-fire recovery, including but not limited to the following:

- Ensuring public health and safety—prompt removal of downed and hazard trees, addressing watershed damage, and mitigating potential flooding.
- Rebuilding communities and assessing economic needs—securing the financial resources necessary for communities to rebuild homes, business, and infrastructure.
- Restoring the damaged landscape—restoration of watersheds, soil stabilization, and tree planting.
- Reducing fire risk in the future—identifying hazard areas and implementing mitigation.

Recovery of the vegetated landscape is often more straightforward than recovery of the human environment. Assessments of the burned landscape are often well-coordinated through the use of interagency crews who are mobilized immediately after a fire to assess the post-fire environment and make recommendations for rehabilitation efforts.

For the community impacted by fire, however, there is often very little planning at the local level to guide the return of community members after the fire. Residents impacted by the fire need assistance making insurance claims; finding temporary accommodation for themselves, pets, and livestock; rebuilding or repairing damaged property; removing debris and burned trees; stabilizing the land for construction; mitigating potential flood damage; repairing infrastructure; reconnecting to utilities; and mitigating impacts to health. Oftentimes, physical impacts can be mitigated over time, but emotional impacts of the loss and change to surroundings are long-lasting and require support and compassion from the community.

Large intense fires may be rare in the county, but preparedness in the event of a significant fire is important in any region. The following provides a general guide to navigating the post-fire environment for homeowners and stakeholders.

AFTER THE FIRE

Returning Home

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

Even if the fire did not damage your house, do not expect to return to normal routines immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Request that the fire department or utility companies turn the utilities back on once the area is secured. Similarly, water supply systems may have been damaged; do not drink from the tap until you have been advised that it is safe to do so. Finally, keep a “fire watch”; look for smoke or sparks in houses and other buildings.

Note any changes of address with the U.S. Postal Service, banks, utilities, credit card companies, and newspapers. If you do stay elsewhere, try to locate any legal documents, medications, valuables, etc. before relocating.

If your home is safe to enter, vacuum all surfaces, clean any airflow filters, and remove soot and smoke from walls if possible. Clean all mattresses and kitchenware. Any perishables exposed to heat should not be consumed.

For additional safety information, see https://aftertheflames.com/.

Insurance Claims

Your insurance agent is your best source of information as to the actions you must take in order to submit a claim. Your insurance claim process will be much easier if you photographed your home and valuable possessions before the fire and kept the photographs in a safe place away from your home. Most if not all of the expenses incurred during the time you are forced to live outside your home could be reimbursable. These could include, for instance, mileage driven, lodging, and meals. Keep all records and receipts. Don't start any repairs or rebuilding without the approval of your claims adjuster. Beware of predatory contractors looking to take advantage of anxious homeowners wanting to rebuild as quickly as possible. Consider all contracts very carefully, take your time to decide, and contact your insurance agent with any questions. If it appears to be a large loss, consider whether you should hire a public adjuster that is licensed by the state department of insurance who will represent and advocate for you as the policyholder in appraising and negotiating the claimant's insurance claim to ensure you get the best outcome and recovery from your insurance company. Most public adjusters charge a small percentage of the settlement that is set by the state and primarily they appraise the damage, prepare an estimate and other claim documentation, read the policy of insurance to determine coverages, and negotiate with the insurance company's claims handler. If you are not insured, contact the American Red Cross: https://www.redcross.org/get-help/disaster-relief-and-recovery-services/recovering-financially.html.

Community Safety: Post-Fire Floods and Debris Flows

There are numerous natural hazards after a wildfire. Perhaps most dangerous are potential flash floods and landslides following rainfall in a burned area upstream from a community. Wildfires increase risk of flooding because burned soil is unable to absorb rainfall and it becomes hydrophobic. Even small rainfall can cause a flash flood, transporting debris and damaging homes and other structures. Listen and look for emergency updates, weather reports, and flash flood warnings. Develop an emergency plan with your family and avoid areas likely to flood (National Oceanic and Atmospheric Administration 2015). Checklists to prepare for flooding are available at: https://www.wrh.noaa.gov/lox/hydrology/files/DebrisFlowSurvivalGuide.pdf.

Mobilizing Your Community

When your community is safe and capable of monitoring potential storms, coordination for recovery efforts can begin. Depending on community size, one person or a team of post-fire coordinators can be appointed to work directly with agencies or teams helping with wildfire response. It is important that this person have demonstrated management and computer skills, community knowledge, and experience with federal and state agencies. The post-fire coordinator(s) can delegate any identified recovery tasks or needs to volunteers; however, it may be helpful to specifically appoint a volunteer coordinator.

The recovery coordinator should become familiar with representatives from local, state, and government agencies that will be helping with coordination or funding of post-fire recovery. The following resources may be helpful for the post-fire and volunteer coordinators:

- Massachusetts Department of Homeland Security and Public Safety
- DCR
- Massachusetts Bureau of Forest Fire Control and Forestry
- Federal Emergency Management Agency (FEMA)
- American Red Cross
- Continuing Authorities Program & Emergency Flood Protection: U.S. Army Corps of Engineers
- Emergency Watershed Protection: Natural Resources Conservation Service
- Food Assistance and Farm Service Agency: USDA

- Conservation Districts
- USFS
- Natural Resources Conservation Service, including Earth Team
- Disaster Distress Helpline
- After the Flames - compilation of post-fire resources: https://aftertheflames.com/resources/

Any large wildfire will also involve an Incident Command System (ICS), an appropriately sized team assigned to aid in post-fire recovery. Learn more at https://www.nps.gov/articles/wildland-fire-incident-command-system-levels.htm.

The following should be considered when assessing community needs:

- Are there paid staff that will be dedicated to helping with recovery?
- Who is familiar with the ICS? Who has technical skills to help with post-fire treatments? Which community members will be able to write grants and apply for assistance? Who has accounting skills? Management skills?
- How much money will the community need? How can you acquire it?
- How will the community address immediate needs such as shelter, food, and health care? Counseling and mental health?

Communication

After a team is assembled and immediate tasks are identified, find the best way to spread information in your community. You may distribute flyers, set up a voicemail box, work to find pets or livestock that have been displaced, develop a mailing list for property owners, hold regular public meetings, etc. It is important that a long-term communications plan is developed.

Post-Fire Rehabilitation and Resources

Post-fire land rehabilitation is critical to protect your community from flooding, erosion, and debris flows. Your community response coordinator can identify a team of federal, state, and local agencies to assess impacts and prioritize areas for treatment. It is important that this treatment team include experts such as foresters, engineers, and hydrologists.

Examples of potential post-fire treatments include:

- Hillside stabilization (for example, placing bundles of straw parallel to the slope to slow erosion)
- Hazard tree cutting
- Felling trees perpendicular to the slope contour to reduce runoff
- Mulching areas seeded with native vegetation
- Stream enhancements and construction of catchments to control erosion, runoff, and debris flows
- Fencing people (and livestock) out of unstable areas
- Planting or seeding native species to limit spread of invasive species.

The effectiveness of various treatments is described at https://www.fws.gov/fire/downloads/ES_BAR/Post-Fire_Hillslope_Treatment_Synthesis.pdf.

Additional post-fire treatment information can be found at https://aftertheflames.com/resources/

Specific Treatment Details

Hillslope Treatments

Cover Applications:

- Dry mulch provides immediate ground cover with mulch to reduce erosion and downstream flow.
- Wet mulch (hydromulch) provides immediate cover to hold moisture and seeds on slopes using a combination of organic fibers, glue, suspension agents, and seeds (most effective on inaccessible slopes).
- Slash spreading provides ground cover to reduce erosion by felling trees in burned areas.
- Seeding reduces soil erosion over time with an application of native seed mixtures (most successful in combination with mulching). Breaking up and loosening topsoil to break down the hydrophobic layer on top of the soil is also effective.

Erosion Barrier Applications:

- Erosion control mat: organic mats staked on the soil surface to provide stability for vegetation establishment.
- Log erosion barrier: trees felled perpendicular to the hillslope to slow runoff.
- Fiber rolls (wattles): rolls placed perpendicular to the hillslope to reduce surface flows and reduce erosion.
- Silt fencing: permeable fabric fencing installed parallel to the slope contour to trap sediment as water flows down the hillslope.

Channel Treatments

- Check dam: small dams built to trap and store sediment in stream channels.
- In-channel tree felling: felling trees in a staggered pattern in a channel to trap debris and sediment.
- Grade stabilizer: structures made of natural materials placed in ephemeral channels for stabilization.
- Stream bank armoring: reinforcing streambanks with natural materials to reduce bank cutting during stream flow.
- Channel deflector: an engineered structure to direct flow away from unstable banks or nearby roads.
- Debris basin: constructed to store large amounts of sediment moving in a stream channel.

Road and Trail Treatments

- Outsloping and rolling dips (water bars) alter the road shape or template to disperse water and reduce erosion.
- Overflow structures protect the road by controlling runoff and diverting stream flow to constructed channels.
- Low water stream crossing: culverts replaced by natural fords to prevent stream diversion and keep water in the natural channel.
- Culvert modification: upgrading culvert size to prevent road damage.
- Debris rack and deflectors: structure placed in a stream channel to collect debris before reaching a culvert.
- Riser pipes filter out debris and allow the passage of water in stream channels.

- Catchment-basin cleanout: using machinery to clean debris and sediment out of stream channels and catchment basins.
- Trail stabilization: constructing water bars and spillways to provide drainage away from the trail surface.

These treatments and descriptions are further detailed at https://afterwildfirenm.org/post-fire-treatments/treatment-descriptions.

For more information about how to install and build treatments, see the Wildfire Restoration Handbook at https://www.rmfi.org/sites/default/files/hero-content-files/Fire-Restoration-HandbookDraft_2015_2.compressed_0.pdf.

Invasive Species Management and Native Revegetation

Wildfire provides opportunity for many invasive species to dominate the landscape because many of these species thrive on recently burned landscapes. It is imperative that landowners prevent invasive establishment by eradicating weeds early, planting native species, and limiting invasive seed dispersal (Coalition for the Upper South Platte [CUSP] 2016).

Planting native seeds is an economical way to restore a disturbed landscape. Vegetation provides protection against erosion and stabilizes exposed soils. In order to be successful, seeds must be planted during the proper time of year and using correct techniques. Use a native seed mixture with a diversity of species and consider the species' ability to compete with invasive species. Before planting, the seedbed must be prepared with topsoil and by raking to break up the hydrophobic soil layer. If you choose to transplant or plant native species, consider whether the landscape has made a sufficient recovery to ensure the safety of the individuals (CUSP 2016).

Long-Term Community Recovery

On non-federal land like that in Dukes County, recovery efforts are the responsibility of local governments and private landowners. Challenges associated with long-term recovery include homes that were severely damaged or were saved but are located in high-severity burn areas. Furthermore, homes saved but located on unstable slopes or in areas in danger of flooding or landslides present a more complicated challenge. Economically, essential businesses that were burned or were otherwise forced to close pose a challenge to communities of all sizes. Given these complications, rebuilding and recovery efforts can last for years, with invasive species control and ecosystem restoration lasting even longer (CUSP 2016).

CHAPTER 5 – MONITORING AND EVALUATION STRATEGY

Developing an action plan and an assessment strategy that identifies roles and responsibilities, funding needs, and timetables for completing highest-priority projects is an important step in organizing the implementation of the DCCWPP. Table 4.1 in the previous section identifies tentative timelines and monitoring protocols for fuels reduction treatments, the details of which are outlined below.

All stakeholders and signatories to this DCCWPP desire worthwhile outcomes. We also know that risk reduction work on the ground, for the most part, is often not attainable in a few months—or even years. The amount of money and effort invested in implementing a plan such as this requires that there be a means to describe, quantitatively or qualitatively, if the goals and objectives expressed in this plan are being accomplished according to expectations.

This section will present a suite of recommended DCCWPP monitoring strategies intended to help track progress, evaluate work accomplished, and assist planners in adaptive management.

The strategies outlined in this section consider several variables:

- Do the priorities identified for treatment reflect the goals stated in the plan? Monitoring protocols can help address this question.
- Can there be ecological consequences associated with fuels work? We may be concerned about soil movement and/or invasive species encroachment post-treatment. Relatively cost-effective monitoring may help clarify changes.
- Vegetation will grow back. Thus, fuel break maintenance and fuels modification in both the home ignition zone and at the landscape scale require periodic assessment. Monitoring these changes can help decision-makers identify appropriate treatment intervals.

As the DCCWPP evolves over time, there may be a need to track changes in policy, requirements, stakeholder changes, and levels of preparedness. These can be significant for any future revisions and/or addendums to the DCCWPP.

Table 5.1 identifies recommended monitoring strategies, both quantifiable and non-quantifiable, for assessing the progress of the DCCWPP and increased sustainability. It must be emphasized that these strategies are 1) not exhaustive and 2) dependent on available funds and personnel to implement them.

Multi-party monitoring is recommended whenever possible (Egan 2013). Multiparty monitoring involves a diverse group consisting of community members, community-based groups, regional and national interest groups, and public agencies. This approach increases understanding of the effects of restoration efforts and trust among restoration partners. Multiparty monitoring may be more time-consuming due to the collaborative nature of the work; therefore, a clear and concise monitoring plan must be developed.

Table 5.1. Recommended Monitoring Strategies

Strategy	Task/Tool	Lead	Remarks
Project tracking system	Online web app to track hazardous fuels projects spatially, integrating wildfire risk layer to show progress towards wildfire hazard and risk reduction. Web app would include attribute tables that outline project details	County	Interactive tool will be easily updated and identify areas that require additional efforts.
Photographic record (documents pre- and post-fuels reduction work, evacuation routes, workshops, classes, field trips, changes in open space, treatment type, etc.)	Establish field global positioning system (GPS) location; photo points of cardinal directions; keep photos protected in archival location	Core Team member	Relatively low cost; repeatable over time; used for programs and tracking objectives
Number of acres treated (by fuel type, treatment method)	GPS/GIS/fire behavior prediction system	Core Team member	Evaluating costs, potential fire behavior
Number of home ignition zones/defensible space treated to reduce structural ignitability	GPS	Homeowner	Structure protection
Number of residents/citizens participating in any CWPP projects and events	Meetings, media interviews, articles	Core Team member	Evaluate culture change objective
Number of homeowner contacts (brochures, flyers, posters, etc.)	Visits, phone	Agency representative	Evaluate objective
Number of jobs created	Contracts and grants	Core Team member	Evaluate local job growth
Education outreach: number, kinds of involvement	Workshops, classes, field trips, signage	Core Team member	Evaluate objectives
Emergency management: changes in agency response capacity	Collaboration	Agency representative	Evaluate mutual aid
Codes and policy changes affecting CWPP	Qualitative	Core Team	CWPP changes
Number of stakeholders	Added or dropped	Core Team	CWPP changes
Wildfire acres burned, human injuries/fatalities, infrastructure loss, environmental damage, suppression and rehabilitation costs	Wildfire records	Core Team	Compare with 5- or 10-year average

An often overlooked but critical component of fuel treatment is monitoring. It is important to evaluate whether fuel treatments have accomplished their defined objectives and whether any unexpected outcomes have occurred. In addition to monitoring mechanical treatments, it is important to carry out comprehensive monitoring of burned areas to establish the success of fuels reduction treatments on fire behavior, as well as monitoring for ecological impacts, repercussions of burning on wildlife, and effects on soil chemistry and physics. Adaptive management is a term that refers to adjusting future management

based on the effects of past management. Monitoring is required to gather the information necessary to inform future management decisions. Economic and legal questions may also be addressed through monitoring. In addition, monitoring activities can provide valuable educational opportunities for students.

The monitoring of each fuel's reduction project would be site-specific, and decisions regarding the timeline for monitoring and the type of monitoring to be used would be determined by project. Monitoring and reporting contribute to the long-term evaluation of changes in ecosystems, as well as the knowledge base about how natural resource management decisions affect both the environment and the people who live in it.

The most important part of choosing a monitoring program is selecting a method appropriate to the people, place, and available time. Several levels of monitoring activities meet different objectives, have different levels of time intensity, and are appropriate for different groups of people. They include the following:

Minimum—Level 1: Pre- and Post-project Photographs

Appropriate for many individual homeowners who conduct fuels reduction projects on their properties.

Moderate—Level 2: Multiple Permanent Photo Points

Permanent photo locations are established using rebar or wood posts, GPS-recorded locations, and photographs taken on a regular basis. Ideally, this process would continue over several years. This approach might be appropriate for more enthusiastic homeowners or for agencies conducting small-scale, general treatments like those recommended by DCR.

High—Level 3: Basic Vegetation Plots

A series of plots can allow monitors to evaluate vegetation characteristics such as species composition, percentage of cover, and frequency. Monitors then can record site characteristics such as slope, aspect, and elevation. Parameters would be assessed pre- and post-treatment. The monitoring agency should establish plot protocols based on the types of vegetation present and the level of detail needed to analyze the management objectives.

Intense—Level 4: Basic Vegetation Plus Dead and Downed Fuels Inventory

The protocol for this level would include the vegetation plots described above but would add more details regarding fuel loading. Crown height or canopy closure might be included for live fuels. Dead and downed fuels could be assessed using other methods, such as Brown's transects (Brown 1974), an appropriate photo series (Ottmar et al. 2000), or fire monitoring (Fire Effects Monitoring and Inventory System [FIREMON]) plots.

IDENTIFY TIMELINE FOR UPDATING THE DCCWPP

The HFRA allows for maximum flexibility in the DCCWPP planning process, permitting the Core Team to determine the time frame for updating the DCCWPP; it is suggested that a formal revision be made on the fifth anniversary of signing and every 5 years following. The Core Team members are encouraged to meet on an annual basis to review the project list, discuss project successes, and strategize regarding project implementation funding. If possible, the DCCWPP revision should coincide with the revision of the County HMP. A goal of the 2020 Dukes County HMP is to contract and implement wildfire management plans for all communities within Dukes County, including project recommendations and strategies (MVC et al. 2020).

IMPLEMENTATION

The DCCWPP makes recommendations for prioritized fuels reduction projects and measures to reduce structural ignitability and carry out public education and outreach. Implementation of fuels reduction projects need to be tailored to the specific project and will be unique to the location depending on available resources and regulations. On-the-ground implementation of the recommendations in the DCCWPP planning area will require development of an action plan and assessment strategy for completing each project. This step will identify the roles and responsibilities of the people and agencies involved, as well as funding needs and timetables for completing the highest-priority projects (SAF 2004). Information pertaining to funding is provided in Appendix F.

ABBREVIATIONS AND ACRONYMS

°F	degrees Fahrenheit
ATV	all-terrain vehicle
BAER	Burned Area Emergency Rehabilitation
BLM	Bureau of Land Management
BTU/ft/sec	British Thermal Units per foot per second
CARs	Communities at Risk
ch/hr	chains per hour
CIG	Conservation Innovation Grants
Cohesive Strategy	National Cohesive Wildland Fire Management Strategy
County	Dukes County
CVARs	Community Values at Risk
CWA	Clean Water Act
CWPP	Community Wildfire Protection Plan
DEM	digital elevation model
DHS	Department of Homeland Security
EAS	Emergency Alert System
EMS	Emergency Management System
EPA	Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
ESRI	Environmental Systems Research Institute
FAC	Fire-adapted Community
FEMA	Federal Emergency Management Agency
FLAME	Federal Land Assistance, Management and Enhancement Act
FP&S	Fire Prevention and Safety
FRI	fire return interval
GAID	Geographic Area Interagency Division
GIS	Geographic Information System
GPS	global positioning system
HFRA	Healthy Forest Restoration Act
HIZ	Home Ignition Zone
ICC	International Code Council
ISO	International Standards Organization
JPA	Joint Powers Agreement
MFI	mean fire interval

NEPA	National Environmental Policy Act
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
PERI	Public Entity Risk Institute
PPE	personal protective equipment
RAWS	remote automated weather station
RFA	Rural Fire Assistance
SAF	Society of American Foresters
SAFER	Staffing for Adequate Fire and Emergency Response
SHPO	State Historic Preservation Office
SWCA	SWCA Environmental Consultants
ULI	Urban Land Institute
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VCC	Vegetation Condition Class
VDEP	Vegetation Departure
WUI	wildland urban interface

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APPENDIX A:

Community and CWPP Background Information

CONTENTS

Figures

OVERVIEW OF COMMUNITY WILDFIRE PROTECTION PLANS

FEDERAL DIRECTION

In response to a landmark fire season in 2000, the National Fire Plan (NFP) was established to develop a collaborative approach among various governmental agencies to actively respond to severe wildland fires and ensure sufficient firefighting capacity for the future. The NFP was followed by a report in 2001 entitled *A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment: A 10-year Comprehensive Strategy*, which was updated in 2002 to include an implementation plan. This plan was updated once more in 2006, with a similar focus on using a collaborative framework for restoring fire-adapted ecosystems, reducing hazardous fuels, mitigating risks to communities, providing economic benefits, and improving fire prevention and suppression strategies. The 2006 implementation plan also emphasizes information sharing and monitoring of accomplishments and forest conditions, a long-term commitment to maintaining the essential resources for implementation, a landscape-level vision for restoration of fire-adapted ecosystems, the importance of using fire as a management tool, and continued improvements to collaboration efforts (Forests and Rangelands 2006). Progress reports and lessons learned reports for community fire prevention are provided annually.

In 2003, the U.S. Congress recognized widespread declining forest health by passing the Healthy Forests Restoration Act (HFRA), and President Bush signed the act into law (Public Law 108–148, 2003). The HFRA was revised in 2009 to address changes to funding and provide a renewed focus on wildfire mitigation (H.R. 4233 - Healthy Forest Restoration Amendments Act of 2009). The HFRA expedites the development and implementation of hazardous fuels reduction projects on federal land and emphasizes the need for federal agencies to work collaboratively with communities. A key component of the HFRA is the development of Community Wildlife Protection Plans (CWPPs), which facilitate the collaboration between federal agencies and communities in order to develop hazardous fuels reduction projects and place priority on treatment areas identified by communities in a CWPP. A CWPP also allows communities to establish their own definition of the WUI, which is used to delineate priority areas for treatment. In addition, priority is placed upon municipal watersheds, critical wildlife habitat, and areas impacted by wind throw, insects, and disease. Communities with an established CWPP are given priority for funding of hazardous fuels reduction projects carried out in accordance with the HFRA.

In 2014, the final stage of the development of a national cohesive strategy for wildfire was developed: *The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy* (Forests and Rangelands 2014). The national strategy takes a holistic approach to the future of wildfire management:

To safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and as a Nation, live with wildland fire.

In order to achieve this vision, the national strategy goals are:

- **Restore and maintain landscapes**: Landscapes across all jurisdictions are resilient to fire-related disturbances in accordance with management objectives.
- **Fire-adapted communities**: Human populations and infrastructure can withstand a wildfire without loss of life and property.
- **Wildfire response**: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions. (Forests and Rangelands 2014:3)

STATE DIRECTION

The 2020 Massachusetts State Forest Action Plan recognizes that Massachusetts faces continued and urgent threats from catastrophic wildfire (DCR 2020). The State Forest Action Plan identifies threats to resources, including wildfire, flooding, disease and insects, climate changes, development and fragmentation, and use and forest management activities (DCR 2020). The Plan then provides strategies

to protect these resources. There are several goals and sub-strategies outlined in the Plan; those specific to wildfire include:

> **Manage Forest Ecosystem Health and Biodiversity**: focuses on restoration, mitigation, and collaboration
>
> **Support the Role and Use of Prescribed Fire in the Landscape**: promotes fire prevention, response, training, and intelligence collaboration as well as the creation of a prescribed fire program and public education.

The recent passing of H.B. 4599, An Act Promoting Climate Change Adaptation, Environmental and Natural Resource Protection, and Investment in Recreational Assets and Opportunity (2018) provides support for landscape resilience throughout the State, by allocating state funds for the purpose of forest and natural resource protection (Massachusetts State Legislature 2018).

Like the 2014 national strategy, the NFP, the Massachusetts State Forest Action Plan, and Federal Emergency Management Agency (FEMA) Disaster Mitigation Act of 2000, all encourage community-based planning efforts with full stakeholder participation, coordination, project identification, prioritization, funding review, and multiagency cooperation. In compliance with Title 1 of the HFRA, a CWPP must be mutually agreed upon by the local government, local fire departments, and the state agency responsible for forest management (Massachusetts Department of Fire Services). As outlined in HFRA, this CWPP is developed in consultation with interested parties and the agencies managing land surrounding the at-risk communities.

GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to enable local communities to improve their wildfire-mitigation capacity, while working with government agencies to identify high fire risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness. Another goal of the CWPP is to enhance public awareness by helping residents better understand the natural- and human-caused risk of wildland fires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the HFRA, are:

> **Collaboration:** Local and state government representatives, in consultation with federal agencies or other interested groups, must collaboratively develop a CWPP (Society of American Foresters [SAF] 2004).
>
> **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuels reduction and treatments and recommend the types and methods of treatment that will protect one or more communities at risk and their essential infrastructures (SAF 2004).
>
> **Treatments of Structural Ignitability:** A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan (SAF 2004).

PLANNING PROCESS

The SAF, in collaboration with the National Association of Counties and the National Association of State Foresters, developed a guide entitled *Preparing a Community Wildfire Protection Plan: A Handbook for Wildland-Urban Interface Communities* (SAF 2004) to provide communities with a clear process in developing a CWPP. The guide outlines eight steps for developing a CWPP and has been followed in preparing the DCCWPP:

> **Step One: Convene Decision-makers.** Form a Core Team made up of representatives from the appropriate local governments, local fire authorities, and state agencies responsible for forest management.

Step Two: Involve Federal Agencies. Identify and engage local federal representatives and contact and involve other land management agencies as appropriate.

Step Three: Engage Interested Parties. Contact and encourage active involvement in plan development from a broad range of interested organizations and stakeholders.

Step Four: Establish a Community Base Map. Work with partners to establish a base map(s) defining the community's WUI and showing inhabited areas at risk, wildland areas that contain critical human infrastructure, and wildland areas at risk for large-scale fire disturbance.

Step Five: Develop a Community Composite Hazard-Risk Assessment. Work with partners to develop a community Composite Hazard-Risk Assessment that considers fuel hazards; risk of wildfire occurrence; homes, businesses, and essential infrastructure at risk; other community values at risk (CVARs); and local preparedness capability. Rate the level of risk for each factor and incorporate this information into the base map as appropriate.

Step Six: Establish Community Priorities and Recommendations. Use the base map and community Composite Hazard-Risk Assessment to facilitate a collaborative community discussion that leads to the identification of local priorities for treating fuels, reducing structural ignitability and other issues of interest, such as improving fire response capability. Clearly indicate whether priority projects are directly related to the protection of communities and essential infrastructure or to reducing wildfire risks to other community values.

Step Seven: Develop an Action Plan and Assessment Strategy. Consider developing a detailed implementation strategy to accompany the CWPP as well as a monitoring plan that will ensure its long-term success.

Step Eight: Finalize Community Wildfire Protection Plan. Finalize the CWPP and communicate the results to community and key partners.

LOCATION AND GEOGRAPHY

Dukes County is located off the southeast coast of Massachusetts and contains 103.25 square miles of land distributed amongst Martha's Vineyard, the Elizabeth Islands, and Noman's Land (an uninhabited isle and National Wildlife Refuge) (Dukes County 2021a; U.S. Census 2020).

Dukes County is primarily composed of privately owned land. Other landowners include the State, municipalities, U.S. Fish and Wildlife Service (Nomans Land Island), towns, and the County.

Table A.1. Breakdown of Land Ownership in Dukes County

Land Ownership	Square Miles	Percentage of the County
Private	53,245.15	84.58%
State	5,577.26	8.9%
Municipal	2,486.64	3.95%
Federal	653.30	1.04%
County	499.76	0.79%
Town	474.71	0.75%
Unknown	17.65	0.028%

ROADS AND TRANSPORTATION

The main transportation corridors of Martha's Vineyard include West Tisbury Road, which runs east–west along the center of the island; Edgartown Vineyard Haven Road, which runs north–south on the east side of the island; and North and State Roads, which connect and run north–south on the west side of the island. Other routes include Barnes Road, which connects to W Tisbury Road in the center of the island and travels north; Chappaquiddick Road, which picks up after the bridge where Edgartown Vineyard Haven Road ends and Chappaquiddick Island begins; and State Road, which runs north–south from the connection point at South Road all the way down through Nashaquitsa and the town of Aquinnah.
All travel between islands and to the mainland must be done via water or air travel as the islands are not connected via roads.

In addition to the surfaced highways, numerous smaller, narrow roads, and forest roads traverse the County, with variable road conditions. Overhanging vegetation, sand, and gravel road surfaces may impede travel in the event of a wildfire evacuation or emergency response (Figure A.1).

Figure A.1. Photograph showing the narrow unsurfaced road of a WUI community.

Figure A.2. Typical landscape in Dukes County, showing the coast, relatively flat topography, and grassy vegetation.

Figure A.3. Typical landscape in Dukes County, showing the relatively flat topography and forested lands.

TOPOGRAPHY

The DCCWPP project area includes all of Dukes County, which is comprised of Martha's Vineyard and the Elizabeth Islands. These islands were formed by ancient glacial activity resulting in hilly morainal regions of sand, clay, gravel, and boulders (Martha's Vineyard Commission [MVC] et al. 2020). The remaining land is categorized as outwash plains, highly porous sand and gravel that form flat to gently sloping lands (MVC et al. 2020).

Percent slope is an important factor in determining the types of treatments that should be implemented. Although much of the county is flat, the topography varies throughout the CWPP project area. On the Elizabeth Islands, there are four summits: Saddleback Hill at 87 feet on west-central Nashawena Island, Mount Sod at 23 feet on southern Nonamesset Island, and Mount Cary at 102 feet and Mount Surat at 154 feet on central Naushon Island (Mountain Zone 2021). The northern end of Martha's Vineyard is home to three summits: Telegraph Hill at 36 feet, Tashmoo Hill at 118 feet, and Pilot Hill at 135 feet (Mountain Zone 2021). The southeast corner of Martha's Vineyard is also home to three summits: Mill Hill at 59 feet, Sampson Hill at 92 feet, and Washaqua Hill at 69 feet (Mountain Zone 2021). Along the west-central side of Martha's Vineyard are Whiting Hill at 236 feet and Goat Rocks at 144 feet. In the southwest corner of Martha's Vineyard are five more summits: Ridge Hill at 128 feet, Abel Hill at 92 feet, Peaked Hill at 269 feet, Prospect Hill at 282 feet, and Squibnocket Ridge at 66 feet. The summits somewhat outline Martha's Vineyard and are focused on the western side, while the center of the island remains relatively flat (Mountain Zone 2021).

POPULATION

The following information is drawn primarily from U.S. Census data (U.S. Census Bureau 2020). In 2019, the population estimate of Dukes County was 17,332 persons, an increase of 4.8% over the 2010 census numbers of 16,535. The majority of the residents, over 99% of the county's population, live on the county's largest island, Martha's Vineyard (Dukes County 2021a). However, as Dukes County is a popular tourism destination, the population may increase by five times the year-round population in the summer months (MVC et al. 2020). The county has a population density of 160.2 people per square mile. The 2019 estimates for housing units falls at 18,146 units.

RECREATION

Outdoor recreation is extremely popular in Dukes County, with public beaches, beach-town amenities, and the Manuel F. Correllus State Forest, thousands of visitors are attracted to these scenic islands. Sightseeing, swimming, golfing, hiking, and hunting are popular on the islands.

During peak seasons and large events, a significant number of people can congregate in a relatively small space, which constitutes a large population to evacuate.

Figure A.4. Residents enjoying Pay Beach in Oak Bluffs.
Source: https://vineyardgazette.com/news/2015/07/16/little-bridge-flows-beach-sand-grows-its-win-win/

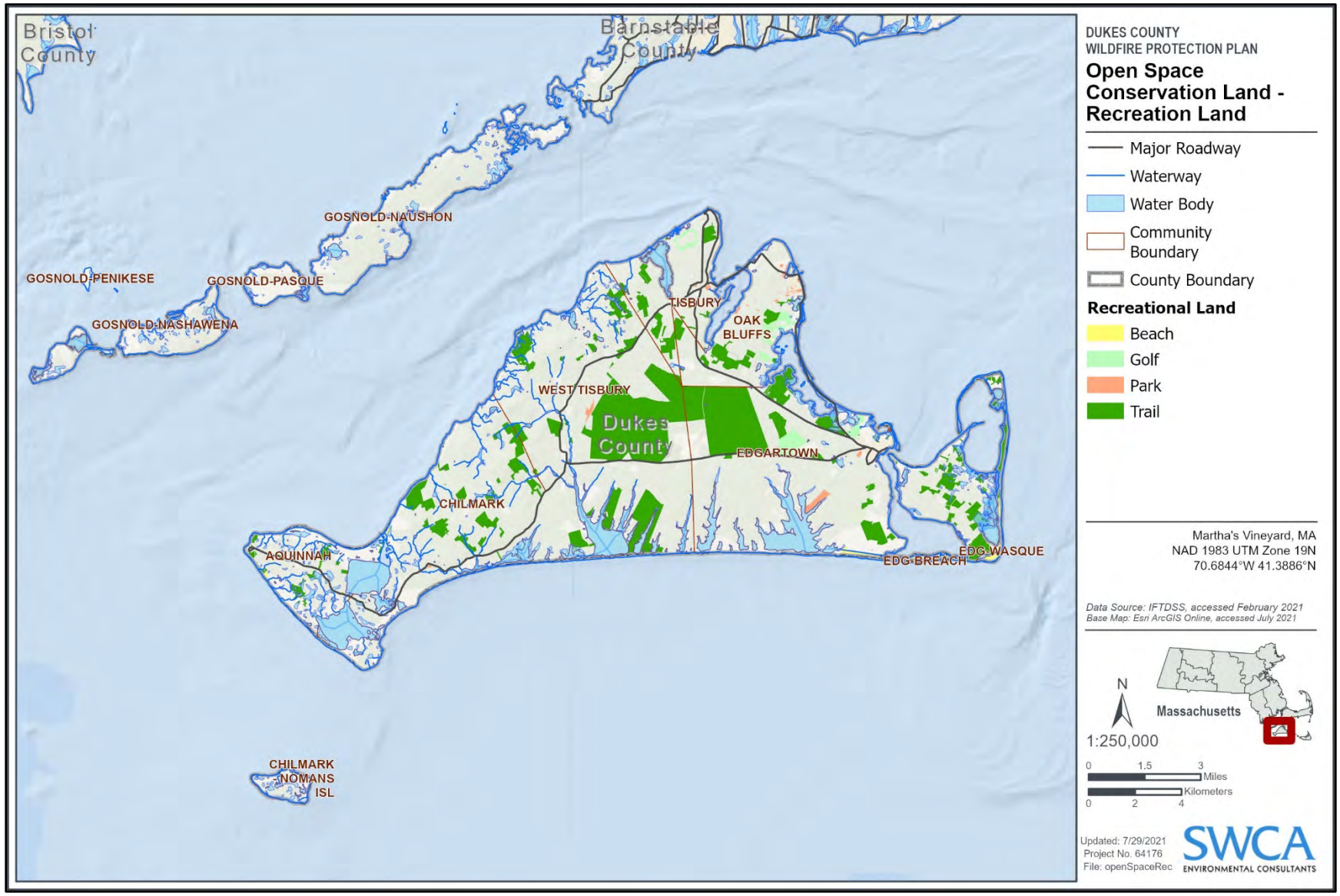

Figure A.5. Dukes County Open Space Recreation Land.

PUBLIC LAND MANAGEMENT

LAND MANAGEMENT STRATEGIES

The State of Massachusetts is divided in 14 conservation districts (Dukes County 2021b). These conservation districts were created to implement and carry out various conservation programs such as proper soil, water, and other resource management. Each district is led by an elected board of volunteers that works directly with the Natural Resources Conservation Service. Dukes County conservation district has been providing technical and financial assistance to landowners in Dukes County since the 1940s (Dukes County 2021b).

The Massachusetts Department of Conservation and Recreation Bureau of Forest Fire Control and Forestry operate the Forest Health Program (Commonwealth of Massachusetts 2021e). The program collaborates with state, federal, and municipal agencies to monitor and assess forest health and influencing factors within the state of Massachusetts. Various survey and trapping protocols are utilized to identify and research impacting components such as insects and disease. In addition, the program administers tree health care services to DCR's forested lands (Commonwealth of Massachusetts 2021e).

The Massachusetts Department of Conservation and Recreation have outlined 10 forest management goals within the 2020 Massachusetts State Forest Action Plan. The goals are as follows:

1) Goal 1: Increase resistance and resilience of trees and forests to mitigate and adapt to the effects of climate change
2) Goal 2: Manage forest ecosystem health and biodiversity
3) Goal 3: Support and enhance forest economy
4) Goal 4: Maintain and increase urban tree canopy
5) Goal 5: Enhance the connection between forests and people
6) Goal 6: Increase land base of conserved forests (keep forests as forests)
7) Goal 7: Advocate for a legal and institutional framework pertinent to the conservation and management of trees and forests
8) Goal 8: Maintain and enhance soil, water, and air resources
9) Goal 9: Support the role and use of prescribed fire in the landscape
10) Goal 10: Cultivate and support partnerships with forestry and conservation Stakeholders

Forest managers in the region are addressing land management objectives through the use of prescribed fire, mechanical and manual treatments to promote more resilient forest lands. Private, state, and federal lands are interspersed creating a matrix of land ownership, which is often a hurdle to implementation of landscape level treatments. By working with private landowners, forest managers are enhancing landscape-scale efforts to create more resilient forest communities.

FEDERAL LANDS

Nomans Land Island National Wildlife Refuge

Nomans Land Island covers 628 acres, is located off the coast of Chilmark, and has relatively flat topography with elevation being at or below 600 feet (U.S. Fish and Wildlife Service [USFWS] 2010). The island was originally purchased in 1914 by Joshua Crane and was used recreationally as a hunting and fishing camp referred to as "The Goose Club". The U.S. Navy began leasing the island from Crane in the 1940s and eventually purchased the land in 1952 (USFWS 2010). While being used by the government, the island was transformed from a recreational lodge to a military aerial bombardment and gunnery range. Although still used for military purposes, about 200 acres were set aside as a migratory

bird and wildlife refuge in the 1970s. An extensive post-military operations cleanup was conducted in 1998, followed by two limited cleanups in 2003 and 2008. Despite the cleanup efforts, Nomans Land Island is still closed to the public due to the number of live explosives still on the island (USFWS 2010).

Figure A.6. Nomans Island.

Source: https://mvmagazine.com/news/2011/09/01/ground-noman%E2%80%99s-land.

Tribal Lands

The Wampanoag Tribe holds 457 acres divided into nine separate parcels within the town of Aquinnah on Martha's Vineyard Island (Clark et al. 2002). The tribal lands are home to various cultural resources such as archaeology sites, burial grounds, and ceremonial sites. Most of the land has been labeled as "unimproved" as there has not been major development outside of several paved roads, housing units, and a few other structures such as a headquarters building (Kennedy H. Clark et al. 2002).

In April of 2002, the Fire Management Plan (FMP) for Wampanoag Tribe of Gay Head (Aquinnah) was released. The plan is a programmatic-level planning document which outlines various wildfire management tactics such as agency coordination, initial and extended attack methods, hazard reduction strategies, and overarching fire planning measures. In addition, the plan touches on land descriptions and use, fire management zones, preparedness, response and mobilization, prevention, hazard reduction, fuels management, and recovery. Some recommended strategies include the use of prescribed fire, completing community hazard assessments, construction hardening, removing hazardous fuels, and creating defensible space (Kennedy H. Clark et al. 2002).

The Tribe is currently limited in fire suppression resources. While the Tribe holds a long-standing cooperative agreement with the Town of Aquinnah for fire response on tribal and tribal-adjacent lands, the Aquinnah Fire Department rarely proceeds beyond initial attack efforts. While efforts to improve Tribe's fire response resources are underway, this shows the importance of attaining said resources.

To aid in fire management, the Tribe's land has been divided into five "representative locations" with the purpose of grouping together lands with similar resource values, fuel types, and fire management strategies. Fire management and response strategies are curated for each representative location based on the factors of the location itself as well as any special consideration given to locations with special areas (Kennedy H. Clark et al. 2002).

STATE LAND

The Manuel F. State Forest was created in 1908 and is still enjoyed to this day. The State Forest covers 5,300 acres in the center of Martha's Vineyard atop a glacial outwash plain with elevations ranging from sea level to 80 feet (Mass Gov 2021b). The Forest is owned by the Massachusetts Department of Conservation and Recreation (Mass Gov 2021a) and managed, along with all other Massachusetts owned park properties, by the Correllus Forest and Park Supervisor. Approximately 90% of the forest is designated as Priority Habitat under the Massachusetts Endangered Species Act (Mass Gov 2021b).

In April of 2020, the Massachusetts Department of Conservation and Recreation released the Fire Management Plan (FMP) for Manual F. Correllus State Forest. This FMP is a ten-year strategic plan with a purpose of providing guidance on forest management and wildfire prevention and response. The plan reviews details on various topics such as land use, climate, vegetation and fuels, invasive species, and fire history. In addition, the FP divides the park into Fire Management Zones where specific information is listed such as ecology, hazards, and special concerns, from which prevention and response recommendations are curated. These recommendations include implementing a Firewise outreach program, fuel thinning, utilizing prescribed fires, evaluating defensibility, and removing remaining plantations (Northeast Forest and Fire Management 2020).

In 2020 the Massachusetts Department of Conservation and Recreation (DCR) created the Massachusetts State Forest Action Plan (MSFAP) to act as a resource for forest conditions, trends, and threats (DCR 2020). The MSFAP speaks on forest ecosystem health and biodiversity, ecosystem services, forest capacity, socioeconomic benefits, legal framework, and priority landscape regions (DCR 2020). The Plan also includes 10 goals for Massachusetts forests;

1. Increase forest resiliency and fire resistance.
2. Manage forest health and biodiversity.
3. Enhance and support the forest economy.
4. Increase and maintain urban tree canopy.
5. Enhance the connection between people and forests.
6. Keep forested land as forests.
7. Advocate for legal framework which encourages conservation and proper land management.
8. Enhance and maintain water, air, and soil resources.
9. Support prescribed fire.
10. Create and support partnerships with conservation and forestry stakeholders (DCR 2020).

In addition, the forest has an active fire management program that includes mowing, brush cutting, grazing, and controlled burns (MVC et al. 2020).

CONSERVATION LANDS

Dukes County contains a large amount of conservation lands, which are managed by a variety of private, state, and NGO groups. Figure A.7 displays the distribution of these conservation lands by landowner. The landowners are critical for the implementation of recommendations outlined in this DCCWPP. Conservation groups were key active participants in the development of this plan and will, in turn, be key contributors in future wildfire planning and mitigation efforts.

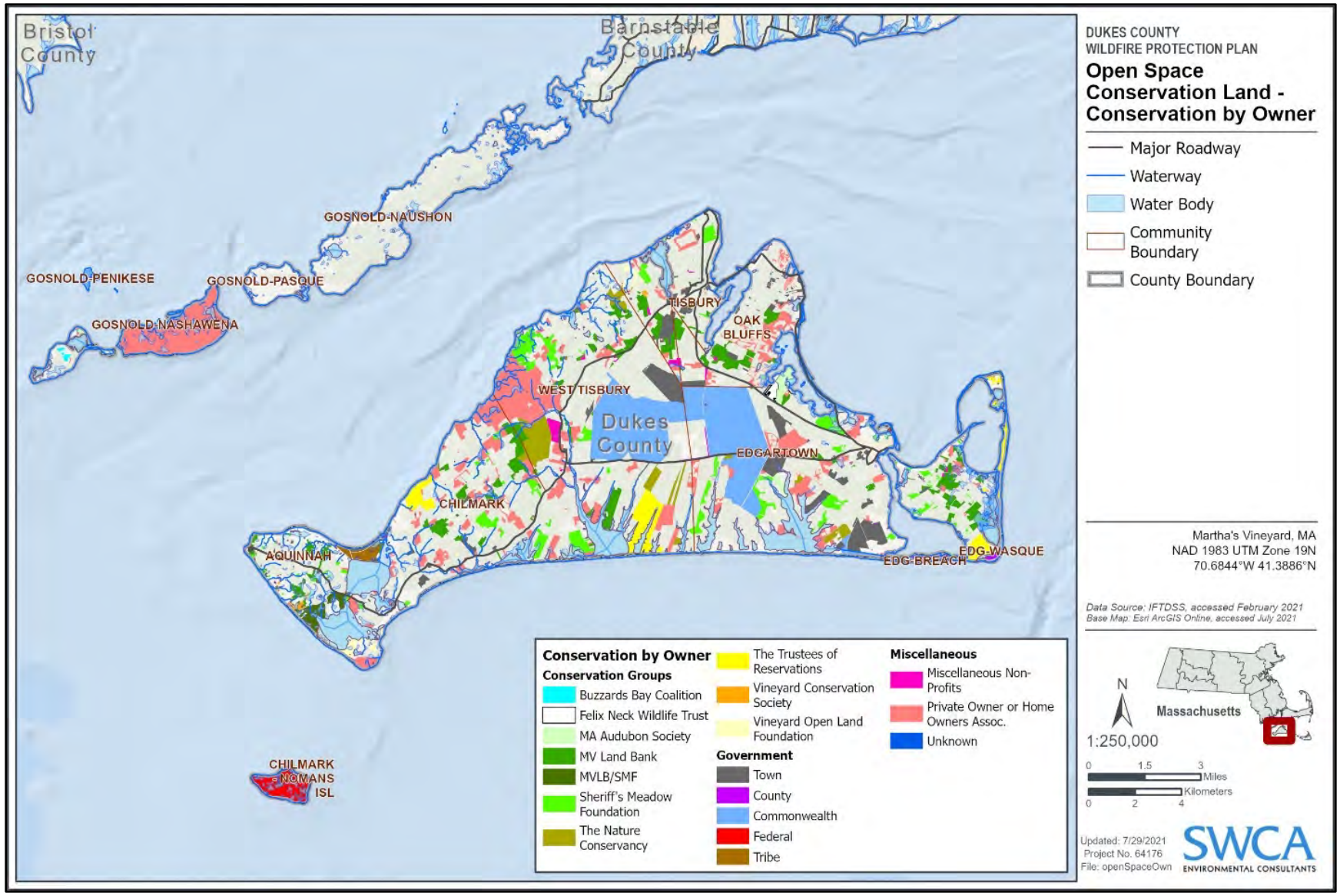

Figure A.7. Dukes County Open Space Conservation Land.

CLIMATE AND WEATHER PATTERNS

Dukes County falls under the Oceanic Köppen climate type (C*f*b). This climate type is defined by lowest temperature monthly averages above 32 degrees Fahrenheit (ºF), at least 4 months with an average temperature above 50ºF, an all-encompassing monthly temperature average below 71.6ºF, and no major precipitation variation between seasons (Northeast Forest and Fire Management 2020).

July is generally the warmest month of the year in Martha's Vineyard, with average monthly maximum temperature of 80ºF. December, January, and February are the coldest months, with an average minimum temperature of 23ºF. Mean annual temperatures in Martha's Vineyard range from approximately 42ºF to 60ºF. The first frost generally occurs in October, and the last frost normally occurs around late April. While the region is relatively flat, topographic depressions, also known as "frost pockets," may experience unusually scheduled frosts due to subsidence of cold air (Northeast Forest and Fire Management 2020).

Table A.2. Mean Annual Temperature and Precipitation by Station in Dukes County

Station	Mean Annual Temperature (°F)			Annual Precipitation (inches)		
	Max[1]	Min[1]	Mean Annual[1]	Max[1]	Min[1]	Mean Snowfall[2]
Vineyard Haven, Martha's Vineyard AP	70.2	31.4	50.2	4.37	2.63	N/A
Edgartown	72.3	32.9	52.3	4.84	2.64	23
Woods Hole Golf Club	71.8	32.1	51.7	N/A	N/A	N/A

Note: N/A = Data not available

Source[1]: Northeast Regional Climate Center (NRCC) 2021; Period of Record 1991–2020

Source[2]: US Climate Data (2021) Version 3.0; Period of Record: 1981–2010

According to the weather stations the monthly average precipitation within the County is typically light and remains relatively consistent ranging from 2.63 inches in the summer months to 4.84 inches in the winter. Total average annual precipitation was between 42.14 and 47.71 inches from 1991 through 2020 (see Table A.2; NRCC 2021).

Martha's Vineyard's climate is highly influenced by the surrounding Atlantic Ocean and the Gulf Stream which help to moderate temperatures throughout the year. Martha's Vineyard lies within the prevailing westerlies, where the predominant wind flow is from the west to the east. Storms are common due to the interaction of high pressure and low-pressure systems in the mid-latitudes. During summer and early fall, hurricanes and tropical storms bring heavy winds and rains. In the late fall and winter, nor'easter storms bring severe weather which may cause flooding and damage to trees. When combined with high tides, coastal storms can make some roadways on the island impassible. These tides also impact local infrastructure including the submerging of docks which coupled with the flooded roadways can providing challenges for emergency access. These types of issues are only expected to get worse as climate change is faced.

Another confounding factor with regards to wildfire is the issue of climate change. Although there is some uncertainty regarding specific climate change scenarios and their effects on local weather patterns, there is consensus that more extreme weather events are likely Therefore, the Vineyard is likely to see an increase and persistence of precipitation and droughts along with increasing temperatures that could have the potential to increase the likelihood and severity of wildfires. Projections have shown that there is a potential for an increase in precipitation in Massachusetts by 12% to 30% (Executive Office of Energy and Environmental Affairs 2011). The implications of this are increased amounts of fine fuels which can transmit fire spread during dry periods.

The projected increase rainfall in Massachusetts may also complicate the ability to effectively implement certain fuel treatments, such as prescribed burning. Prescribed burns are dependent on specific weather conditions where vegetative fuels are dry enough to be consumed, but fuel moistures and soil moistures are high enough to prevent problems for fire control. In addition, specific weather parameters, such as ventilation rates, mixing heights, and soil moisture are required in order to avoid smoke impacts during prescribed burn operations.

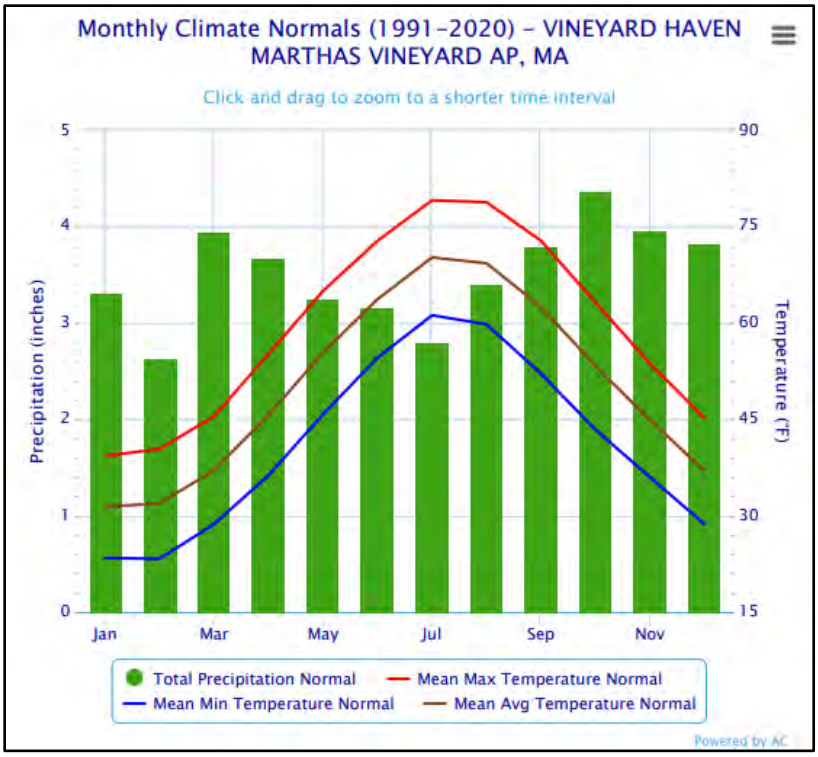

Figure A.8. Monthly average total precipitation for Dukes County for the period of record (1998–2021).

Source: NRCC (2021)

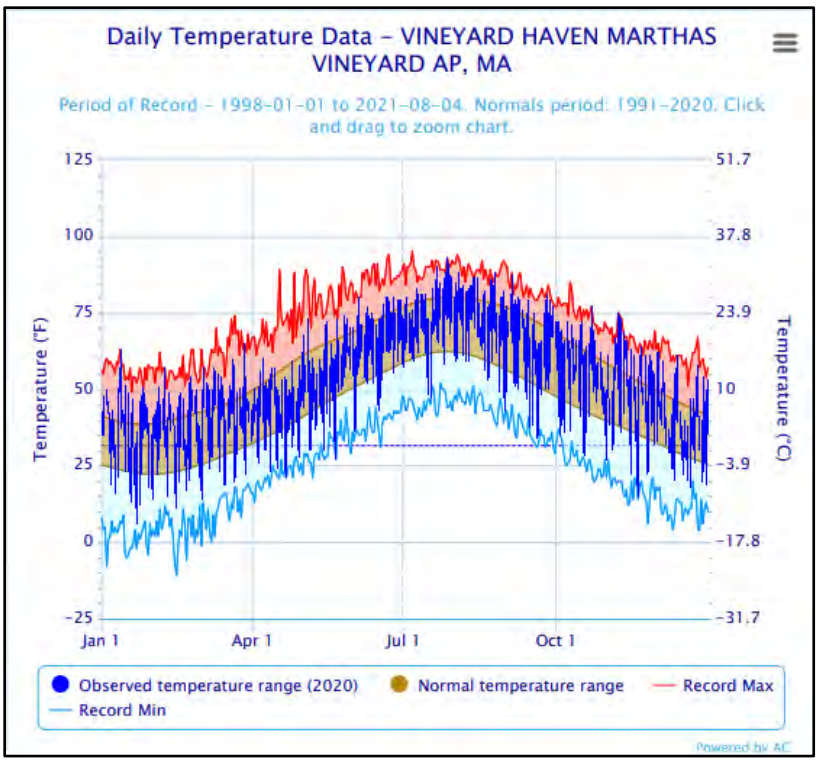

Figure A.9. Daily temperature averages and extremes for Dukes County for the period of record (1991–2020).

Source: NRCC (2021)

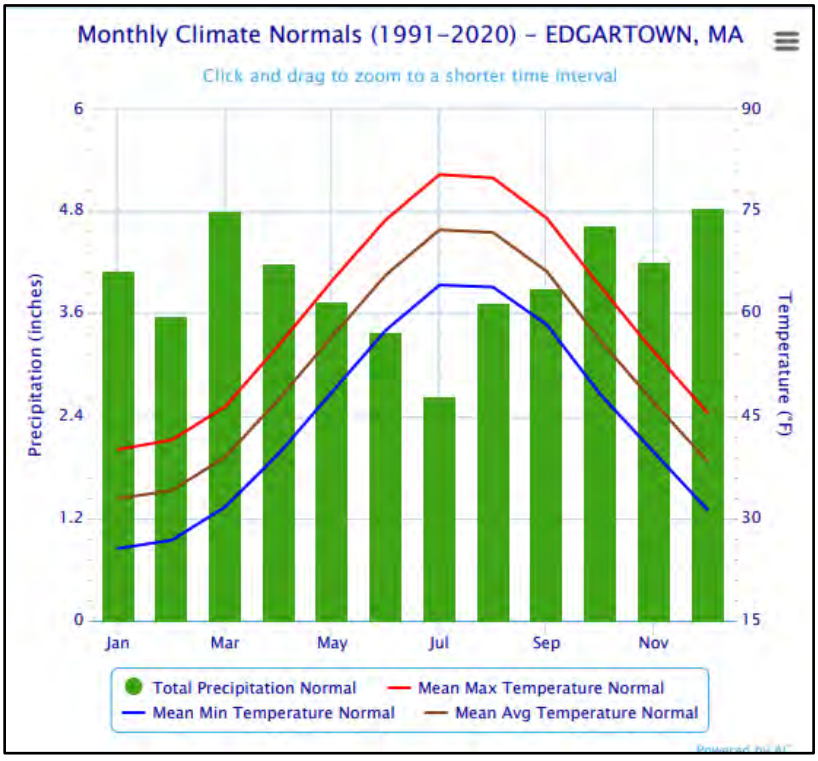

Figure A.10. Monthly average total precipitation for Dukes County for the period of record (1991–2020).

Source: NRCC (2021)

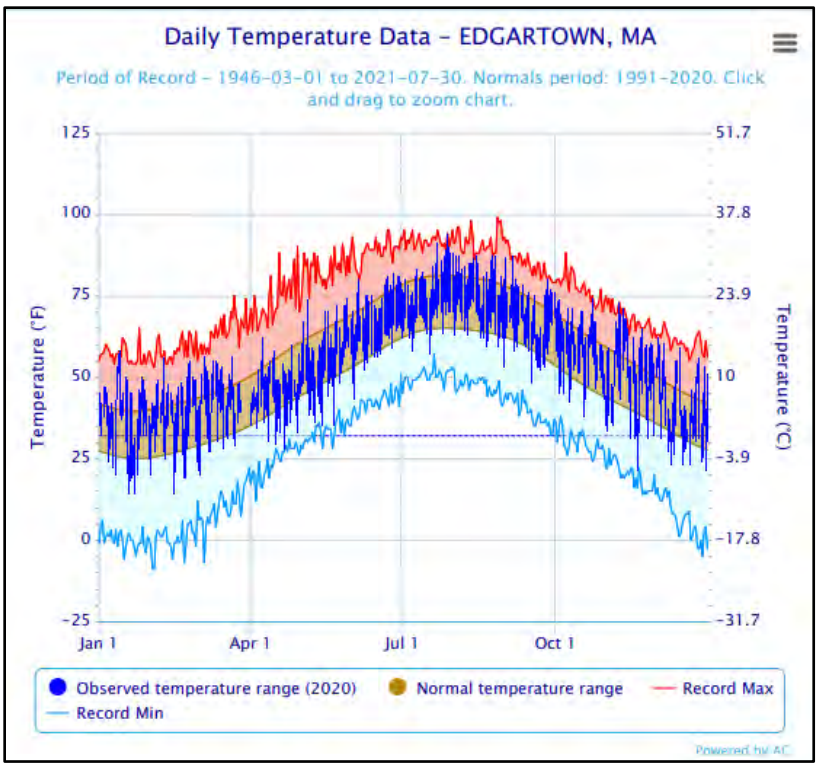

Figure A.11. Daily temperature averages and extremes for Dukes County for the period of record (1946-2021).

Source: NRCC (2021)

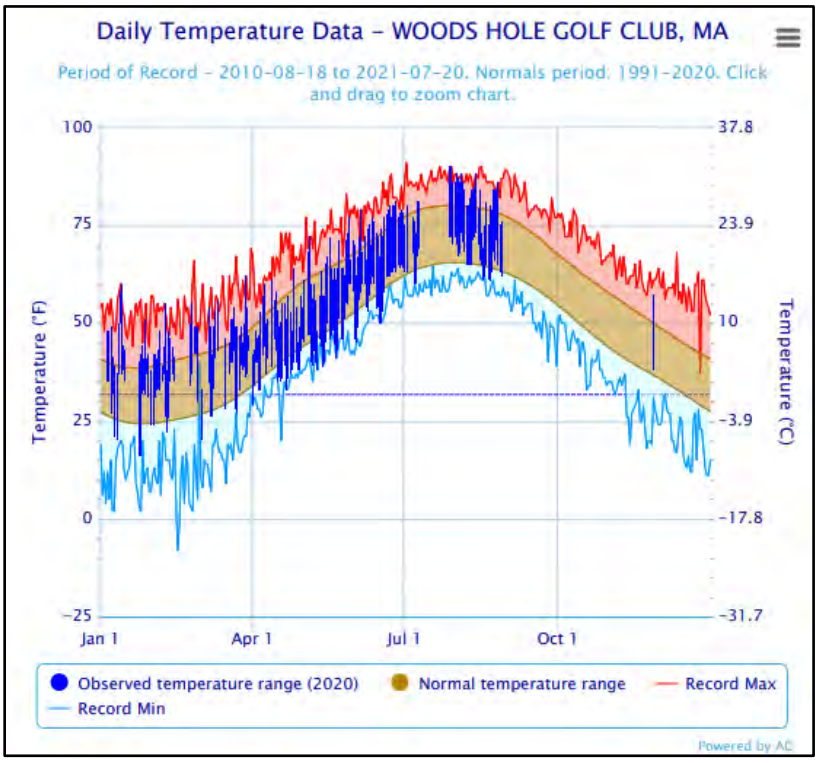

Figure A.12. Daily temperature averages and extremes for Dukes County for the period of record (2010–2021).

Source: NRCC (2021)

VEGETATION AND LAND COVER

The major vegetation types in the County are listed in Table A.3 and are described below the table. Other types of land cover (e.g., agricultural and developed) also exist in a very small percentage of the County and are not described in more detail as they do not play a significant role in fire behavior.

Table A.3. Major Vegetation Types within Dukes County

Existing Vegetation Type	Acres	Percent
National Agriculture Statistic Service (NASS)-Vineyard	*27.79*	*0.04%*
NASS-Row Crop	41.57	0.06%
Quarries-Strip Mines-Gravel Pits-Well and Wind Pads	48.05	0.07%
Developed-Upland Deciduous Forest	48.47	0.07%
Developed-High Intensity	136.18	0.21%
NASS-Close Grown Crop	492.07	0.74%
Developed-Upland Evergreen Forest	653.00	0.99%
Developed-Upland Mixed Forest	670.44	1.01%
Developed-Medium Intensity	686.87	1.04%
Developed-Upland Shrubland	845.98	1.28%
Barren	1030.90	1.56%
Developed-Upland Herbaceous	2075.49	3.14%
Developed-Low Intensity	2133.06	3.23%
Open Water	2171.65	3.29%
Shrub Cover	4242.39	6.42%
Developed-Roads	6192.27	9.37%
Herb Cover	7613.88	11.53%
Tree Cover	36950.38	55.93%

Source: MVC (2021)

GRASSLAND COMMUNITIES

Dukes County, along with other coastal regions of Massachusetts, is home to the globally rare maritime grassland habitat (USFWS 1991). Maritime grasslands are dominated by Indian grass (*Sorghastrum nutans*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), toothed white-topped aster (*Sericocarpus asteroides*), Pennsylvania sedge (*Carex pennsylvanica*), wild indigo (*Baptisia tinctoria*), and goat's rue (*Tephrosia virginiana*) (USFWS 1991).

Heathlands, plant communities consisting of low-growing shrubs, are primarily composed of ericaceous shrubs such as wild rose (*Rosa virginiana*), lowbush blueberry (*Vaccinium angustifolium*), black huckleberry (*Gaylussacia baccata*), bayberry (*Myrica pensylvanica*), sheep laurel (*Kalmia angustifolia*), and staggerbush (*Lyonia mariana*). These communities grow in dry acidic soils and are home to globally rare species (USFWS 1991).

FORESTED COMMUNITIES

Black Oak/Scarlet Oak woodlands occur within dry, acidic, gravelly or sandy regions. The canopy is dominated by black oak (*Quercus velutina*) and scarlet oak (*Q. coccinea*) accompanied by white oak (*Q. alba*) and red maple (*Acer rubrum*). It is not uncommon to see sassafras (*Sassafras albidum*), American holly (*Ilex opaca*), or black gum (*Nyssa sylvatica*) within the canopy as well (Massachusetts Division of Fisheries and Wildlife [MDFW] 2020). Subcanopies are commonly composed of species such as black cherry (*Prunus serotina*), grey birch (*Betula populifolia*), sassafras, shadbush (*Amelanchier* spp.), and flowering dogwood (*Benthamidia florida*) (MDFW 2020). The low shrub layer is made up of huckleberry, scrub oak (*Quercus ilicifolia*), sheep laurel, lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum*), maple-leaved viburnum (*Viburnum acerifolium*), and American hazelnut (*Corylus americana*). The herbaceous layer is sparse with patches of vegetation such as pink lady's slipper (*Cypripedium acaule*), Pennsylvania sedge (*Carex pensylvanica*), and bracken fern (*Pteridium aquilinum*) (MDFW 2020).

Coastal Forest/Woodlands are located along the coast in areas protected from daily maritime influences (salt spray), such as behind dunes and along slopes. While they are sheltered from the ocean day to day, they still receive winds and salt during storms (MDFW 2020). These woodlands are dominated by tree oaks (scarlet oak, white oak, black oak, and chestnut oak [*Quercus montana*]). Post oak (*Q. stellata*) pop up on Martha's Vineyard and Buzzards Bay. Additionally, a few species with primarily southern distributions, such as American holly, black gum, and sassafras, make up this woodland (MDFW 2020). Red maple, black cherry, American beech (*Fagus grandifolia*), pitch pine (*Pinus rigida*), and white pine (*P. strobus*) may become abundant but usually stay in small percentages. The low-shrub heath layer is usually dominated by lowbush blueberries (*Vaccinium pallidum*, *V. angustifolium*) and black huckleberry, with Sweet pepperbush (*Clethra alnifolia*) being common as well (MDFW 2020). The herbaceous layer of coastal forests/woodlands are usually sparse with common species including Pennsylvania sedge, bracken fern, wintergreen (*Gaultheria procumbens*), and wild sarsaparilla (*Aralia nudicaulis*). Vines along forest edges and openings are regular occurrences within these woodlands; common species include poison ivy (*Toxicodendron radicans*), Virginia creeper (*Parthenocissus quinquefolia*), grape (Vitis spp.), and greenbrier (*Smilax* spp.) (MDFW 2020).

Forest Seep Communities are very small wetlands that occur within upland forests where ground water emerges (MDFW 2020). The canopy is formed by upland species rooted in surrounding forest while the shrub and herbaceous layers are made of wetland species. Forest seep communities are not uncommon statewide; therefore, canopy cover species may include northern hardwoods, conifers, oak, or mixed (MDFW 2020). The shrub layer could be dense or barely present with a mixture of wetland and upland species depending on location. These species may be highbush blueberry (*Vaccinium corymbosum*), mountain laurel (*Kalmia latifolia*), hobble-bush (*Viburnum lantanoides*), swamp dewberry (*Rubus hispidus*), silky dogwood (*Swida amomum*), winterberry (*Ilex verticillata*), and, in coastal regions, sweet pepperbush. Forest Seep Communities usually possess dense herbaceous layers with species (dependent on location) such as golden saxifrage (*Chrysosplenium americanum*), jewelweeds (*Impatiens* spp.), golden ragwort (*Packera aurea*), crooked-stemmed aster (*Symphyotrichum prenanthoides*), scouring rush (*Equisetum hyemale*), water avens (*Geum rivale*), and a variety of sedges, including eastern rough sedge (*Carex scabrata*), bladder sedge (*Carex intumescens*), and three-seeded sedge (*Carex trisperma*) (MDFW 2020). Wetland and upland ferns, such as cinnamon fern (*Osmundastrum cinnamomeum*), ostrich fern (*Matteuccia struthiopteris*), silvery spleenwort (*Deparia acrostichoides*), rattlesnake fern (*Botrychium virginianum*), and Christmas fern (*Polystichum acrostichoides*) are commonly found within seeps. Invasive species within these communities include multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), and common buckthorn (*Rhamnus cathartica*) (MDFW 2020). Wetland communities are extremely prone to drought and drying, making these fuels more available for combustion, fueling fire spread.

Maritime Beach Strand Communities are narrow, sparsely vegetated communities located between the wrack line of high tide and foredunes (MDFW 2020). Vegetation within this community includes sea-rocket (*Cakile edentula* ssp. *edentula*) and dunegrass (*Ammophila breviligulata* ssp. *breviligulata*). Beach pea (*Lathyrus japonicus*), seabeach orache (*Atriplex cristata*), seabeach sandwort (*Honckenya peploides*), seaside-flatsedge (*Cyperus filicinus*), seabeach saltwort (*Salsola kali* ssp. *kali*), seaside

goldenrod (*Solidago sempervirens*), and non-native Russian thistle (*Salsola tragus*) may be found on protected beaches or at the foot of the dunes (MDFW 2020).

Maritime Forest/Woodlands occur in various locations near the ocean, including salt marsh borders, interdunal areas, exposed bluffs, and the back or inland side of dunes. The canopies of Maritime Forest/Woodlands are a mix of deciduous and evergreen trees. Black oak, scarlet oak, white oak, other oaks, hickories (*Carya* spp.), American holly, sassafras, black gum, black cherry, American beech, and red maple are other common species found within Maritime Forest/Woodland communities (MDFW 2020). Pitch pine and red cedar (*Juniperus virginiana*) grow in these communities, but in low amounts. Vines within Maritime Forests/Woodlands are prominent along edges of openings and include roundleaf greenbrier (*Smilax rotundifolia*), poison ivy, Virginia creeper, grape, and the non-native Oriental bittersweet (*Celastrus orbiculatus*) (MDFW 2020).The shrub layer is commonly composed of bayberry (*Morella pensylvanica*), inkberry (*Ilex glabra*), winged sumac (*Rhus copallinum*), shadbush, and sweet pepperbush. The understory of this forest type commonly hosts non-native shrubs such as Japanese barberry, Japanese honeysuckle (*Lonicera japonica*), Morrow's honeysuckle, common buckthorn, and/or multiflora rose. Common species within the variable herbaceous layer include bracken fern, Canada mayflower (*Maianthemum canadense*), partridgeberry (*Mitchella repens*), starflower (*Lysimachia borealis*), Pennsylvania sedge, and other sedges and grasses (MDFW 2020).

Maritime Juniper Woodland/Shrubland communities host scattered pitch pine, various oaks (*Quercus* spp.), American holly, black cherry, red maple, bayberry, and winged sumac. Along with these species, red cedar, occurs sporadically in low densities (MDFW 2020). Roundleaf greenbriar may be found in well-established woodlands. Little bluestem, dunegrass (*Ammophila breviligulata* ssp. *breviligulata*), sedges, and scattered beach heather (*Hudsonia tomentosa*) or seabeach sandwort make up the herbaceous layer (MDFW 2020).

Maritime Pitch Pine Woodlands on Dunes make up small patchy communities of pitch pine located on sand dunes, barrier beaches, or other sandy shores, just out of reach from the salt spray (MDFW 2020). Highly exposed pines are usually on the shorter side, getting taller as they move farther away from the saltwater (MDFW 2020). A very low and patchy shrub layer composed of beach heather and bearberry (*Arctostaphylos uva-ursi*), along with earth star fungus and lichens, helps to cover areas of sand between trees. Sands on older, more stable dunes, may be blanketed by a sedge lawn between trees (MDFW 2020).

Maritime Shrubland communities are located in areas directly influenced by the ocean, but on land that does not retain water, such as coastlines, bluffs, barrier beach dunes, or rocky headlands (MDFW 2020). Vegetation within these communities are stress tolerant, as they are not sheltered from the coastal elements, and tend to grow in dense patches with space of bare ground between (MDFW 2020). Species may include lowbush blueberry, chokeberry (*Aronia melanocarpa*), bearberry, black cherry, beach plum (*Prunus maritima*), bayberry, black huckleberry, or red cedar. Non-native species, such as Morrow's honeysuckle and Oriental bittersweet, are abundant (MDFW 2020).

Pitch Pine - Oak Forests/Woodlands prefer to grow inland, sheltered from oceanic influences, on dry, acidic, and low nutrient soils (MDFW 2020). When this community develops close to the ocean, it may transform into a Coastal Forest/Woodland. Canopy cover differs by site, but is typically Pitch pine dominant with scattered oaks, or oak dominant with scattered pines (MDFW 2020). Canopy species may include pitch pine, chestnut oak, scarlet oak, black oak, white oak, and occasionally red maple and white pine (MDFW 2020). Species in the shrub layer commonly include black huckleberry, blueberries (*Vaccinium angustifolium* and *V. pallidum*), catbrier, and other briers (*Smilax rotundifolia* and *Smilax* spp.) (MDFW 2020). The typically spare herbaceous layer is composed of species such as Pennsylvania sedge, bracken fern, wintergreen, wild sarsaparilla, and sometimes pink lady's-slipper (MDFW 2020).

Pitch Pine - Scrub Oak Communities are communities of relatively low diversity that form an open canopy with a continuous understory. The canopy, composed of scattered pitch pine, shelters an understory of scrub oak, black huckleberry, bearberry, dwarf chinquapin oak (*Q. prinoides*), and lowbush blueberries (*Vaccinium angustifolium* and *V. pallidum*) (MDFW 2020). Openings between larger shrubs are commonly filled with intermixed with sedges (primarily Pennsylvania sedge with others), patches of lichens, or little bluestem (MDFW 2020).

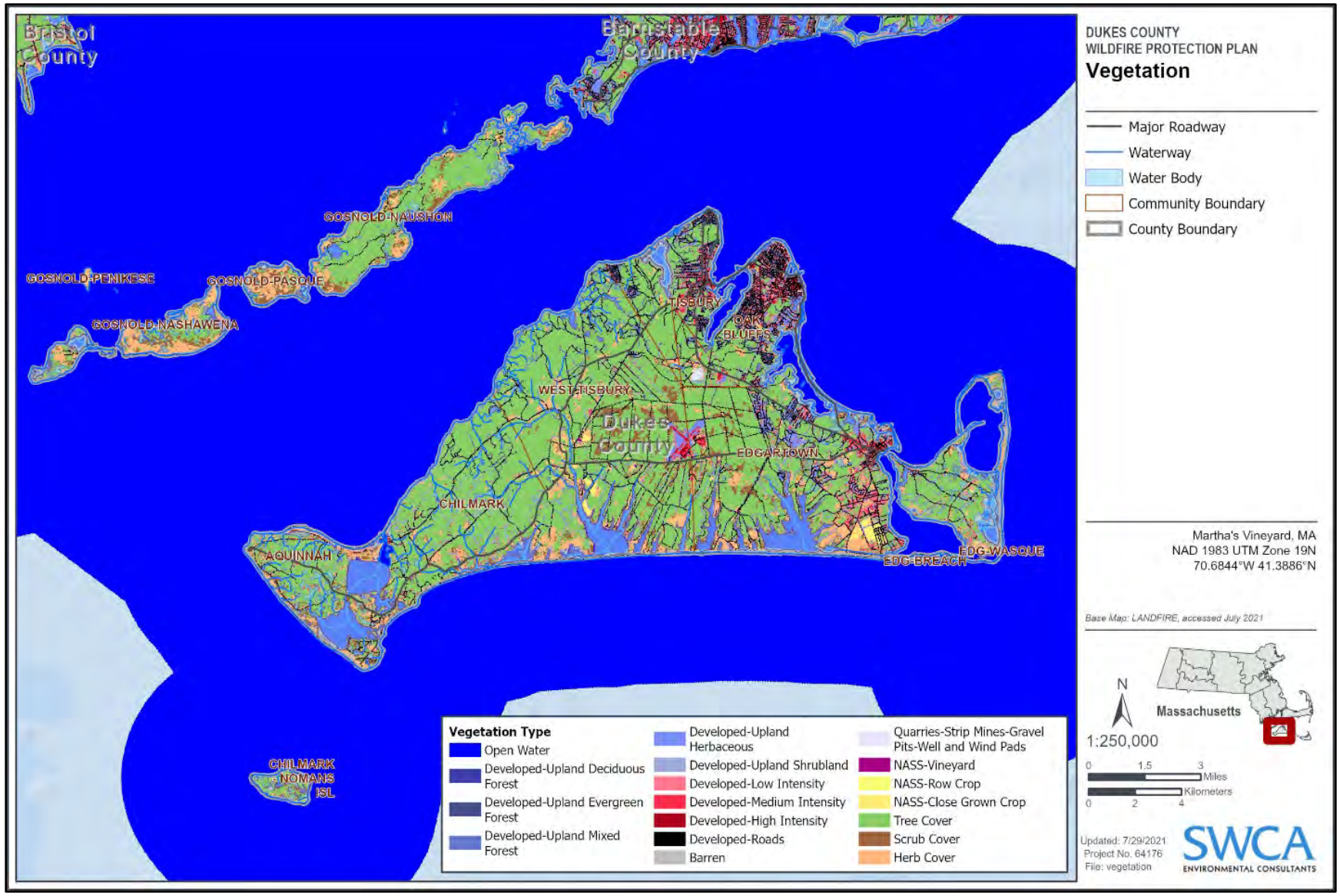

Figure A.13. Dukes County existing vegetation cover.

FOREST HEALTH CONSIDERATIONS

Insects

Native insect epidemics within plant communities are usually part of a natural disturbance cycle similar to wildfire. They are often cyclic in nature and are usually followed by the natural succession of vegetation over time. Of primary interest are those that attack tree species because of the implications for fire management.

Present-day insect epidemics in U.S. forests are on the rise. Between 2018 and 2019 the number of acres with tree mortality in the U.S. increased from 6 million acres in 2018 to 7.1 million acres in 2019 (USDA 2019). This may be a result of drought-related stress and/or faster completion of insect life cycles due to warmer climate regimes. Stands of trees that have been killed by insects have varying degrees of associated fire danger depending on the time lapse following an insect attack and structure of the dead fuels that remain. However, forests with a large degree of mortality following an insect attack may have the potential to experience extremely high fire danger, especially if a large degree of needle cover remains in the canopy.

Insects that have infested or have the potential to infect the forests within and around the DCCWPP planning area are discussed below.

Gypsy Moth (*Lymantria dispar).* Gypsy Moths were introduced to Massachusetts in 1869 when they were accidently released in Medford (UNH 2018). Gypsy Moths have been the leading driver of canopy damage in the state of Massachusetts (DCR 2020). Unless closely monitored, Gypsy Moth populations can exist or grow unnoticed. Adult moths do not feed on foliage, it is the juveniles that cause defoliation. While oak, birch, willows, apple, and poplar trees are preferred by Gypsy Moths, they will still feed on maples, elms, softwoods, beeches, and many other plant varieties once their preferred trees have been defoliated. Because of this, the amount of growth loss and mortality is directly related to the number of oaks within the stand (UNH 2018). Defoliation by Gypsy moth increases openings in forest canopies, drying understories and increases flammability.

Winter Moth *(Operophtera brumata).* Winter Moths were first identified in Massachusetts in 2003. Adult moths lay 150-350 tiny eggs each winter (UMass 2021a). The eggs hatch in spring right as foliage begins to bud. The juveniles, smaller than an eyelash, then crawl into and feed on the new buds. Once they have been consumed from the inside the moth will move to the exterior and repeat the process. Maple, oak, and apple are preferred hosts. However, Winter Moths will feed on many other vegetation types such as basswood, blueberry, white elm, and cherry (UMass 2021a). Young larvae are capable of producing silk strands. The moths will use this silk to make themselves buoyant and able to float through the air. These "balloons" can be found beneath infected trees in other plant varieties such as roses. In addition, this "ballooning" process allows larvae to travel and expand to previously unaffected locations (UMass 2021a).

Hemlock Woolly Adelgid *(Adelges tsugae).* The Hemlock Wolly Adelgid was introduced in Massachusetts in 1988. Preferred hosts include the Eastern hemlock and Carolina hemlock (UMass 2021b). Due to their tiny size, about 1 millimeter, these insects can be transported via wind, birds, and people (such as via nursery plants). This pest is most active in the winter months and rather inactive during growing season. From mid-July to mid-October juveniles will attach themselves on stems or needle-bases on host plants. They begin feeding on plant sap in mid-October and progress to an adult by March. While even healthy trees can succumb to Hemlock Woolly Adelgids, those under stressed conditions may face mortality in less time (UMass 2021b)

Southern Pine Beetle *(Dendroctonus frontalis).* Southern Pitch Pine Beetles were first trapped in Massachusetts in 2015 (UMass 2021c). Loblolly (*Pinus taeda*), shortleaf (*P. echinata*), pond (*P. serotina*), and Virginia (*P. virginiana*) pine are the preferred host species of Southern Pitch Pine. However, they have been known to venture out to spruce (*P. glabra*) and sand pines (*P. clausa*) as well. Female beetles will borough into the selected host's bark and release pheromones attracting males and other adult beetles. This leads to colonization beneath the bark and can result in tree mortality. Lifespans of this pest are short, resulting in 3-9 generations per year (UMass 2021c).

Emerald Ash Borer *(Agrilus planipennis.* The Emerald Ash Borer was first discovered in the United States in 2002 (IFAS 2019). These pests have been known to destroy Green ash (*Fraxinus pennsylvanica*), white ash (*Fraxinus americana*), black ash (*Fraxinus nigra*), and blue ash (*Fraxinus quadrangulata*). Emerald Ash Borer eggs are laid in tree bark crevices. Once they progress into larvae the pests will feed on outer phloem and carve out galleries within the tree. If there is an Emerald Ash Borer infestation you may see D-shaped emergence holes, capopy die-back, and bark splitting (IFAS 2019).

Black Oak Gall Wasp *(Zapatella davisae*). Black Oak Gall Wasps are known to infest many oak species (Baker 2021). Eggs from this pest are laid within tree buds in the spring. When the egg hatches, the grubs secrete a salvatory substance that acts as a plant growth regulator and forces galls to form. The wasp will pupate in the gall and chew their way out a few weeks later to lay their own eggs. Gall wasps may cause death to the tree twigs/limbs from the gall outwards or kill the host if there is a heavy infestation (Baker 2021).

Diseases

Diseases of trees, such as parasitic plants, fungi, and bacteria, can also affect forests in the DCCWPP planning area. These diseases impact forest systems by degrading the productivity and health of the forest. Some of the more common forest diseases that are found in the County are described below. Trees that are killed by disease have the similar potential to increase fire hazards.

White Pine Needle Disease (WPND). This disease was first spotted in Massachusetts in 2010. WPND is influenced by the type of fungi infesting the host. There are four fungi associated with White Pine Needle Disease in this region: *Lecanosticta acicola*, *Lophophacidium dooksii*, *Bifusella linearis*, and *Septorioides strobi* (DCR 2020). Warm, wet conditions encourage the growth of these pathogens. Therefore, the warm temperatures and frequent rains from May through June provide the pathogens with an ideal environment. Increasing temperatures due to climate change contribute to concern around this disease. While WPND does not kill the host trees directly, the disease results in needle loss, browning, and overall stress and weakening, making the host tree more vulnerable to other dangers (DCR 2020).

WILDLIFE

Vegetation management treatments are commonly applied throughout the County to benefit habitat for general wildlife species or game habitat. Most native wildlife species found in the region evolved with a frequent fire regime.

Threatened and Endangered Species

The County is delineated as both estimated habitat of rare wildlife and known priority habitat of rare species by the Massachusetts Natural Heritage and Endangered Species Program (NHESP) (2021). The County is home to several threatened and endangered species, including three birds, one beetle, one plant, and one bat. Treatments on federal land would be subject to the National Environmental Policy Act (NEPA) and associated analysis of impacts to these species. Treatments in areas that may impact threatened and endangered species would require application of certain mitigation measures to prevent degradation to habitat. To view more on these species, see the table of ferally listed and endangered species in Massachusetts: https://www3.epa.gov/region1/npdes/hydrogp/2018gp/table-1-appendix-1-ma-esa.pdf

FIRE MANAGEMENT POLICY

The primary responsibility for WUI fire prevention and protection lies with property owners and state and local governments. Property owners must comply with existing state statutes and local regulations. These primary responsibilities should be carried out in partnership with the federal government and private sector areas. The current Federal Fire Policy states that protection priorities are 1) life, 2) property, and

3) natural resources. These priorities often limit flexibility in the decision-making process, especially when a wildland fire occurs within the WUI.

LAWS, ORDINANCES, STANDARDS, AND CODES FOR WILDFIRE PREVENTION

In 2018 the State of Massachusetts established a state-wide Fire Code. The state adopted the 2015 edition of the National Fire Protection Association Fire Code with Massachusetts amendments. You can view the fire code here: https://www.mass.gov/doc/massachusetts-527-cmr-100-2015-edition-as-of-october-18-2019/download.

FIRE PLANNING

There are a number of existing documents relating to fire management in Dukes County. This CWPP is meant to supplement and not replace any other existing plans. See Chapter 1 for summaries of existing plans and Chapter 2 for information on agency fire management planning and the growing use of spatial fire planning and decision support tools.

EMERGENCY MANAGEMENT PLANNING

Dukes County updated their County Hazard Mitigation Plan (HMP) in 2020. This CWPP dovetails with the wildfire section of the HMP by incorporating wildfire hazard mitigations identified in that plan. In the future, the County should consider revising both plans in unison.

PUBLIC EDUCATION AND OUTREACH PROGRAMS

Public education and outreach programs are a common factor in virtually every agency and organization involved with the wildfire issue.

Local and State Programs

Massachusetts Department of Fire Services

The Massachusetts Department of Fire Services employs several fire prevention programs to educate residents and visitors.

YouTube High School Burn Awareness Video Contest

This is a contest sponsored by Massachusetts Property Insurance Underwriting Association and the Massachusetts Association of Safety and Fire Educators. The contest is for children in grades 9 through 12 to promote burn safety, teach children the consequences of misusing fire, and to promote accurate fire and burn information sharing. To learn more and view winning entries, please see the following URL: https://www.mass.gov/service-details/youtubetm-high-school-burn-awareness-video-contest.

Fire Station Tours

Massachusetts schools can request a fire station tour to teach children about fire dangers, firefighting processes, firefighter gear and tools, firefighting vocabulary, and home fire safety items. To learn more please visit the following webpage: https://www.mass.gov/doc/fire-station-tours/download.

Arson Watch Reward Program

The Arson Watch Reward Program is a fire awareness poster contest for children in grades 6 through 8. The purpose of this program is to promote fire awareness education and show that fire prevention requires support from all community members. Each contest cycle is designated a fire prevention related theme. To learn more about the contest, click here: https://www.arsonwatchrewardprogram.org/poster-contest/ma-contest-rules/.

Massachusetts Public Education Conference on Fire and Life Safety

Every year Massachusetts holds the Public Education Conference on Fire and Life Safety. This conference provides educational and collaborative workshops to develop and expand programs and educational programs for both new and experienced fire and safety educators. Prevention officers, EMTs, fire educators, teachers, nurses, adult care specialists, school leaders, and both police and fire officers are encouraged to attend. To learn more, please see: https://www.mass.gov/service-details/massachusetts-public-education-conference-on-fire-and-life-safety.

National Programs

Ready, Set, Go!

The Ready, Set, Go! Program, which is managed by the International Association of Fire Chiefs, was launched in 2011 at the WUI conference. The program seeks to develop and improve the dialogue between fire departments and residents, providing teaching for residents who live in high-risk wildfire areas—and the WUI—on how to best prepare themselves and their properties against fire threats (Ready, Set, Go! 2016).

The tenets of Ready, Set, Go! as included on the website (http://www.wildlandfirersg.org) are:

Ready – Take personal responsibility and prepare long before the threat of a wildland fire so your home is ready in case of a fire. Create defensible space by clearing brush away from your home. Use fire-resistant landscaping and harden your home with fire-safe construction measures. Assemble emergency supplies and belongings in a safe place. Plan escape routes and ensure all those residing within the home know the plan of action.

Set – Pack your emergency items. Stay aware of the latest news and information on the fire from local media, your local fire department, and public safety.

Go – Follow your personal wildland fire action plan. Doing so will not only support your safety but will allow firefighters to best maneuver resources to combat the fire.

Parameters for developing defensible space around a home are described in the County Ready, Set, Go Guide and are illustrated in Figure A.14. Three zones for defensible space actions are described. These include:

Zone 1 This zone, which consists of an area of 0 to 30 feet around the structure, features the most intense modification and treatment. This distance is measured from the outside edge of the home's eaves and any attached structures, such as decks. Do not plant directly beneath windows or next to foundation vents. Frequently prune and maintain plants in this zone to ensure vigorous growth and a low growth habit. Remove dead branches, stems, and leaves. Do not store firewood or other combustible materials in this area. Enclose or screen decks with metal screening. Extend gravel coverage under the decks. Do not use areas under decks for storage. Prune low-lying branches (ladder fuels that would allow a surface fire to climb into the tree) and any branches that interfere with the roof or are within 10 feet of the chimney. In all other areas, prune all branches of shrubs or trees up to a height of 10 feet above ground (or 1/3 the height, whichever is the least).

Zone 2 This zone features fuel reduction efforts and serves as a transitional area between Zones 1 and 3. The size of Zone 2 depends on the slope of the ground where the structure is built. Typically, the defensible space should extend at least 100 feet from the structure. Remove stressed, diseased, dead, or dying trees and shrubs. Thin and prune the remaining larger trees and shrubs. Be sure to extend thinning along either side of your driveway all the way to your main access road. These actions help eliminate the continuous fuel surrounding a structure while enhancing home site safety and the aesthetics of the property. Keep grass and wildflowers under 8 inches in height. Regularly remove leaf and needle debris from the yard.

Zone 3 This area extends from the edge of your defensible space to your property boundaries. The healthiest forest is one that has multiple ages, sizes, and species of trees where adequate growing room is maintained over time, so maintain a distance of at least 10 feet between the tops of

trees. Remove ladder fuels, creating a separation between low-level vegetation and tree branches to keep fire from climbing up trees. A greater number of wildlife trees can remain in Zone 3, but regularly remove dead trees and shrubs. Ensure trees in this area do not pose a threat to power lines or access roads.

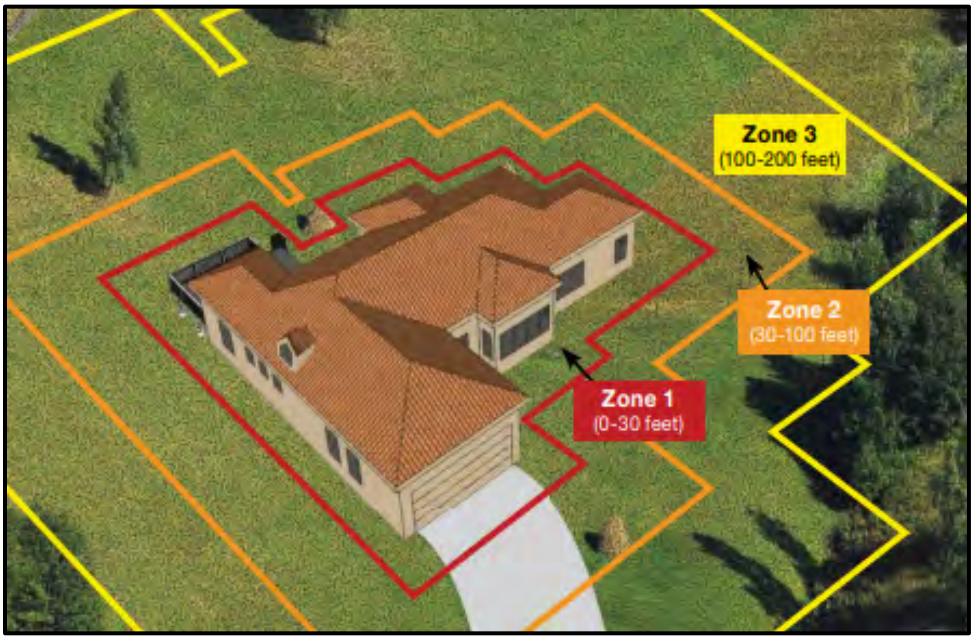

Figure A.14. Defensible Space Zones.
Source: Ready, Set, Go

National Fire Protection Association

The NFPA is a global non-profit organization devoted to eliminating death, injury, property, and economic loss due to fire, electrical, and related hazards. Its 300 codes and standards are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation around the world.

The NFPA develops easy-to-use educational programs, tools, and resources for all ages and audiences, including Fire Prevention Week, an annual campaign that addresses a specific fire safety theme. The NFPA's Firewise Communities program (www.firewise.org) encourages local solutions for wildfire safety by involving homeowners, community leaders, planners, developers, firefighters, and others in the effort to protect people and property from wildfire risks.

The NFPA is a premier resource for fire data analysis, research, and analysis. The Fire Analysis and Research division conducts investigations of fire incidents and produces a wide range of annual reports and special studies on all aspects of the nation's fire problem.

U.S. Fire Administration's WUI Toolkit

The U.S. Fire Administration (USFA) is an entity of the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) that aids in the preparation for and response to fire. Their WUI toolkit consists of a list of websites and other information regarding Composite Hazard-Risk Assessment, public outreach, and community training. Find the toolkit here: https://www.usfa.fema.gov/wui/index.html.

COMPOSITE HAZARD-RISK ASSESSMENT MODELING PROCESS

Our Composite Hazard-Risk Assessments comprise multiple inputs, which can be grouped into three categories: hazard, threat, and values. The result is a raster data layer that weighs and sums those inputs to determine risk. Datasets in the hazard category include historical weather data, topography, and vegetation and fuel regimes. Datasets in the threat category include fire history points and perimeters. The values category includes the WUI, distance from fire station, and natural, cultural, and socioeconomic assets datasets.

As shown in Figure A.15 with the elements in the black shaded box, we began by using the Interagency Fuel Treatment Decision Support System (IFTDSS) application to prepare a landscape file for the project area. This landscape file compiles multiple LANDFIRE datasets, including fuels, slope, elevation, and aspect, into one layer that can then be used to develop fire behavior outputs. We then edited the fuels model to match the more precise local datasets and used the edited fuels and landscape file to create custom fire behavior outputs.

Next, in Esri ArcGIS Pro, we processed the fire history, fire station, WUI, and HVRA datasets to merge and create buffers where appropriate and converted the layers to rasters with the same spatial extent and resolution as the IFTDSS fire behavior outputs (30-meter cell size).

Last, we used ArcGIS Pro to run a weighted sum raster process to add all the inputs together. We assigned weights for input layers, based on feedback from the Core Team on the importance that each layer should contribute to the Composite Hazard-Risk Assessment (Figure 3.3). While weighted sum composite rasters can be better for describing more detailed variations in risk, they can be overwhelming and difficult to understand, so we also created a reclassified raster from the weighted sum composite, using the natural breaks (Jenks) method, with four categories of low, medium, high, and extreme risk.

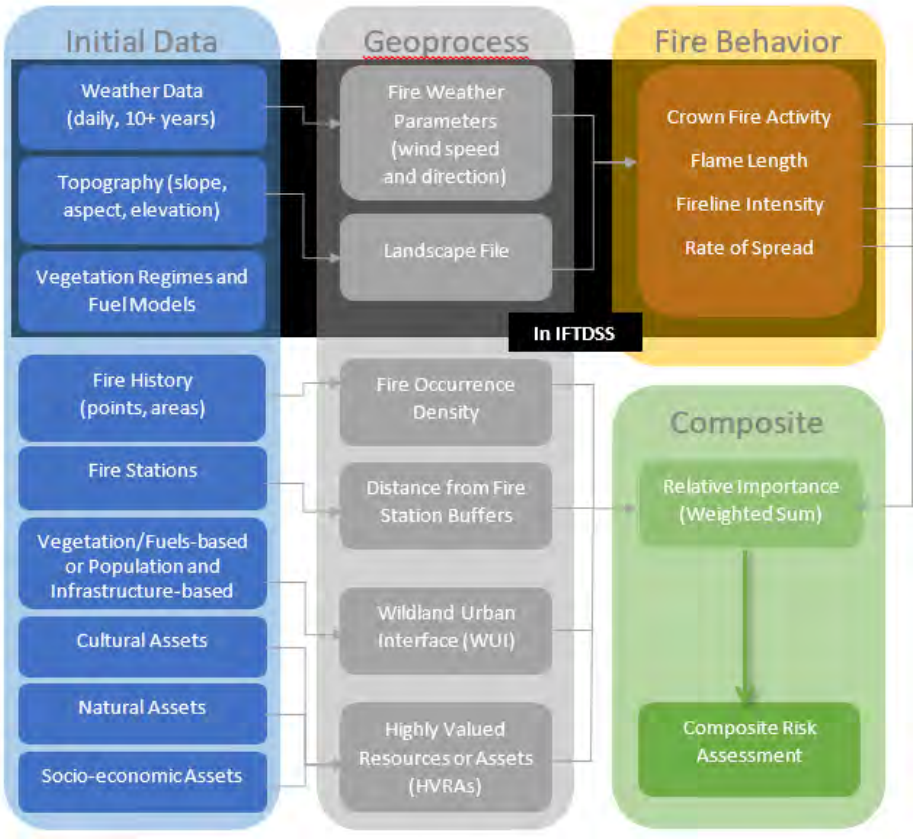

Figure. A.15. Composite Hazard-Risk Assessment Breakdown

APPENDIX B:

Maps

Figures

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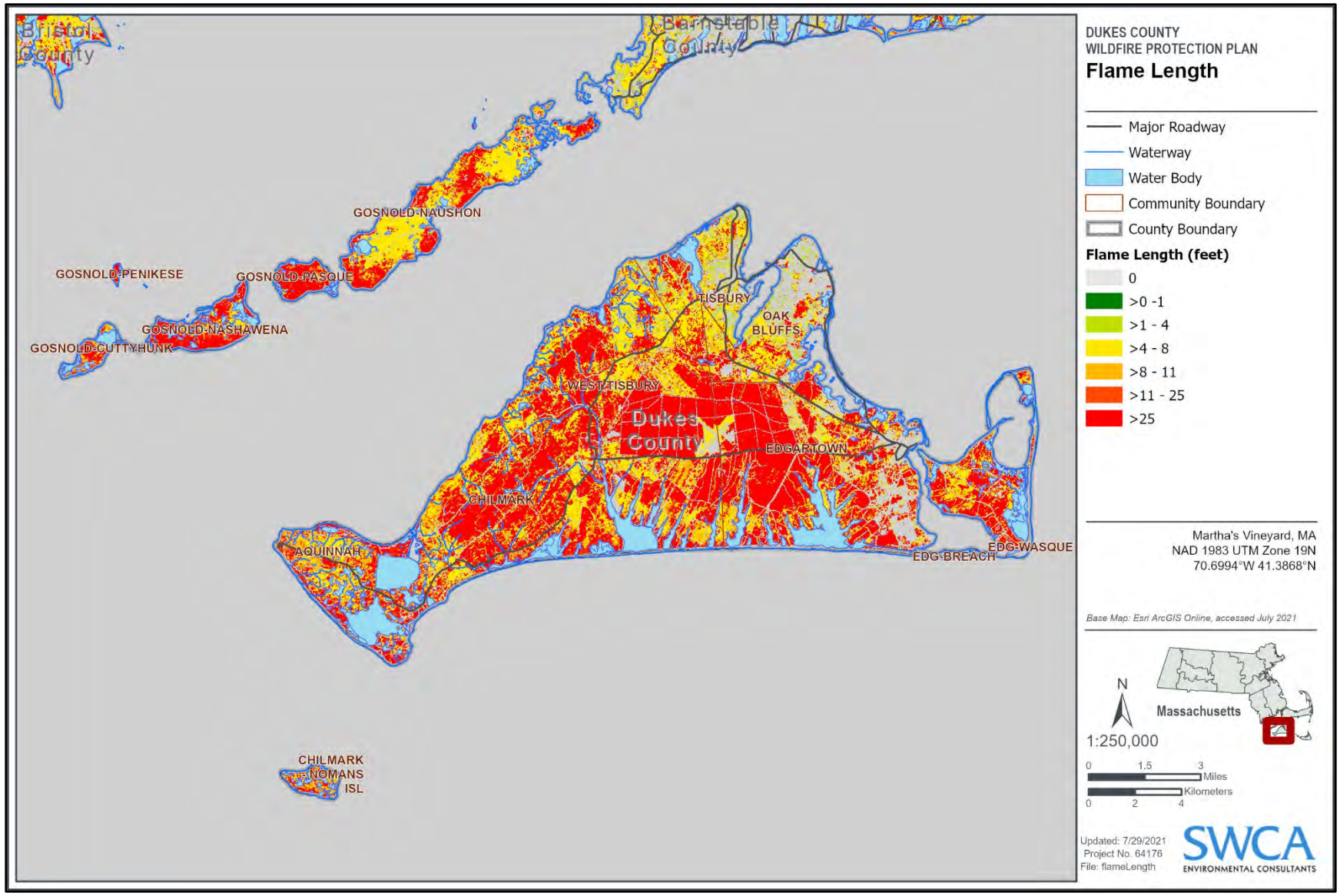
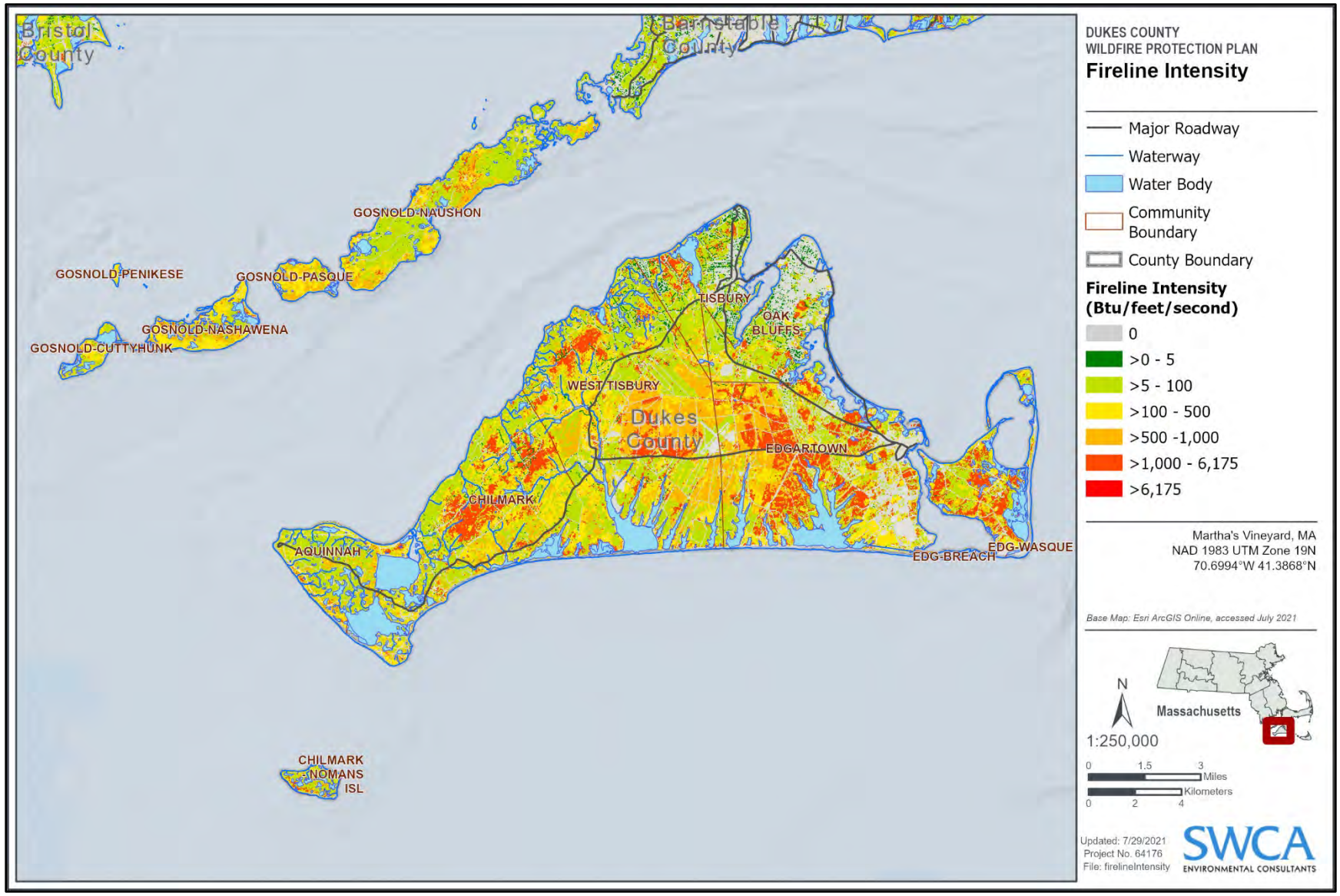
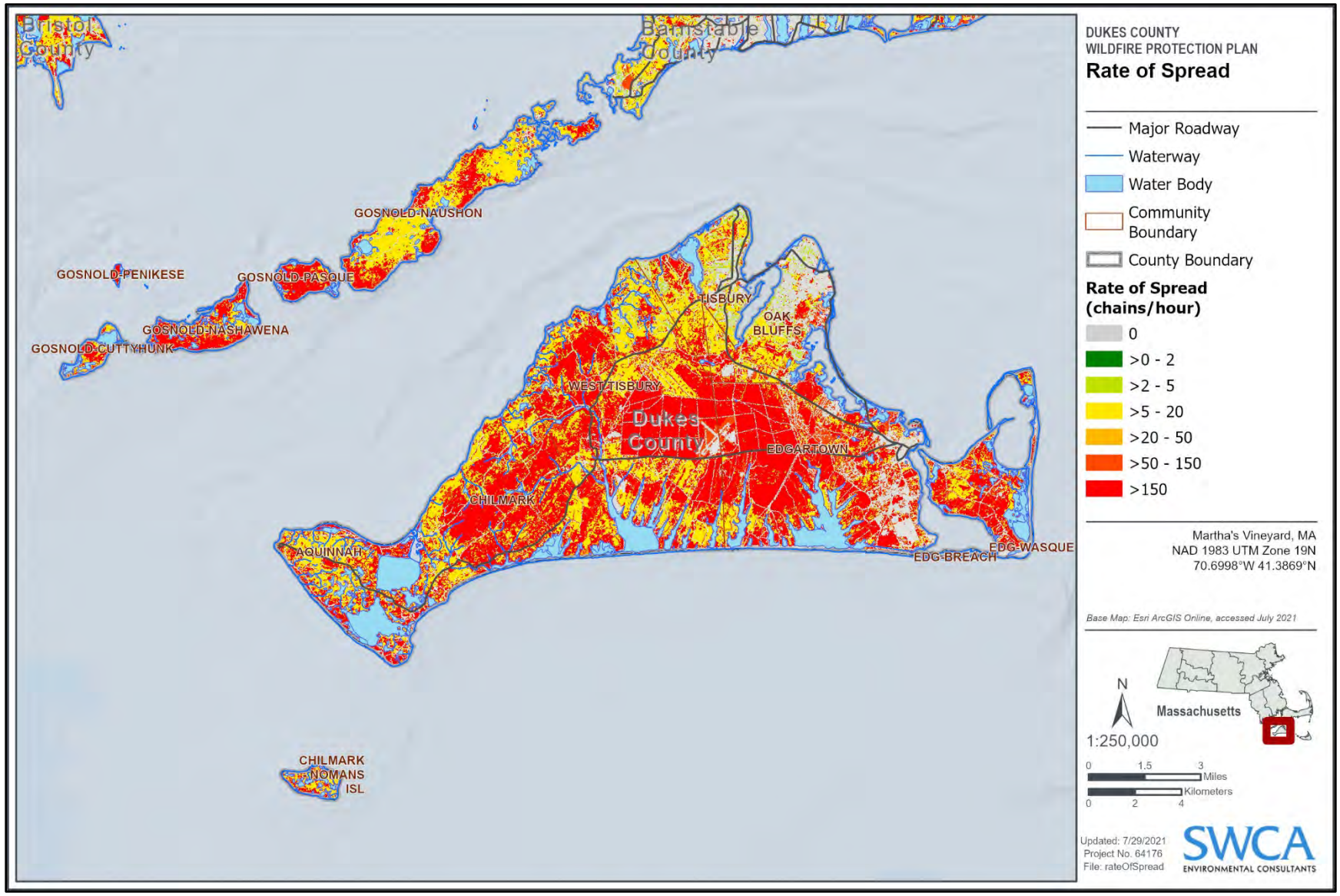


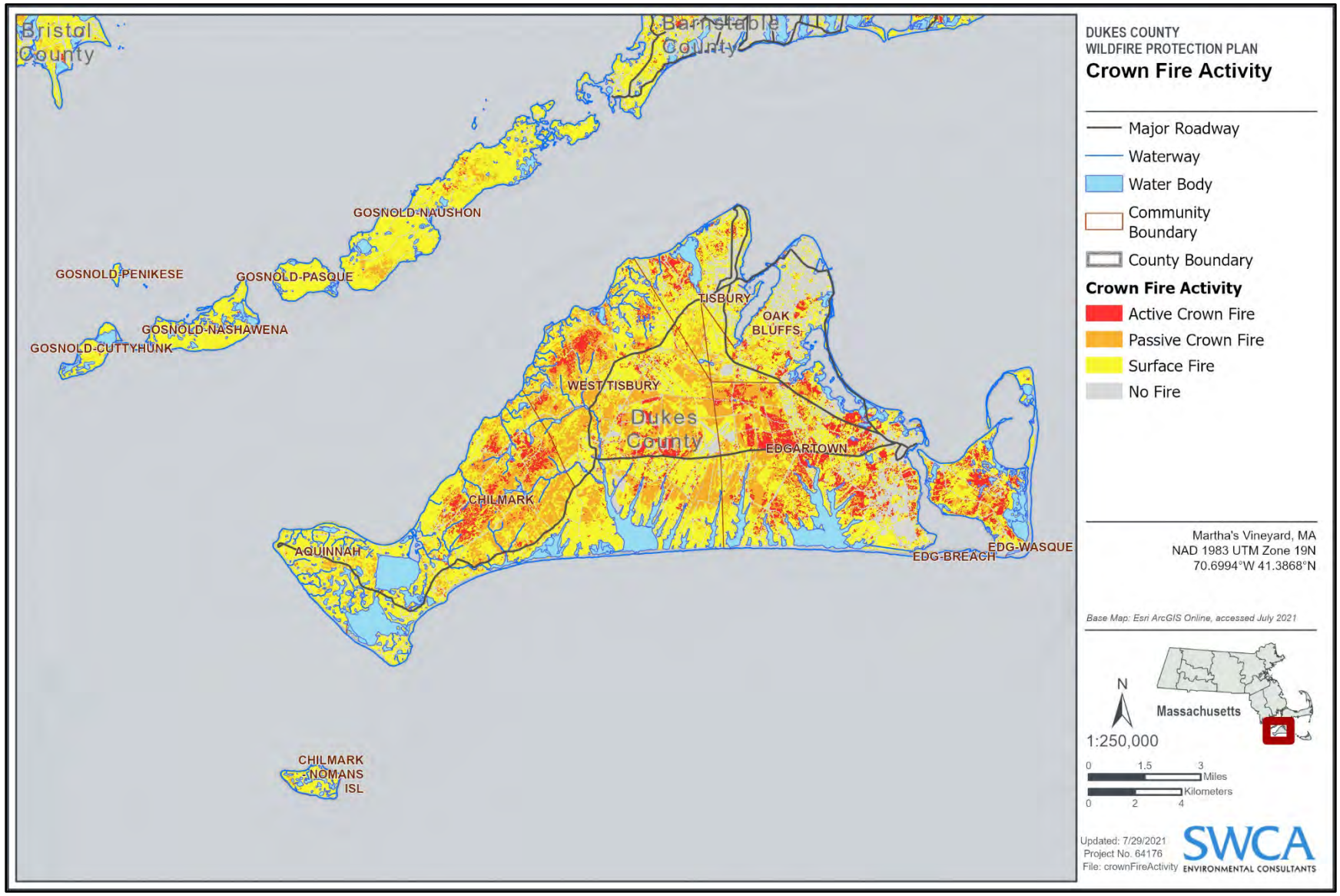
Map 1. Composite Hazard-Risk Assessment inputs: flame length.



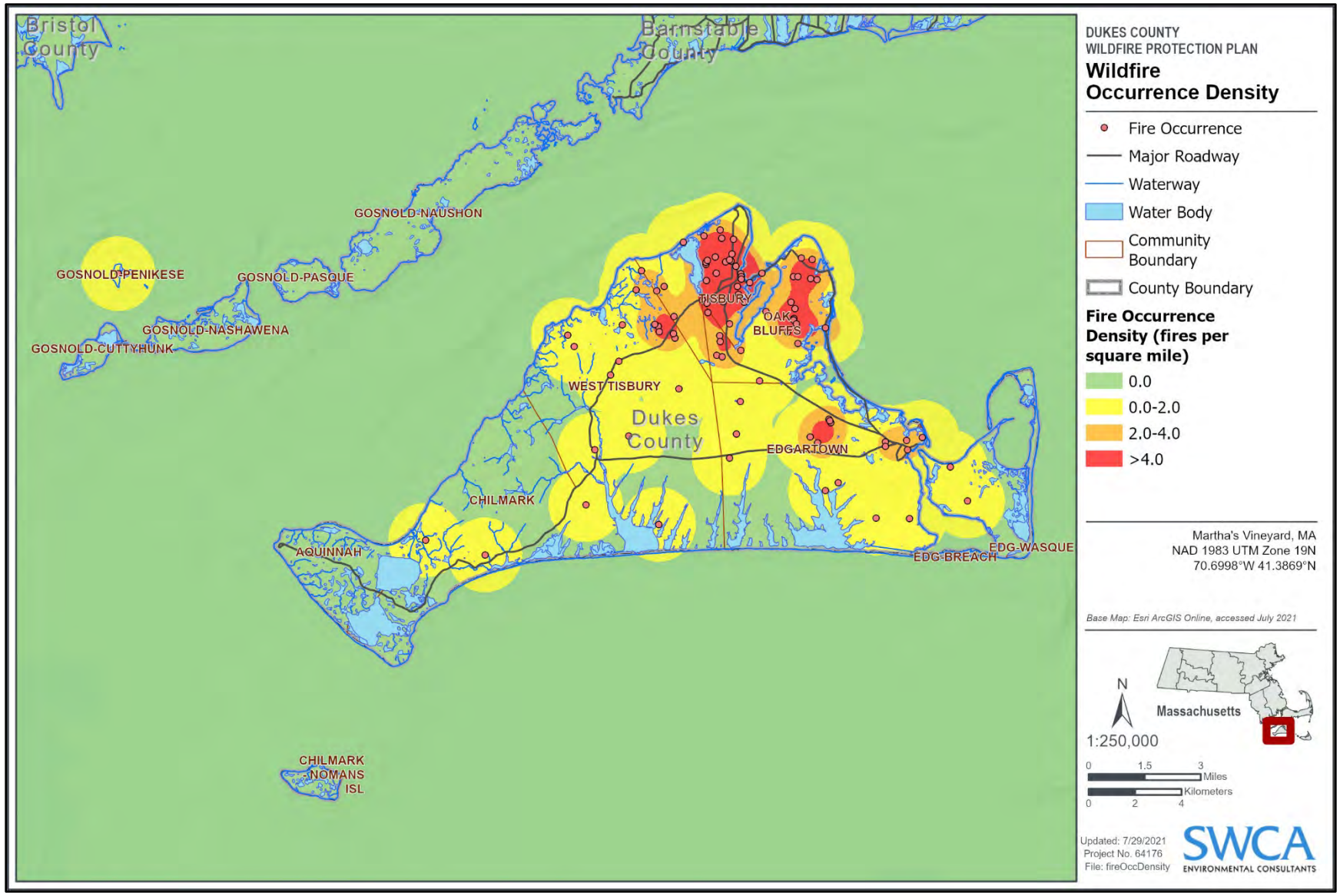
Map 2. Composite Hazard-Risk Assessment inputs: fireline intensity.



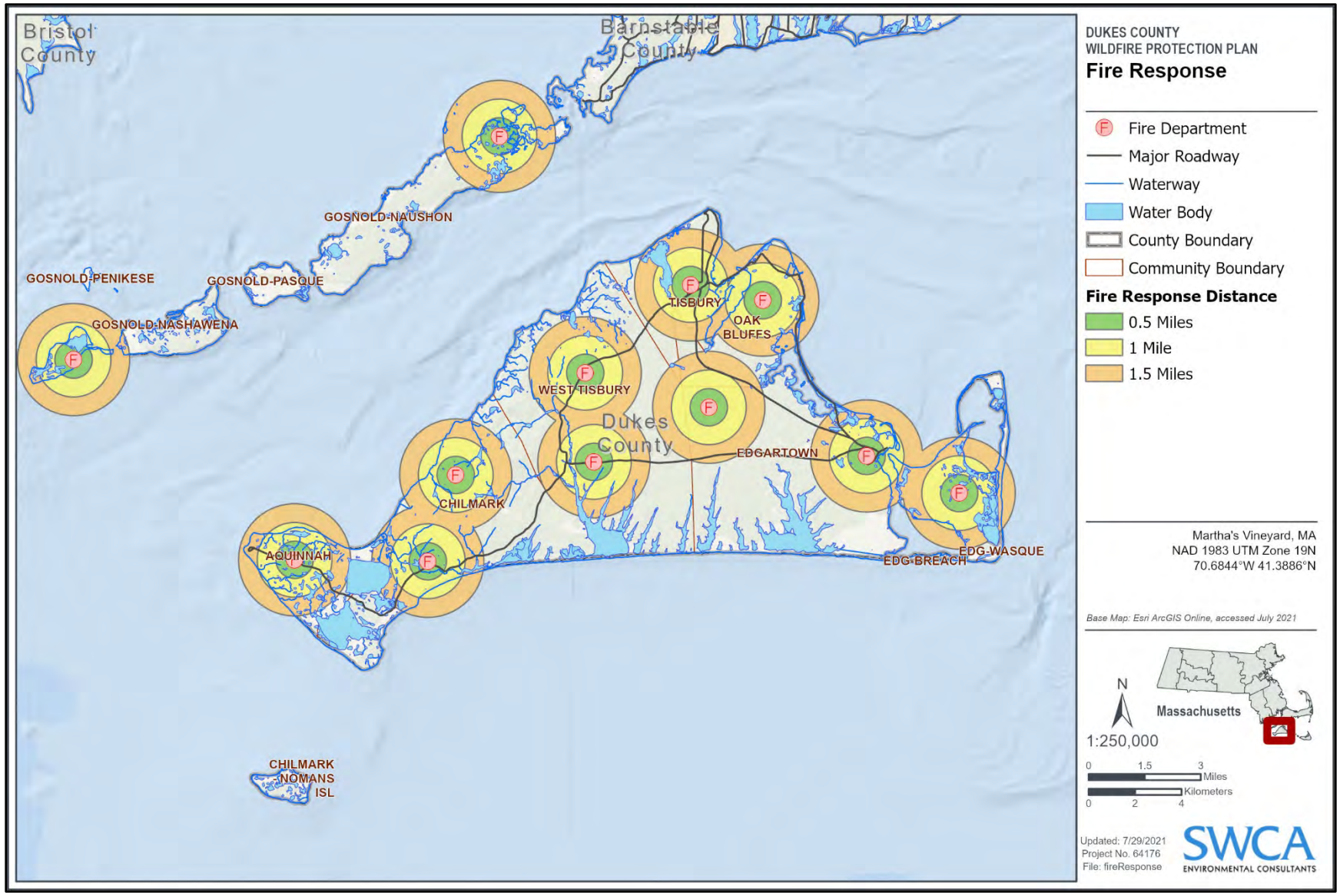
Map 3. Composite Hazard-Risk Assessment inputs: rate of spread.



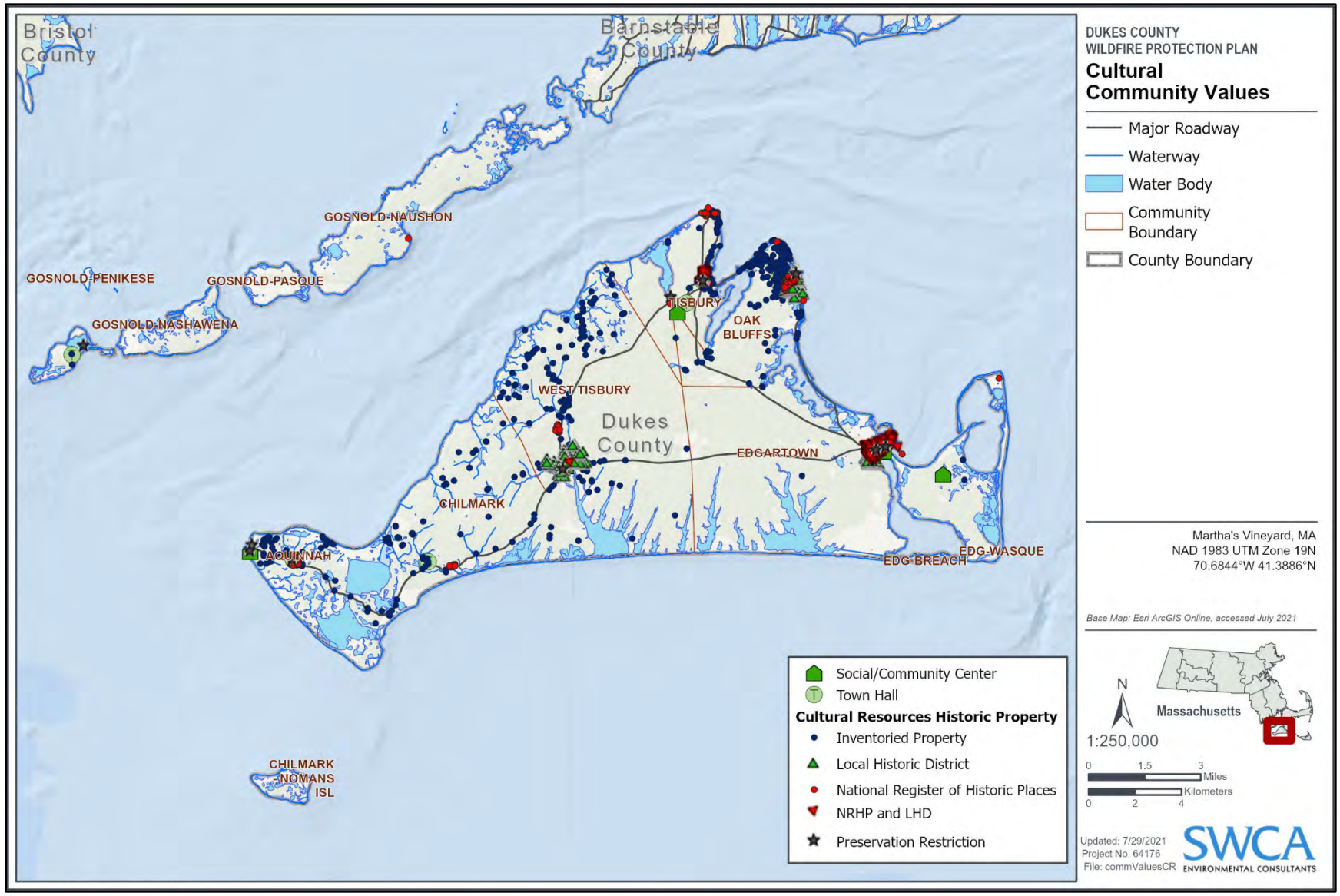
Map 4. Composite Hazard-Risk Assessment inputs: crown fire activity.



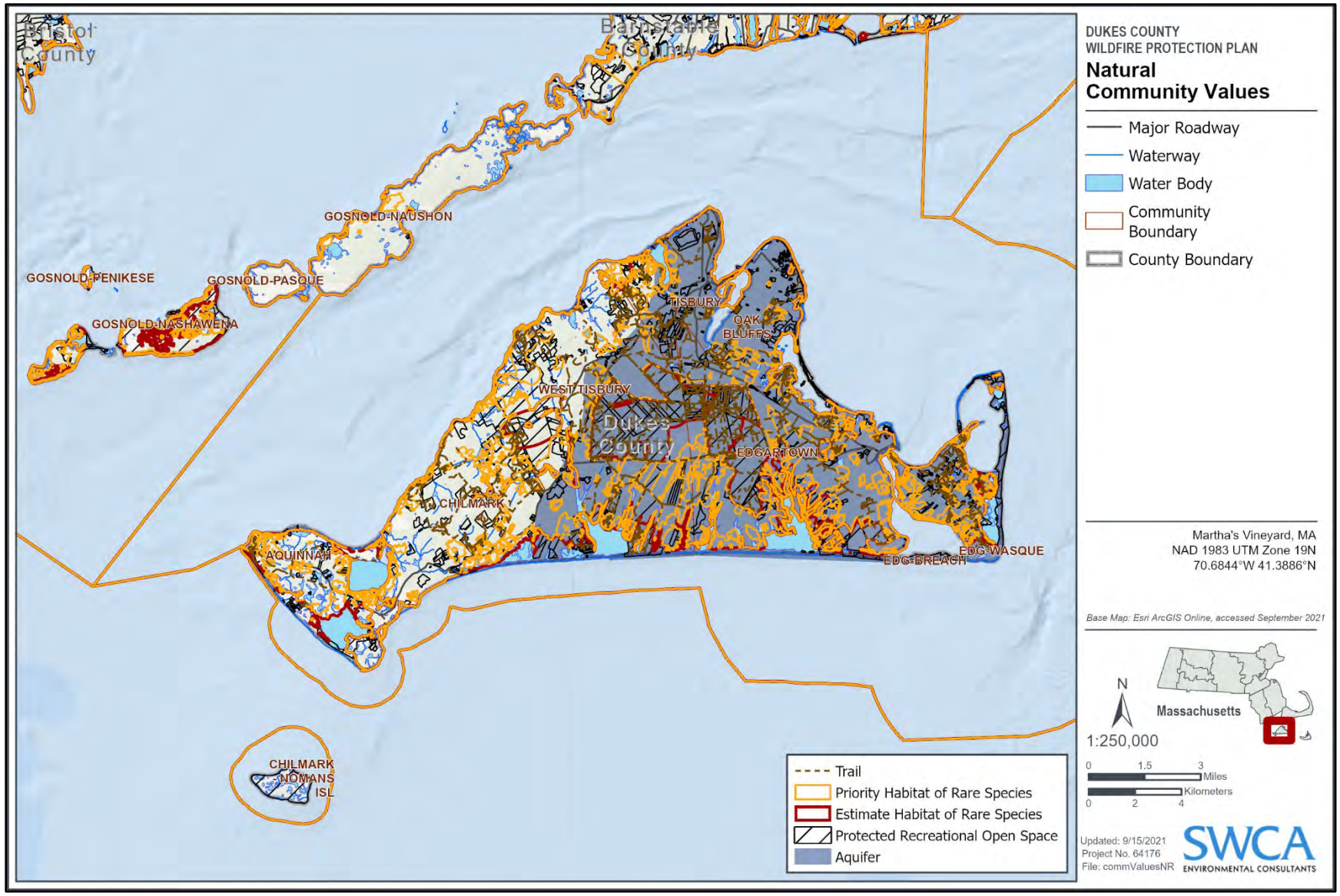
Map 5. Composite Hazard-Risk Assessment inputs: fire occurrence density.



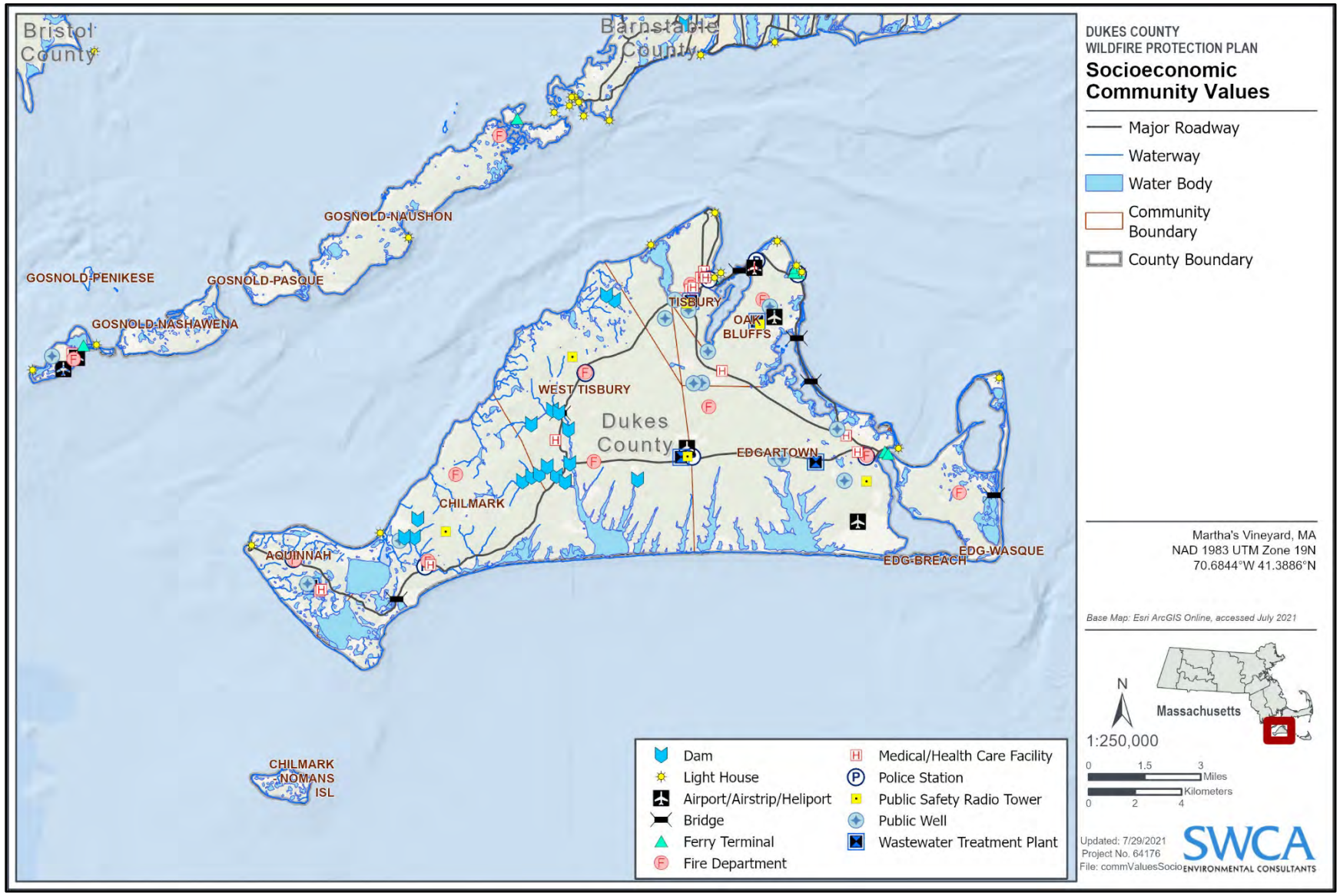
Map 6. Fire Response Within the County.



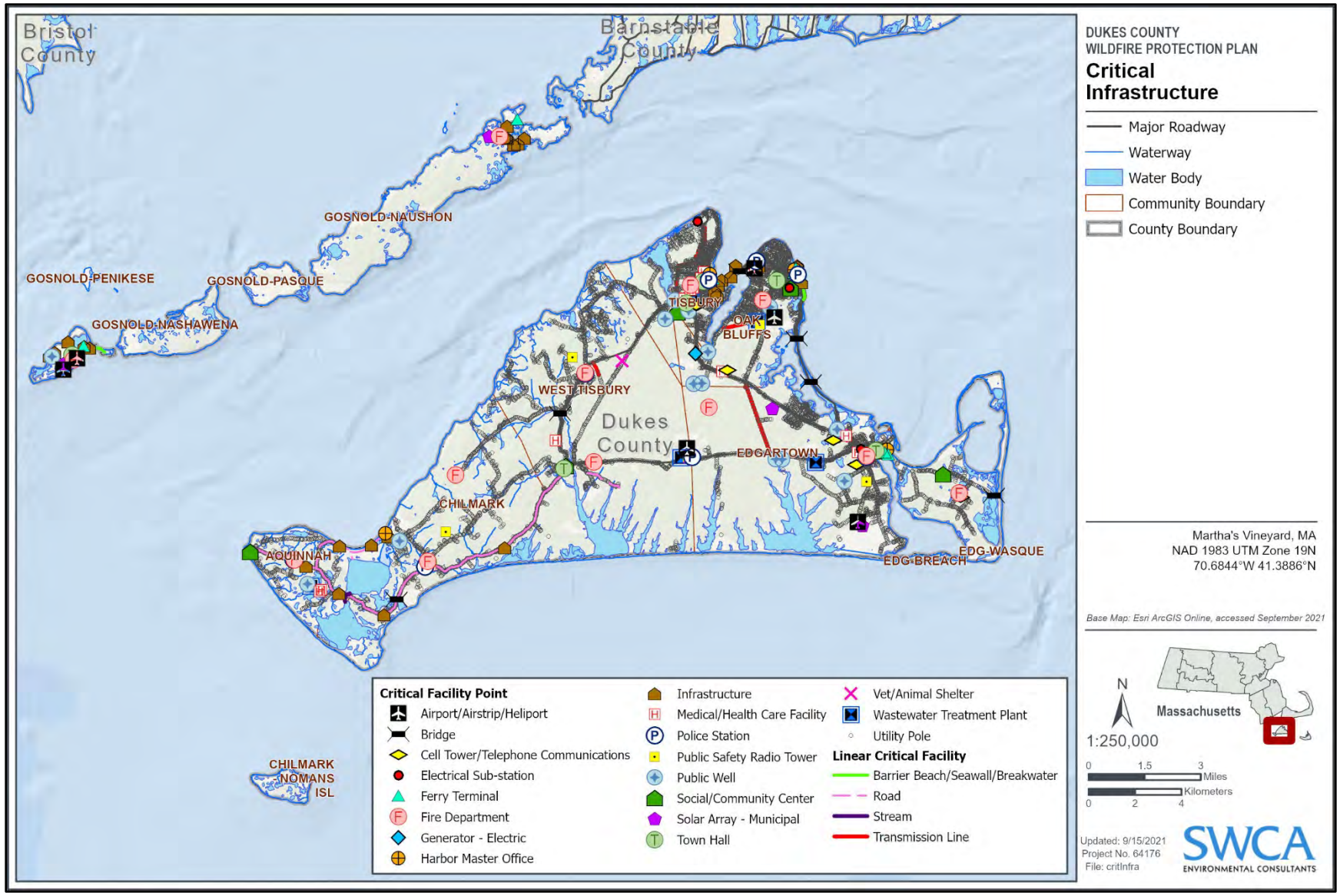
Map 7. Cultural community values at risk.



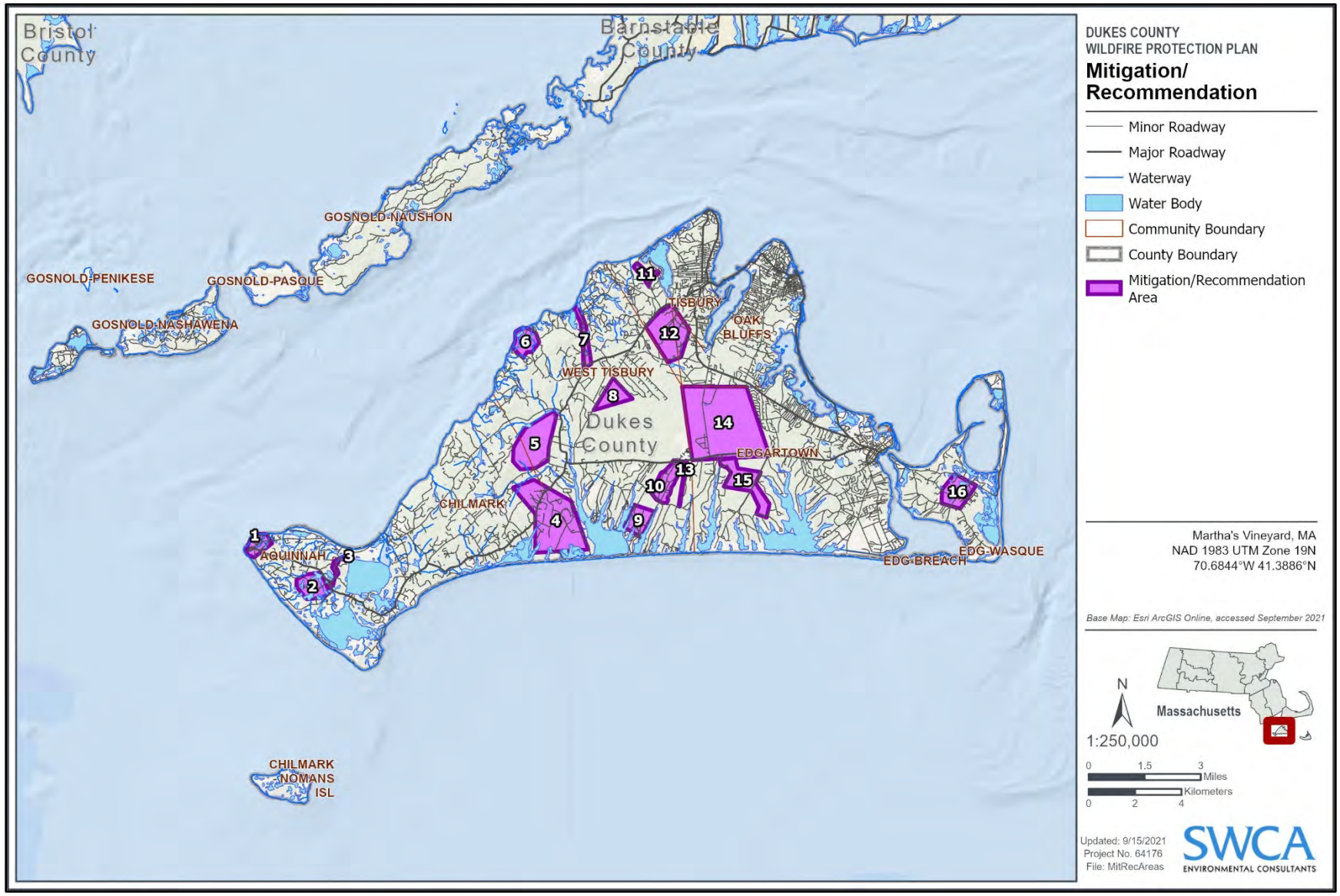
Map 8. Natural community values at risk.



Map 9. Socioeconomic community values at risk.



Map 10. Critical infrastructure.



Map 11. Site-specific project recommendations.

Table B.1.Site-Specific Project Recommendation Descriptions

Poly ID	Recommendation Details	Parties Involved	Area (acres)
1	Identify water source location and install if possible	Town	178.76
2	Identify fuel breaks and develop fuel management plan	Tribal community	289.94
3	Critical access point - maintain access and increase turnouts, etc.	Town	61.59
4	High Area of Concern (these are also Town-wide recommendations): • Increase access – widen roads where possible and add turnouts, etc. • Identify water sources and reduce time to fill up at water source locations	Town Road Associations	1,372.79
5	TNC Woods Preserve: • Manage vegetation due to gypsy moth damage • Maintain roads and consider developing fuel break	TNC Town	708.56
6	Widen existing trails to 5 feet Identify potential hydrant or water storage location	Sheriff's Meadow Town	236.70
7	Identify a location for and install a dry hydrant or water storage	Town	163.68
8	"The Triangle" *(RFP developed to implement work)*: • Define 400-foot fuel break on south side and develop fuel break on northeast side • Develop multiple units and develop mowing plan including defined access road(s) • Update habitat management plan	DCR	237.15
9	Identify a location for a hydrant or water storage and install if possible	Town	261.84
10	Identify water source location	Town	302.86
11	Phillips Preserve: • Potential Hydrant or water storage location- identify and install • Increase road turnouts, etc.	Sheriff's Meadow Town	89.84
12	Martha's Vineyard Public Campground and surrounding area: • Identify and develop fire breaks (around the perimeter and within) • Identify location for newly installed hydrant (if possible)	Martha's Vineyard Land Bank Campground Town(s)	677.75
13	Vegetation management area: • Used to be maintained – establish new maintenance procedures	Private Landowner/HOA Town	27.32

Poly ID	Recommendation Details	Parties Involved	Area (acres)
14	State Forest: • Address fuel breaks and widen existing fuel breaks • Determine if changes need to be made to fuel breaks and maintenance regime	DCR Town	2,333.68
15	Work with NHESP to develop year-round mowing/management Consider creating fuel breaks	DCR NHESP Sheriff's meadow	470.06
16	Particular fuel management concerns *(also concern across Chappaquiddick)*: • Education to private homeowners – emphasize more defensible space • Fuel management on Town and Conservation lands (where necessary) o Particular focus on treating scrub oak and reducing presence of ladder fuels	Town Private Homeowners Conservation Land Owners	338.40

Notes: These polygons relate to location-specific recommendations that could be identified at the time of the last Core Team Meeting (September 2, 2021). This does not exhaust all recommendations, as there are non-location-specific recommendations as well. Furthermore, each community will continue to develop recommendations as more data is collected.

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APPENDIX C:

Core Team List

Name	Organization
Dan Doyle	Martha's Vineyard Commission
Chris Seidel	Martha's Vineyard Commission
Adam Turner	Martha's Vineyard Commission
Liz Durkee	Martha's Vineyard Commission
Josh Nigro	Mass. Department of Conservation and Recreation
Karyn Lothrop	State Forest (DCR)
Alex Schaeffer	Edgartown Fire Department
Adam Moore	Sheriff's Meadow Foundation
Reade Milne	Edgartown Building Commission
Geoff Freeman	Martha's Vineyard (KMVY) Airport
Bret Stearns	Wampanoag Tribe
Beckie Finn	Wampanoag Tribe
Julie Russell	Martha's Vineyard Land Bank Commission
Naomi Valentine	SWCA Environmental Consultants
Victoria Amato	SWCA Environmental Consultants
Arianna Porter	SWCA Environmental Consultants
Breanna Plucinski	SWCA Environmental Consultants
Anne Russell	SWCA Environmental Consultants
Liz Hitzfelder	SWCA Environmental Consultants

Thank you to all the Fire Chiefs who dedicated time for site visits along with their critical insights throughout the planning process. Thank you also to Isaac and Noli Taylor, who represented the Town of Aquinnah during our field visits in their town. In addition, the Core Team would like to acknowledge the important contributions of Joel Carlson, Wildland Fire Program Coordinator at Massachusetts Army National Guard, while dedicating his time to a key session during this planning process.

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APPENDIX D:

Community Descriptions and Hazard Ratings

CONTENTS

Figures

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DUKES COUNTY
WILDLAND URBAN INTERFACE COMMUNITIES

TOWN OF AQUINNAH SUMMARY STATISTICS

Town:	Aquinnah	**Population Density (people/*mi.²*)[1]:**	57.6
Land Area (*mi.²*)	5.33	**Home Density (housing units/ *mi.²*)[2]:**	94.4
		Town Housing Units Vacant for Seasonal/Recreational Use (%)[1,2]:	69.8
		Seasonal/Vacationers (%)[1]:	79.9

Percent of Town Classified by Wildland Urban Interface Types

68.64

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
51.08	13.31	13.96	21.65

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 63.35	0-5 (ch./hr.): 51.09	No Data: 13.23	0-0.5 (mi.): 14.7
4-8 (ft): 8.82	5-20 (ch./hr.): 13.20	Surface Fire: 78.22	0.5-1.0 (mi.): 40.8
8-12 (ft): 4.70	20-50 (ch./hr.): 0.05	Passive Crown Fire: 7.56	1.0-1.5 (mi.): 29.2
>12 (ft): 23.12	>50 (ch./hr.): 35.57	Active Crown Fire: 0.99	>1.5 (mi.): 15.3

Fire Department Statistics

Fire stations: 1 Fulltime Firefighters: 0 Call Firefighters: 0 Volunteer Firefighters 13

Water Tender			Wildland Engines		
Type 1:	1			4WD/AWD	Brush Breaker
Type 2:	0		Type 3:	0	0
Type 3:	0		Type 4:	0	0
Structure Engines			Type 5:	0	0
Type 1:	1		Type 6:	0	0
Type 2:	0		Type 7:	0	0

Port-A-Tanks: 1 Portable Pumps: 1

Current Fire and Fuel Management Programs and Plans

- Wampanoag Tribe Fire Management Plan

1144 Survey Summary	
Positive Attributes (Low Scores)	Negative Attributes (High Scores)
• History of Fire Occurrence	• Ingress/Egress
• Water Sources	• Road Width
• Station Location	• Fire Access
•	• Defensible Space
•	• Siding and Decking Materials

Community Polygon NFPA 1144 Summaries	
Community Polygon Name	Total Score
Aquinnah	84

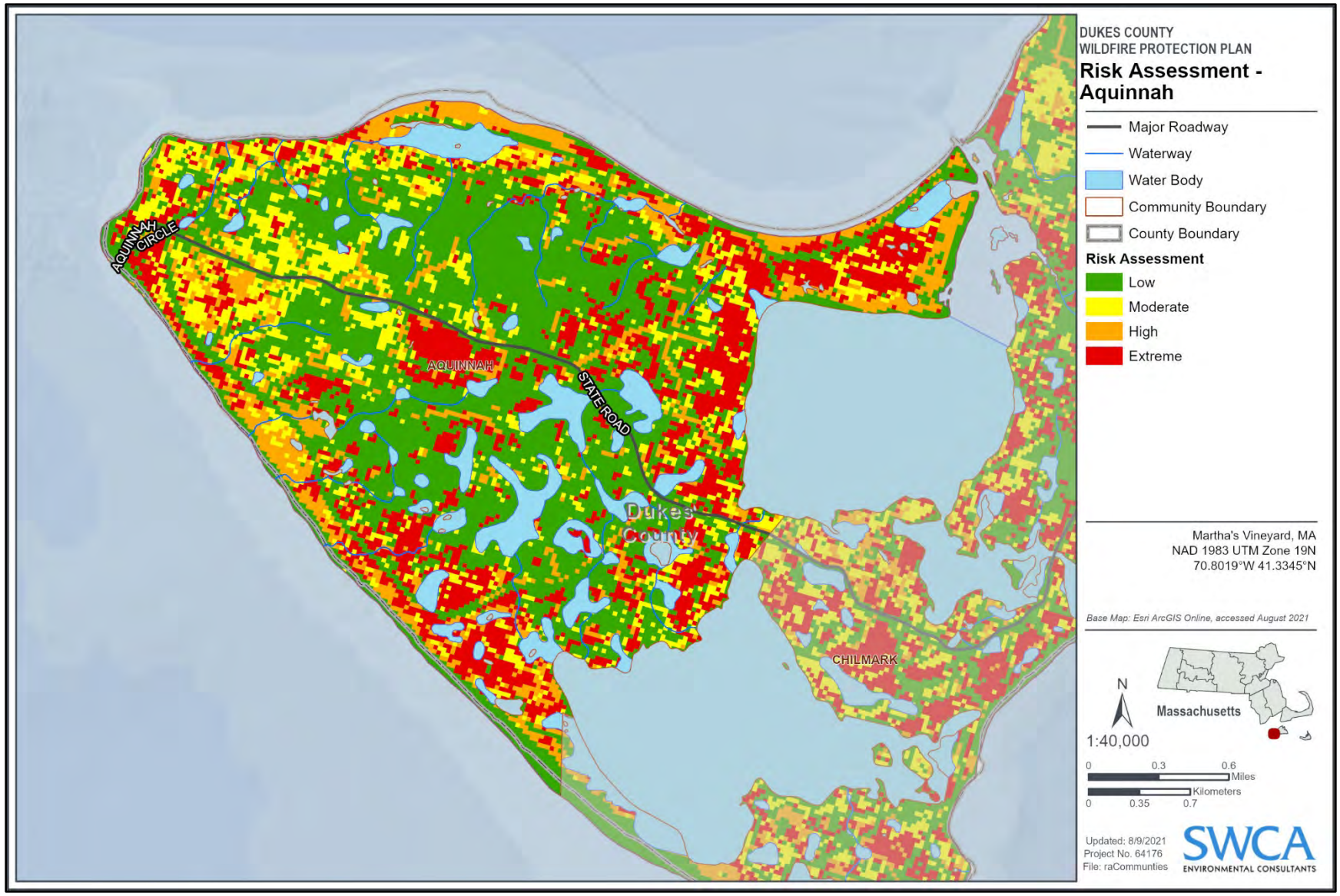

Figure D.1.a Community Composite Hazard-Risk Assessment for Aquinnah.

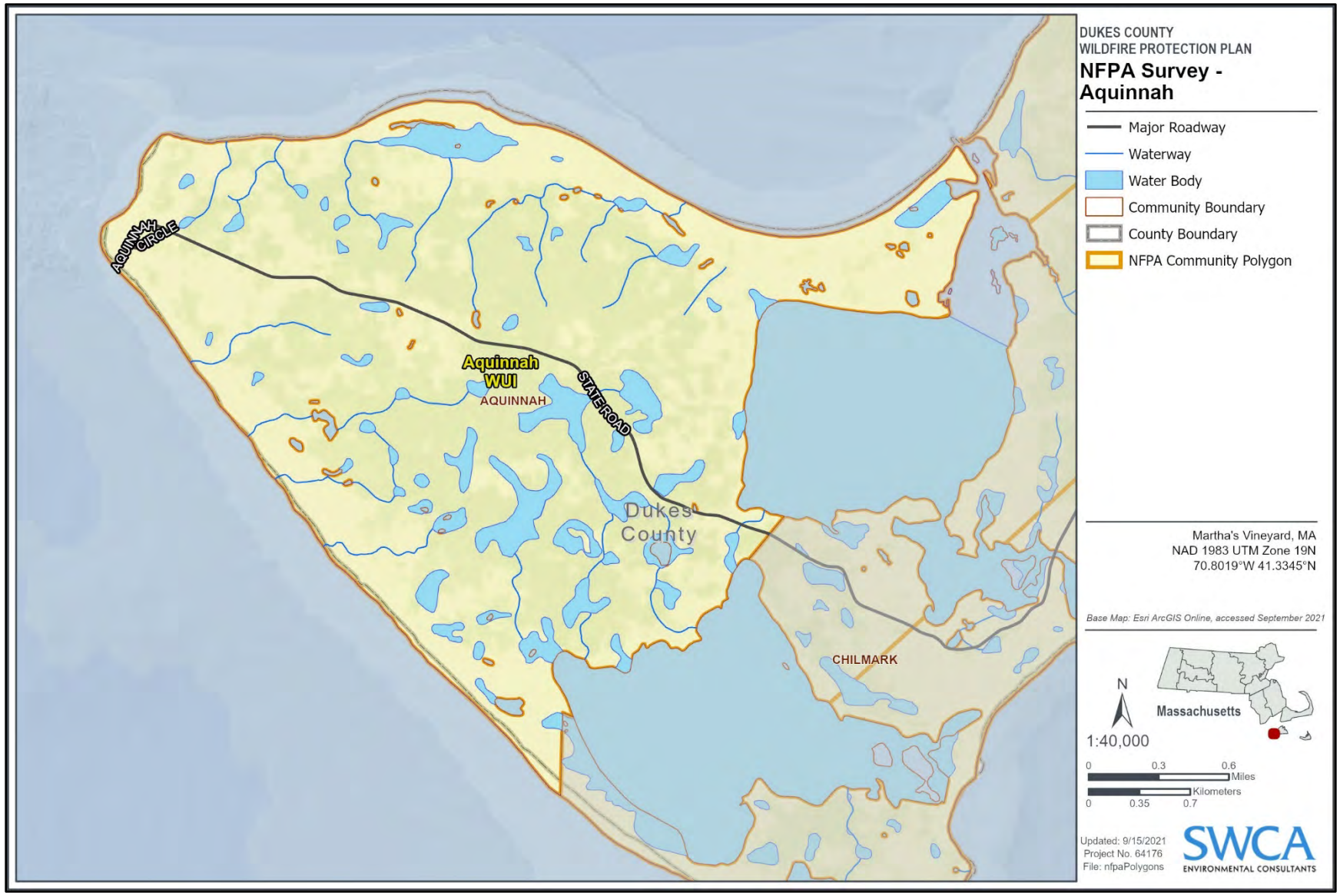

Figure D.1.b NFPA Community Survey Polygons for Aquinnah.

Figure D-1.c. Narrow winding road within the Aquinnah Polygon.

Figure D-1.d. Narrow road with no defensible space within the Aquinnah polygon.

Aquinnah Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/ Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Aquinnah								
Fire break installation around values at risk	Vanderhoop Homestead	Private Landowners HOAs Town Conservation Orgs	Increase fire breaks to double as fire access. Create defensible space around property Coordinate with Sheriff's Meadow Foundation and the Land Bank, as abutting land is owned by these parties	Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. Create a fuel arrangement unlikely to support crown fire Ensure the protection of vulnerable ecosystems and values at risk.	Within 2 years	H	Regular maintenance needed to ensure the fuel break remains clear of vegetation. Monitor for invasive species. Continued management of fire breaks maintained by grazing, brush breaking, controlled burns.	See Appendix F: Funding Sources
Understory Vegetation Management	Prioritize areas rated as high or extreme risk as identified in the Composite Hazard-Risk Assessment.	Town HOAs	Utilize the fire behavior modeling completed for the CWPP to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire responders could more safely suppress future wildfire. Focus on following treatments: -Removing ladder fuels in pitch pine/scrub oak areas to reduce extreme fire behavior, intensity, and rates of spread. -Carryout understory vegetation management to minimize surface to canopy continuity.	Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential. Consider a full tool kit of mitigation measures.	Within 2 years	H	Carry out a 2-year review of accomplishments in reducing hazardous fuels. Calibrate fuel model based on treatment effectiveness at altering fuel loading. Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.	See Appendix F: Funding Sources

Aquinnah Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Aquinnah								
Mitigate home ignition zone concerns related to poor defensible space, potential combustible construction materials and limited fire access.	Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment. Structures in coastal areas	Private Homeowners HOAs	Offer hands-on Firewise workshops to highlight individual home vulnerabilities and how-to techniques to reduce ignitability of common structural elements. Provide printed list of mitigation measures to homeowners with different scales of actions. Initiate neighborhood wide assessments of structure access and educate homeowners on needed driveway width to accommodate apparatus.	Educate homeowners on the actions that they can take to be proactive with fire safety.	Summer 2022	H	Annual review- report on how many residents have been reached. Complete NFPA 1144 assessments every 5 years to quantify reduction in risk associated with construction material mitigations and defensible space.	See Appendix F: Funding Sources

Aquinnah Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Aquinnah								
Increase access by emergency vehicles within the community	[*Need FD to provide specific areas that justify this action. This will help with grant applications in the future*]	Fire Department Town HOAs	Purchase smaller vehicles and additional corresponding mobile equipment to access narrow roads. Develop a list of the vehicles needed to increase the safety and capacity.	Improve fire-fighting response if smaller more agile vehicles are available to navigate the narrow unimproved roads	Within 2 years	H	NA	See Appendix F: Funding Sources
Mandate fire access to all pools.	Town-wide	Town	Work with private residence and HOAs to draft a MOA allowing access to pools at private residence during a wildfire incident. Include both new pool mandates and means to request access of existing pools.	Enhance fire suppression capabilities in areas with limited water supply.	Within 2 years	H	Review success of measure annually.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Enhance access to wildfire training	Fire Department	Fire Department	NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. Use online forum to facilitate scheduling. Work with State and federal agencies to develop evening and weekend courses for volunteers. Pursue online training programs and have trainees work with an in-house trained mentor to complete training. Facilitate Annual refresher participation by having in-house refreshers available or convene departments to have a Duke County wide refresher. Utilize available funds for volunteers to participate in annual Wildfire Academy. Educate fire departments on the availability of volunteer fire assistance grants that could be used to purchase equipment and support training	Add more capacity and provide for safe and effective wildfire response.	Spring 2022	H	Annual review of training opportunities and barriers to attendance	See Appendix F: Funding Sources
Equip all personnel with PPE and wildfire equipment	Fire department	Fire department	Seek grant money to be spent on acquisition of PPE. Task a member of the department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by all personnel.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Develop pre-fire plans to address potential fire behavior in areas of high hazard	Town-wide	Fire department	Review the Composite Hazard-Risk Assessment and identify areas with potential for extreme fire behavior. Ensure a seat at the table for discussion with land management agencies to develop plans for mitigation.	Improve public and firefighter safety and situational awareness	Spring 2022	H		See Appendix F: Funding Sources

TOWN OF CHILMARK SUMMARY STATISTICS

Town:	Chilmark	**Population Density (people/*mi.²*):**	45.2
Land Area (*mi.²*)	19.04	**Home Density (housing units/ *mi.²*):**	84.3
		Town Housing Units Vacant for Seasonal/Recreational Use (%):	80.5
		Seasonal/Vacationers (%):	82.1

Percent of Town Classified by Wildland Urban Interface Types

64.93

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
31.59	15.93	7.01	45.47

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 46.96	0-5 (ch./hr.): 39.08	No Data: 12.44	0-0.5 (mi.): 4.1
4-8 (ft): 5.63	5-20 (ch./hr.): 8.50	Surface Fire: 54.22	0.5-1.0 (mi.): 10.8
8-12 (ft): 1.77	20-50 (ch./hr.): 0.26	Passive Crown Fire: 25.10	1.0-1.5 (mi.): 12.3
>12 (ft): 45.64	>50 (ch./hr.): 52.16	Active Crown Fire: 8.23	>1.5 (mi.): 72.8

Fire Department Statistics

Fire stations: 2 Fulltime Firefighters: 1 Call Firefighters: 0 Volunteer Firefighters 32

Water Tender			Wildland Engines	
Type 1:	0		4WD/AWD	Brush Breaker
Type 2:	1	Type 3:	0	0
Type 3:	0	Type 4:	0	0
Structure Engines		Type 5:	1	0
Type 1:	2 (1 4WD)	Type 6:	0	0
Type 2:	1 (Brush Breaker & 4WD)	Type 7:	0	0

Port-A-Tanks: 2 Portable Pumps: 2

Current Fire and Fuel Management Programs and Plans

- Road clearance requirements
- The Identification, classification and evaluation of water sources located in the Town of Chilmark, MA

1144 Survey Summary	
Positive Attributes (Low Scores)	Negative Attributes (High Scores)
• Ingress/Egress (inland communities) • Water Source (see narrative for details) • • •	• Ingress/Egress (coastal communities) • Understory & Forest Fuel Type • Defensible Space • Roof, building, decking, and fencing materials • Placement of Gas and Electric Utilities

Community Polygon NFPA 1144 Summaries	
Community Polygon Name	Total Score
Coastal Chilmark	97
East Chilmark	93
South Central Chilmark	75
North Central Chilmark	71

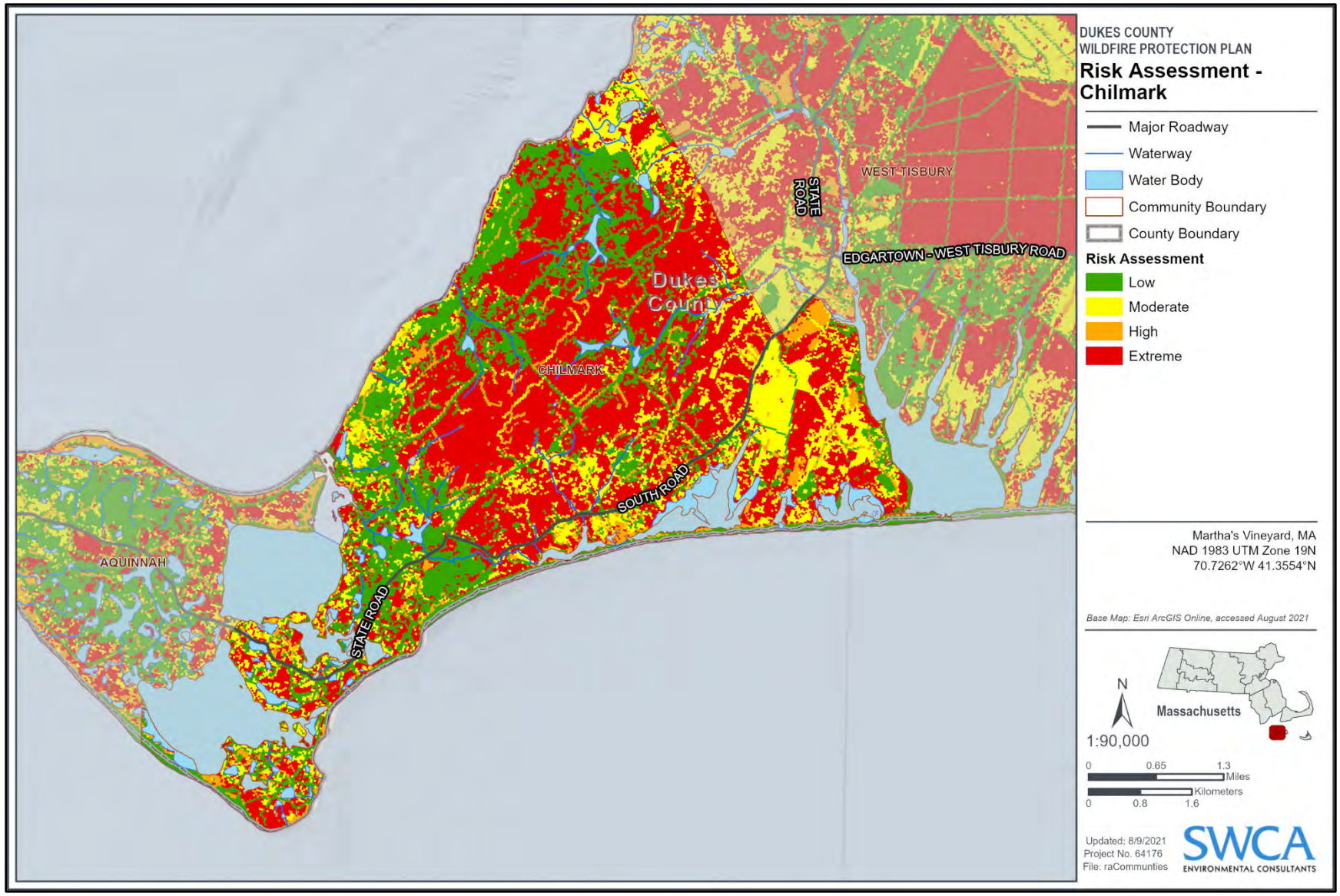

Figure D.2.a Community Composite Hazard-Risk Assessment for Chilmark.

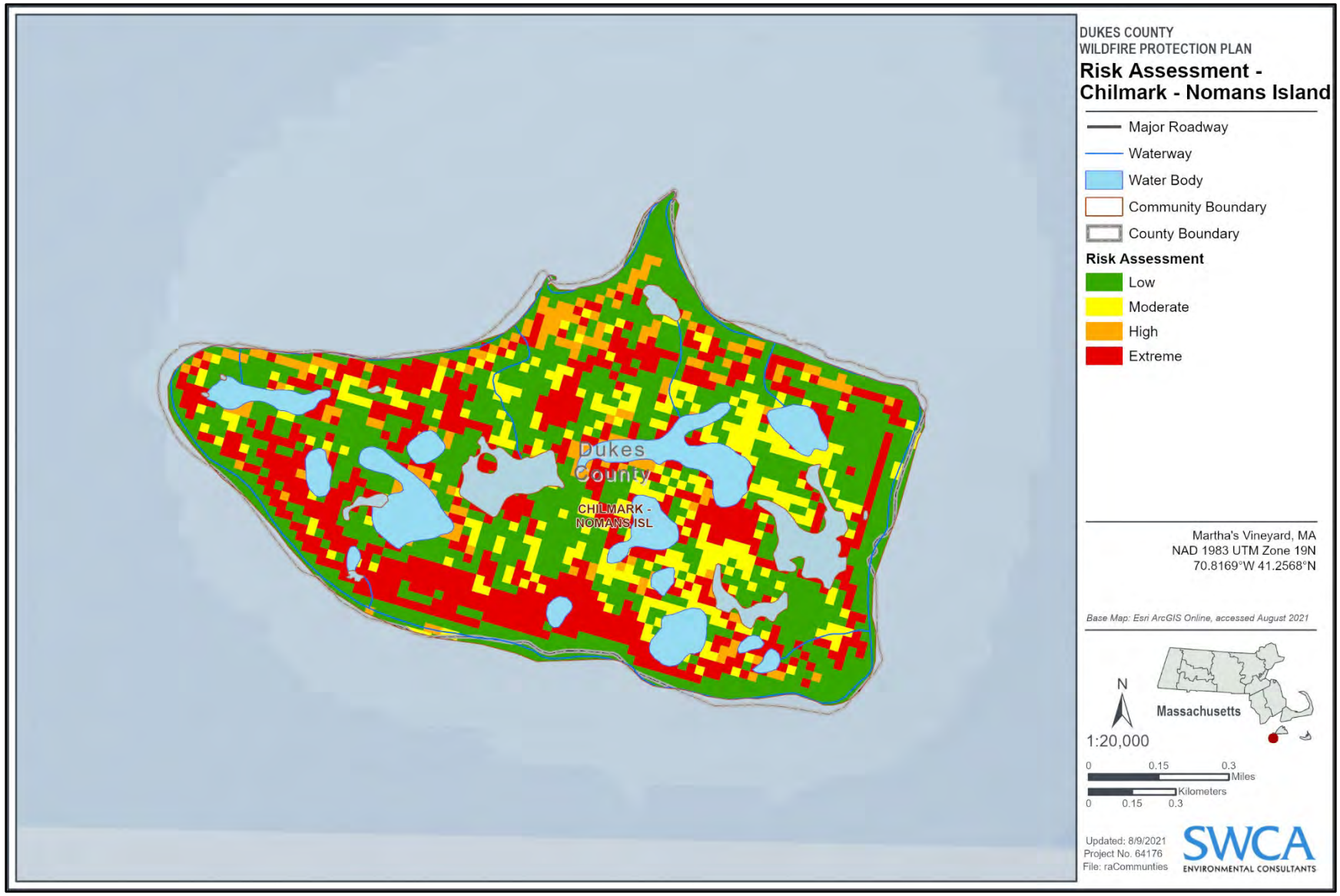

Figure D.2.b Community Composite Hazard-Risk Assessment for Chilmark – Nomans Island.

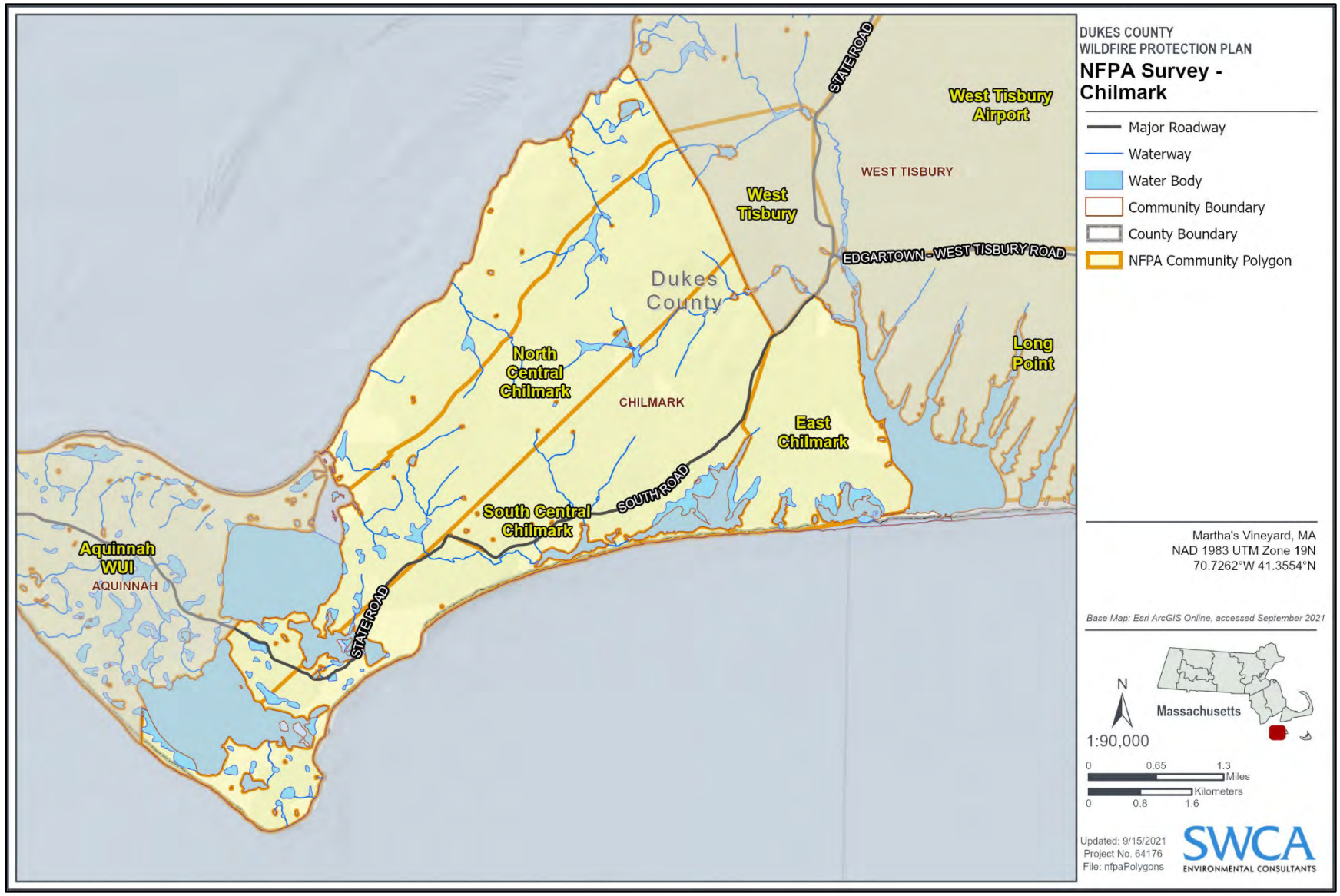

Figure D.2.c NFPA Community Survey Polygons for Chilmark.

Figure D-2.d. Narrow winding road with heavy fuel loads within the Chilmark Polygon.

Figure D-2.e. Extremely limited defensible space within the Chilmark Polygon.

Chilmark Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Chilmark								
Develop strategic road turnouts/buffers and fire breaks along poor access roadways	Prioritize roadways that abut high and extreme risk areas, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: North Road to water Middle of town South Road to water	Town HOAs Private Landowners	<u>Roadway improvements:</u> While increasing roadway width is not feasible in many locations, create passing areas where possible should be prioritized. Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing) <u>Road ROW vegetation improvements:</u> Annual spring maintenance of ROW Treat surface fuels for a minimum of 10 ft turnout/buffer and up to 30ft where possible. Strive for 15-ft clearance free of branches and brush, minimum height of 15 ft, and a goal for a 14-ft wide road surface on narrower roads (*In line with current plan by the Chilmark Fire Chief*) Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles Control of plants that may contribute to rapid fire spread (i.e., weeds and grasses).	Provides for safe and effective wildfire response capabilities Creates a strategic fuel break along roadways to create potential firebreak, given landowner permission is granted.	Spring 2022	H	Regular maintenance needed to ensure the roads are drivable for emergency response vehicles	See Appendix F: Funding Sources

Chilmark Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Chilmark								
Create fire maps for distribution to residents to increase understanding of potential fire risk	All residents	N/A	Utilize the CWPP fire behavior mapping for distribution of risk maps to residents. Distribute in the form of a flyer delivered house-to-house or share via social media.	Increase awareness of the potential for fire spread into the community.	Spring 2022	H	NA	See Appendix F: Funding Sources

Chilmark Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Chilmark								
Increase water sources	Chilmark-Menemsha public water supply Improve access to potential water sources of turtle cove pond, Harlock Pond, and Tiasquam River.	Town Fire Department Conservation Orgs	Strategic placement of 8,000 gallon holding tanks for fire suppression purposes. Will require local fire code and land development amendments. (*Plan already in place by Chilmark Fire Chief).* Increase ability to draft water at different locations around Chilmark through improvements that will accommodate tanker access (i.e., Brush removal, creation of compacted soil areas where tanks wont sink). Utilize conservation organizations to assist in strategically locating tanks where feasible.	Improve fire-fighting response if water is more readily available. Alleviates public and agency concern for limited water supply in remote areas.	Within 2 years	H	NA	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Increase communications through cell phone dead zones	Town-wide	Fire Department/ Town Private cellular companies	Cellular communications are poor in West Tisbury and Chilmark. Cell phone providers need to determine this need and fund tower construction. This would need to occur in response to public demand for service	Improve public and firefighter safety and situational awareness	Spring 2022	H		See Appendix F: Funding Sources
Increase access by emergency vehicles within the community	[*Need FD to provide specific areas that justify this action. This will help with grant applications in the future*]	Fire Department Town HOAs	Purchase smaller vehicles and additional corresponding mobile equipment to access narrow roads. Develop a list of the vehicles needed to increase the safety and capacity.	Improve fire-fighting response if smaller more agile vehicles are available to navigate the narrow unimproved roads	Within 2 years	H	NA	See Appendix F: Funding Sources
Increase address signage visibility	Town-wide	Town	There is a need to educate homeowners on the law regarding maintaining good visibility of address markers. Implement program to replace existing house number markers with reflective markers that meet consistent standard. Education on proper placement and maintenance of address markers.	Improves fire response times and assists out-of-town responders who are not familiar with the local area, especially at night. Would need funding to implement program. Could consider private contributions.	Summer 2023	M	Document number of house markers distributed. Complete NFPA1144 assessments after 2 years to determine change in behavior.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Enhance access to variety of wildfire training options	Town-wide	Fire Department	NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. Use online forum to facilitate scheduling. Work with State and federal agencies to develop evening and weekend courses for volunteers. Pursue online training programs and have trainees work with an in-house trained mentor to complete training. Facilitate Annual refresher participation by having in-house refreshers available or convene departments to have a Duke County wide refresher. Utilize available funds for volunteers to participate in annual Wildfire Academy. Educate fire departments on the availability of volunteer fire assistance grants that could be used to purchase equipment and support training	Add more capacity and provide for safe and effective wildfire response.	Spring 2022	H	Annual review of training opportunities and barriers to attendance	See Appendix F: Funding Sources
Equip all personnel with PPE and wildfire equipment	Fire department	Fire department	Seek grant money to be spent on acquisition of PPE. Task a member of the department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by all personnel.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Recruit and retain fire fighters	Fire department	Fire department Town	Methods that may be considered for addressing this and other training issues include the following: -Recruit young people locally and from major population centers who are interested in a fire service career for a summer residency program. In exchange for staffing the station several shifts per week, they will receive basic wildland fire and other training that can launch their careers. -Determine qualification needs and provide training to accomplish these needs. For example, in 3 years the department would like to have 10 Type II firefighters, four squad leaders, three driver/operators, three engine bosses, etc.. Defining specific goals would aid in recruiting strategies, resource allocations, mutual aid, and automatic aid. -Create an interagency training cadre to establish a routine class rotation. -Educate fire-fighters in WUI and Firewise procedures so that they can in turn educate residents during their daily interactions.	Improve capacity for fire response.	Within 5 years	M	Annual review of recruitment	See Appendix F: Funding Sources

TOWN OF EDGARTOWN SUMMARY STATISTICS

Town:	Edgartown	**Population Density (people/*mi.²*):**	150.6
Land Area (*mi.²*)	26.81	**Home Density (housing units/ *mi.²*):**	194.7
		Town Housing Units Vacant for Seasonal/Recreational Use (%):	72.8
		Seasonal/Vacationers (%):	69.0

Percent of Town Classified by Wildland Urban Interface

69.80

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
32.28	16.12	5.30	46.30

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 48.10	0-5 (ch./hr.): 38.93	No Data: 26.98	0-0.5 (mi.): 5.7
4-8 (ft): 4.24	5-20 (ch./hr.): 9.53	Surface Fire: 43.27	0.5-1.0 (mi.): 14.7
8-12 (ft): 1.92	20-50 (ch./hr.): 0.37	Passive Crown Fire: 12.67	1.0-1.5 (mi.): 14.4
>12 (ft): 45.74	>50 (ch./hr.): 51.16	Active Crown Fire: 17.07	>1.5 (mi.): 65.2

Fire Department Statistics

Fire stations: 2 Fulltime Firefighters: 1 Call Firefighters: 31 Volunteer Firefighters 0

Water Tender			Wildland Engines	
Type 1:	0		4WD/AWD	Brush Breaker
Type 2:	0	Type 3:	0	0
Type 3:	1	Type 4:	0	0
Structure Engines		Type 5:	0	0
Type 1:	4	Type 6:	2	0
Type 2:	0	Type 7:	0	0

Port-A-Tanks: 1 Portable Pumps: 1

Current Fire and Fuel Management Programs and Plans

-

1144 Survey Summary

Positive Attributes (Low Scores)	Negative Attributes (High Scores)
• Present but not reflective signage	• Ingress/Egress (Chappy & South Edgartown)
• Topographic features	• Heavy fuel load & fuel type (Chappy, South Edgartown, & State Forest)
• Water source (E. Edgartown & State Forest)	• Building, fencing, and decking materials
•	• Water Source (Chappy & South Edgartown)

Community Polygon NFPA 1144 Summaries

Community Polygon Name	Total Score
South Edgartown	88
Chappaquiddick	84
Edgartown Golf Course	83
Katama Bay – Dense Residential	80
State Forest	59
Katama Bay	55

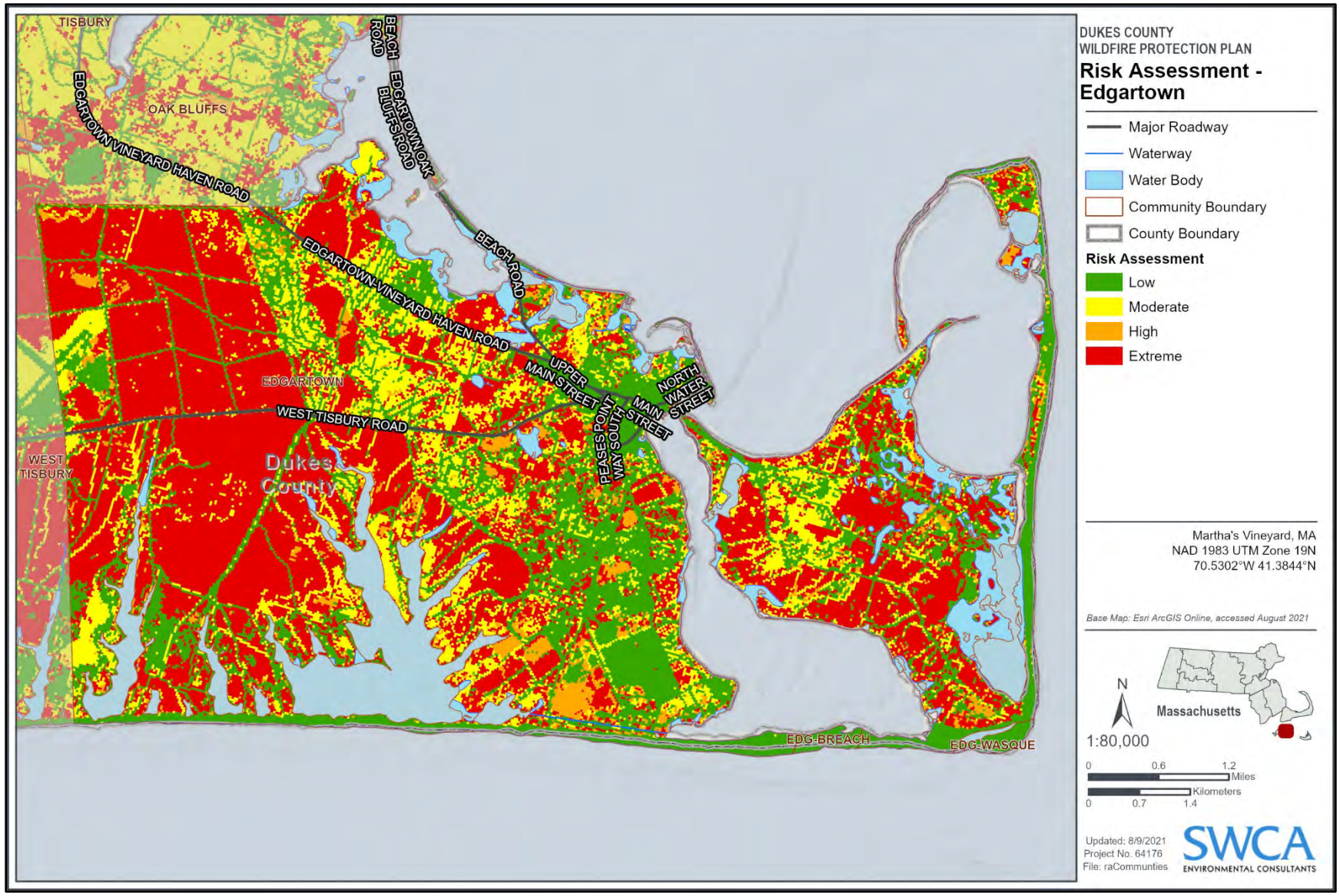

Figure D.3.a. Community Composite Hazard-Risk Assessment for Edgartown.

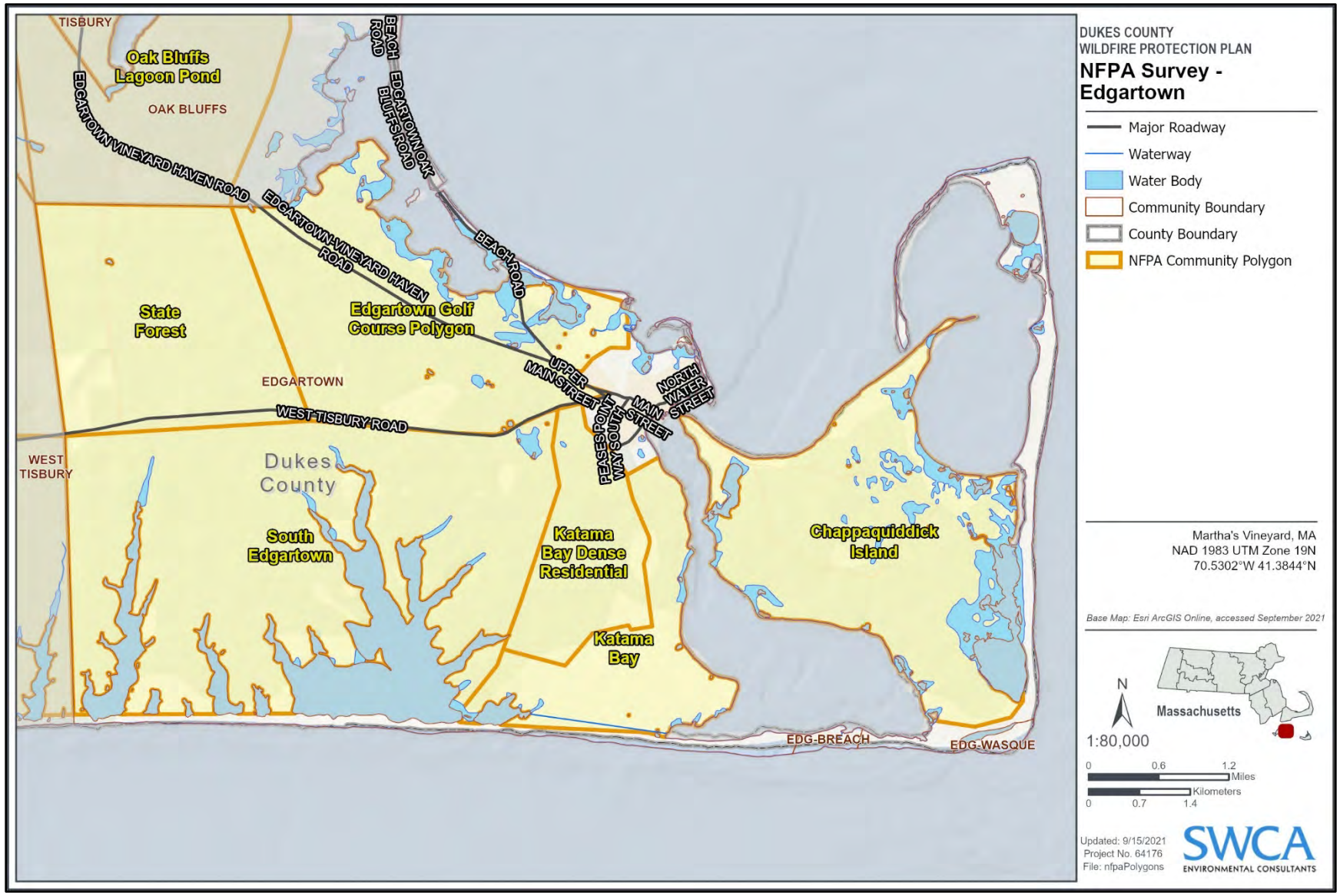

Figure D.3.b NFPA Community Survey Polygons for Edgartown.

Figure D-3.c. Narrow road with heavy fuel loads within the Edgartown polygon.

Figure D-3.d. Heavy fuel loads within the Edgartown polygon.

Edgartown Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Edgartown								
Mitigate heavy and hazardous fuel loads close to structures	Chappaquiddick, Katama and State Forest Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: Chappaquiddick State Forest Ocean Heights	State and Local MVC Conservation Orgs (especially on Chappaquiddick)	Utilize the fire behavior modeling completed for the CWPP to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire responders could more safely suppress future wildfire. Focus on following treatments: -Removing ladder fuels in pitch pine/scrub oak areas to reduce extreme fire behavior, intensity, and rates of spread. -Carryout understory vegetation management to minimize surface to canopy continuity. -Treat small patches of state land tucked into residential areas. -Create mosaic of vegetation types and stand ages to reduce vertical continuity of vegetation to limit fire spread. -Prepare to treat fine fuels that establish in areas of insect mortality and defoliation. Scrub oak shrublands are vulnerable to defoliation by the fall cankerworm. Defoliation occurs in spring when fire hazard is already high. Fine fuels in the understory dry out rapidly because of defoliation and increased sunlight to the understory. -Preferentially treat hazardous fuel types first- e.g., pitch pines.	Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential. Consider a full tool kit of mitigation measures.	Within 2 years	H	Carry out a 2-year review of accomplishments in reducing hazardous fuels. Calibrate fuel model based on treatment effectiveness at altering fuel loading. Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
			-Treat areas impacted by frost (frost bottoms) to reduce potential for intense fire behavior due to high fuel loading and high temps during fire season.					
Develop strategic road turnouts/buffers and fire breaks along poor access roadways	Prioritize roadways that abut high and extreme risk areas, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: Chappaquiddick Ocean Heights Rural Southwestern Portion of Town	State Forest Town Private Landowners	<u>Roadway improvements:</u> While increasing roadway width is not feasible in many locations, create passing areas where possible should be prioritized. Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing) <u>Road ROW vegetation improvements:</u> Annual spring maintenance of ROW Treat surface fuels for a minimum of 10 ft turnout/buffer and up to 30ft where possible. See Chapter 4 'Cohesive Strategy Goals 1: Restore and Maintain Landscapes' for treatment types in various vegetation types. Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles Control for invasive species that may contribute to rapid fire spread (i.e., weeds and grasses).	Provides for safe and effective wildfire response capabilities Creates a strategic fuel break along roadways to create potential firebreak	Spring 2022	H	Regular maintenance needed to ensure the roads are drivable for emergency response vehicles	See Appendix F: Funding Sources

Edgartown Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Edgartown								
No specific actions for structural ignitability or public education and outreach identified. See Island-wide measures.								

Edgartown Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Edgartown								
Address ingress and egress concerns	Chappaquiddick and Katama	Town Conservation Orgs	Carry out pre-fire planning and drills to map and build strategy for difficult access areas. Work with the town to look into road improvements- widening/passing areas. Work with homeowners to identify improvements to driveways to increase access and turnarounds. Work with landowners to look into alternative egress routes, maybe across private land. Work with landowners to increase ROW clearance of vegetation to facilitate safe passage of apparatus. Develop plan to more easily, quickly, and consistently access Chappaquiddick (smaller engines, in-community equipment, etc.)	Improve safe and effective wildfire response	Ongoing	H	Create running task list and assess on a 6 month basis.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Identify water sources	Chappaquiddick and Katama	Town Conservation Orgs	Initiate a detailed study of feasible locations for water development improvements. Install dry hydrants to pump pond water for firefighting. If there is no pond nearby, install a water source. Install hand pumps or other methods independent of the grid for accessing private well water. Install holding tanks on Chappaquiddick.	Improve fire-fighting response if water is more readily available or closest locations could be identified on a GIS map on a tablet/computer. Alleviates public and agency concern for limited water supply in remote areas	Within 2 years	H	Review number of water improvements annually and remaining needs.	See Appendix F: Funding Sources
Increase access by emergency vehicles within the community	Chappaquiddick [*Need FD to provide specific areas that justify this action. This will help with grant applications in the future*]	Fire Department	Purchase smaller vehicles and additional corresponding mobile equipment to access narrow roads. Develop a list of the vehicles needed to increase the safety and capacity.	Improve fire-fighting response if smaller more agile vehicles are available to navigate the narrow unimproved roads	Within 2 years	H	NA	See Appendix F: Funding Sources
Develop a collaborative mutual aid program	[*Was included in chief survey*. *Need FD assistance in describing what this would look like*]	Fire Department(s)	Collaborate with neighboring municipalities to ensure quick and effective response to wildfires.	Improve fire-fighting response time and efficacy by working as a community through a detailed program				See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Enhance access to wildfire training	Town-wide	Fire Department	NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. Use online forum to facilitate scheduling. Work with State and federal agencies to develop evening and weekend courses for volunteers. Pursue online training programs and have trainees work with an in-house trained mentor to complete training. Facilitate Annual refresher participation by having in-house refreshers available or convene departments to have a Duke County wide refresher. Utilize available funds for volunteers to participate in annual Wildfire Academy. Educate fire departments on the availability of volunteer fire assistance grants that could be used to purchase equipment and support training	Add more capacity and provide for safe and effective wildfire response.	Spring 2022	H	Annual review of training opportunities and barriers to attendance	See Appendix F: Funding Sources
Equip all personnel with PPE and wildfire equipment	Fire department	Fire department	Seek grant money to be spent on acquisition of PPE. Task a member of the department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by all personnel.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	See Appendix F: Funding Sources

TOWN OF GOSNOLD SUMMARY STATISTICS

Town:	Gosnold	**Population Density (people/*mi.²*):**	5.6
Land Area (*mi.²*)	13.19	**Home Density (housing units/ *mi.²*):**	16.3
		Town Housing Units Vacant for Seasonal/Recreational Use (%):	91.1
		Seasonal/Vacationers (%):	96.5

Percent of Town Classified by Wildland Urban Interface

1.98

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
44.84	10.39	15.71	29.06

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 54.57	0-5 (ch./hr.): 44.43	No Data: 9.88	0-0.5 (mi.): 3.0
4-8 (ft): 11.45	5-20 (ch./hr.): 10.80	Surface Fire: 85.00	0.5-1.0 (mi.): 3.1
8-12 (ft): 2.73	20-50 (ch./hr.): 0.03	Passive Crown Fire: 4.43	1.0-1.5 (mi.): 13.2
>12 (ft): 31.25	>50 (ch./hr.): 44.74	Active Crown Fire: 0.69	>1.5 (mi.): 80.7

Fire Department Statistics

Fire stations: 1 Fulltime Firefighters: 0 Call Firefighters: 0 Volunteer Firefighters 8

Water Tender			Wildland Engines	
Type 1:	0		4WD/AWD	Brush Breaker
Type 2:	0	Type 3:	0	0
Type 3:	0	Type 4:	0	0
Structure Engines		Type 5:	0	0
Type 1:	1	Type 6:	0	0
Type 2:	1 (Brush Breaker & 4WD/AWD)	Type 7:	0	0

Port-A-Tanks: 2 Portable Pumps: 0

Current Fire and Fuel Management Programs and Plans

- Cuttyhunk CWPP (2013)

1144 Survey Summary

Positive Attributes (Low Scores)	Negative Attributes (High Scores)
•	•
•	•

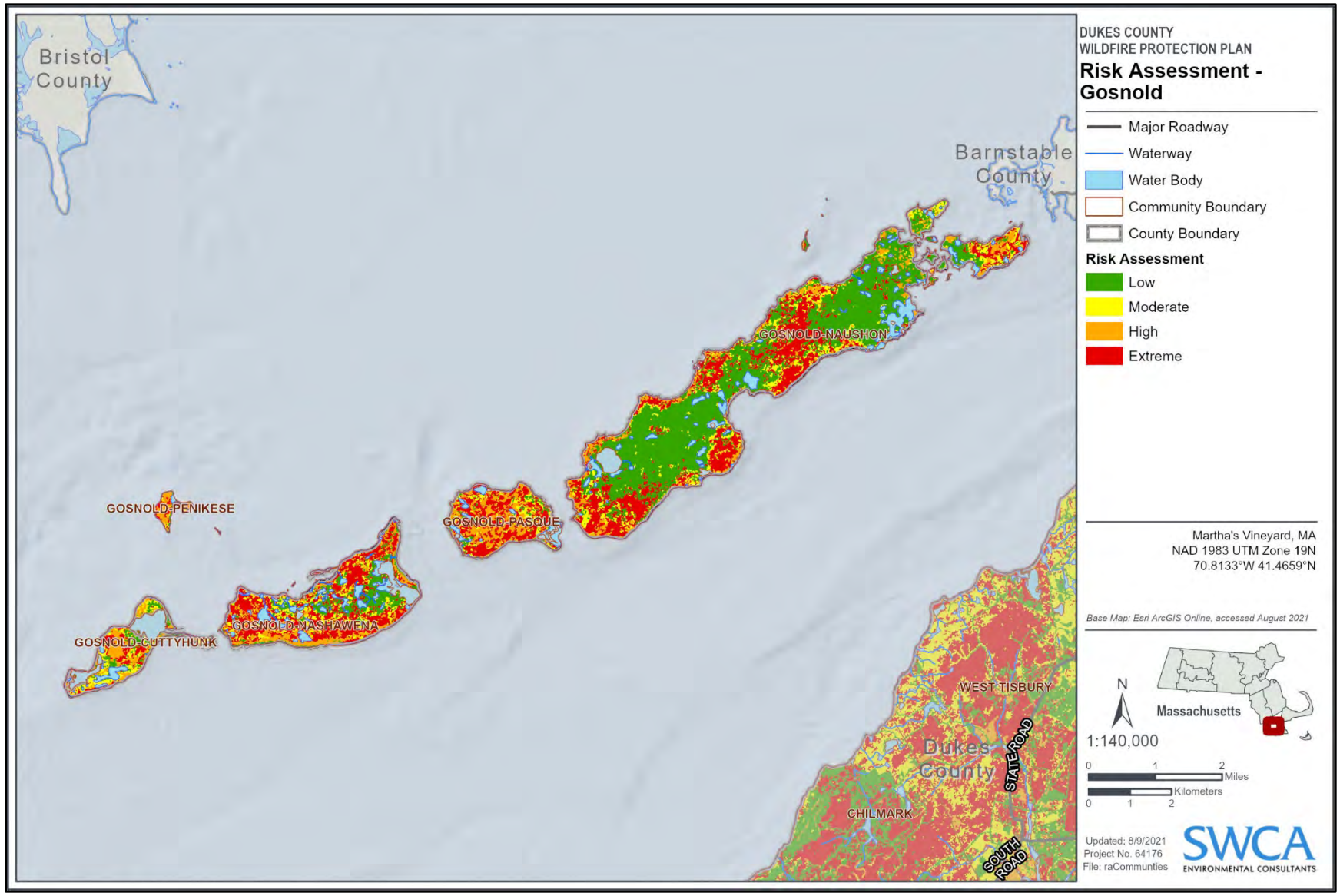

Figure D.4. Community Composite Hazard-Risk Assessment for Gosnold.

Gosnold Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Gosnold								
Enhance existing fire breaks using mowing	Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: West end of island	Town Private Landowners	Utilize the fire behavior modeling completed for the CWPP to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire responders could more safely suppress future wildfire. Focus on following treatments: -Mow grasses in understory of shrub or timber fuels. -Create patches of grassland with reduced grass height and continuity to slow rapid rates of spread across areas dominated by grass. -Complete treatments ahead of peak fire season.	Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential.	Within 2 years	H	Closely monitor grass conditions and change mowing frequency accordingly.	See Appendix F: Funding Sources
Consider the use of prescribed fire for maintenance of grass and shrub communities	As appropriate based on vegetation type and exposure	Town Private Landowners	Utilize prescribed burn planning that follows agency and regulator protocols. Closely follow plan prescriptions. Identify liability insurance needs and barriers. Seek a private vendor to conduct prescribed burns on private land (work with State Forest Fire Warden). Utilize prescribed burn program to provide training for local fire department personnel and volunteers.	Protect communities and infrastructure by reducing fuel loads. Increase capacity and training for fire departments.	Within 5 years	M	Carry out inventory each year of number and acreage of prescribed fire completed.	See Appendix F: Funding Sources

Gosnold Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Gosnold								
No specific actions for structural ignitability or public education and outreach identified. See Island-wide measures.								

Gosnold Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Gosnold								
No specific actions for fire response identified. See Island-wide measures.								

TOWN OF OAK BLUFFS SUMMARY STATISTICS

Town:	Oak Bluffs	**Population Density (people/*mi.²*):**	611.4
Land Area (*mi.²*)	7.31	**Home Density (housing units/ *mi.²*):**	594.5
		Town Housing Units Vacant for Seasonal/Recreational Use (%):	68.4
		Seasonal/Vacationers (%):	50.0

Percent of Town Classified by Wildland Urban Interface

66.44

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
46.21	34.85	3.96	14.99

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 81.03	0-5 (ch./hr.): 75.04	No Data: 44.11	0-0.5 (mi.): 10.7
4-8 (ft): 3.57	5-20 (ch./hr.): 6.06	Surface Fire: 45.87	0.5-1.0 (mi.): 25.8
8-12 (ft): 0.78	20-50 (ch./hr.): 0.20	Passive Crown Fire: 454	1.0-1.5 (mi.): 23.1
>12 (ft): 14.61	>50 (ch./hr.): 18.71	Active Crown Fire: 5.48	>1.5 (mi.): 40.4

Fire Department Statistics

Fire stations: 1 Fulltime Firefighters: 0 Call Firefighters: 0 Volunteer Firefighters 36

Water Tender				Wildland Engines	
Type 1:	0			4WD/AWD	Brush Breaker
Type 2:	0	Type 3:		0	0
Type 3:	0	Type 4:		0	0
Structure Engines		Type 5:		0	0
Type 1:	4	Type 6:	0		0
Type 2:	0	Type 7:		0	0
Port-A-Tanks:	0	Portable Pumps:	0		

Current Fire and Fuel Management Programs and Plans

-

1144 Survey Summary	
Positive Attributes (Low Scores)	Negative Attributes (High Scores)
• Road Conditions • Ingress/Egress • Fire Access • Topography • Water Source	• Defensible Space • Building, fencing, and decking materials

Community Polygon NFPA 1144 Summaries	
Community Polygon Name	Total Score
Lagoon Pond	93

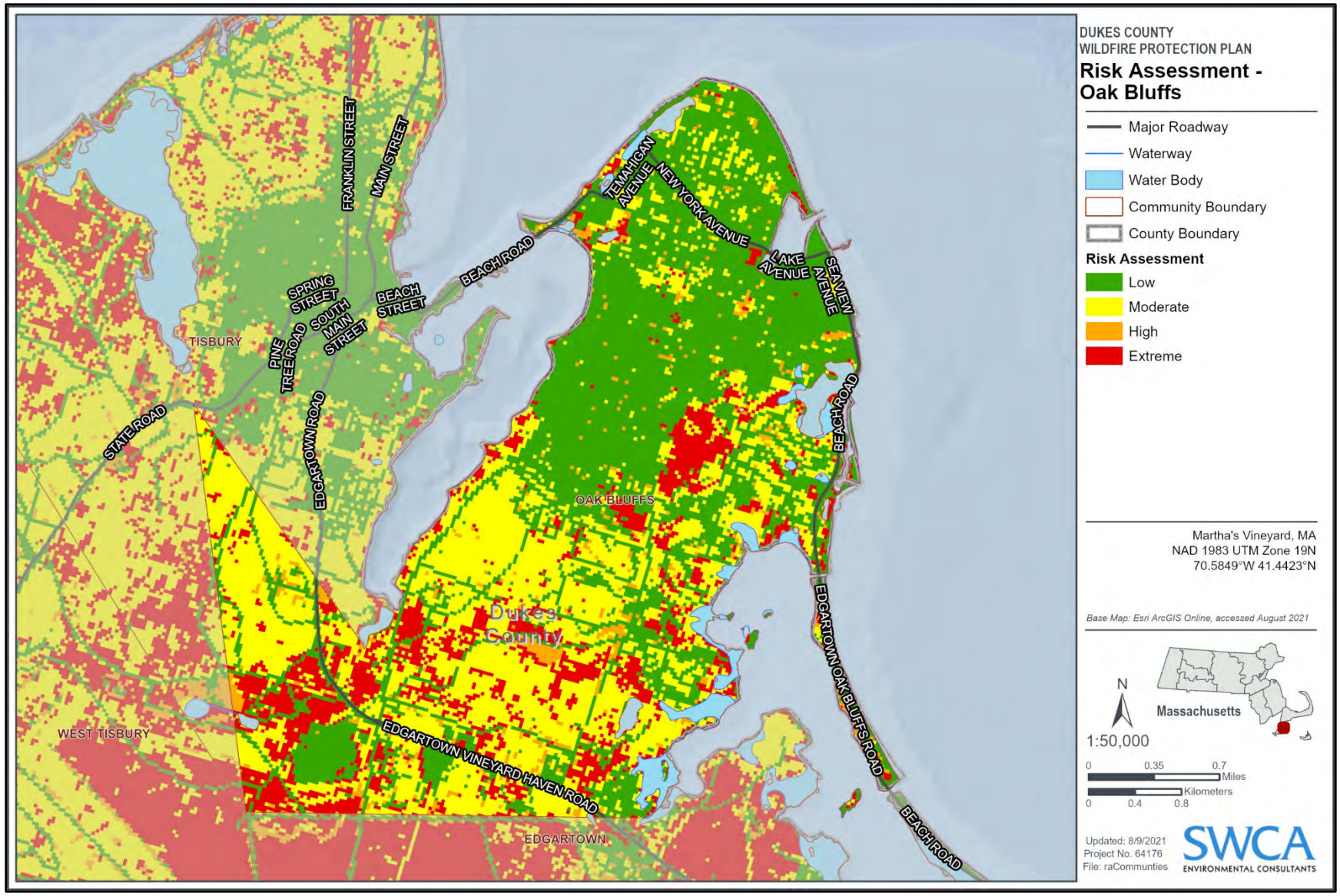

Figure D.5.a. Community Composite Hazard-Risk Assessment for Oak Bluffs.

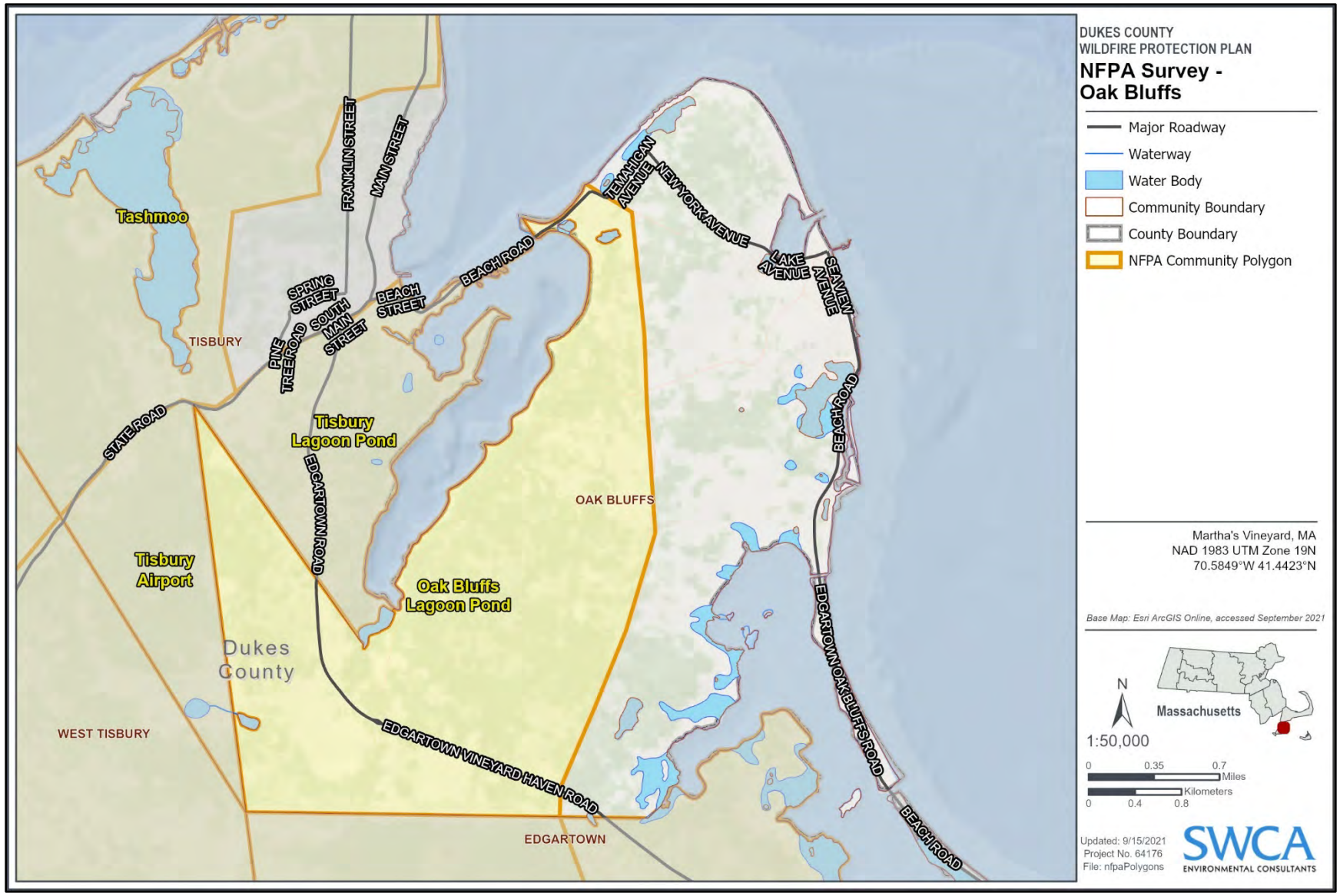

Figure D.5.b NFPA Community Survey Polygons for Oak Bluffs.

Figure D-5.c. Poor defensible space around homes and utilities within the Oak Bluffs polygon.

Figure D-5.d. Poor defensible space and combustible fencing within the Oak Bluffs Polygon.

Oak Bluffs Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Oak Bluffs								
Address poor defensible space and structural ignitability concerns	Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: Southern woodlands Sengekontacket State Forest Martha's Vineyard Camp Meeting Association Camp Duarte	Private Landowners Fire Department	Conduct Firewise Community-based assessments of individual homes. The professional assessment would help identify the most critical actions that an individual could take. Assessments could also include marking trees and shrubs suggested for removal to enhance defensible space.	Reduce risk of home ignitions. Empower homeowners to take the most effective actions. Allow funding to address a larger number of homes.	Within 2 years	H	Conduct on-site inspections with owners; identify and mark trees or shrubs for removal within the 100-foot safety zone. Develop a community task force to carry out assessments of properties.	See Appendix F: Funding Sources

Oak Bluffs Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Oak Bluffs								
No specific actions for structural ignitability or public education and outreach identified. See Island-wide measures.								

Oak Bluffs Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Oak Bluffs								
Enhance access to wildfire training	Town-wide	Fire Department	NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. Use online forum to facilitate scheduling. Work with State and federal agencies to develop evening and weekend courses for volunteers. Pursue online training programs and have trainees work with an in-house trained mentor to complete training. Facilitate Annual refresher participation by having in-house refreshers available or convene departments to have a Duke County wide refresher. Utilize available funds for volunteers to participate in annual Wildfire Academy. Educate fire departments on the availability of volunteer fire assistance grants that could be used to purchase equipment and support training	Add more capacity and provide for safe and effective wildfire response.	Spring 2022	H	Annual review of training opportunities and barriers to attendance	See Appendix F: Funding Sources
Equip all personnel with PPE and wildfire equipment	Fire department	Fire department	Seek grant money to be spent on acquisition of PPE. Task a member of the department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by all personnel.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Increase participation in prescribed burns for training	Town-wide	Fire department DCR	Work collaboratively with the State DCR to identify prescribed fire training opportunities. [*Need assistance from DCR on how this program could be initiated/enhanced*]	Increase capabilities of existing personnel	Summer 2022	H	Record number of prescribed fires served.	See Appendix F: Funding Sources

TOWN OF TISBURY SUMMARY STATISTICS

Town:	Tisbury	**Population Density (people/*mi.²*):**	627.3
Land Area (*mi.²*)	6.54	**Home Density (housing units/ *mi.²*):**	473.1
		Town Housing Units Vacant for Seasonal/Recreational Use (%):	54.2
		Seasonal/Vacationers (%):	40.2

Percent of Town Classified by Wildland Urban Interface

70.24

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
37.87	41.41	2.85	17.86

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 79.28	0-5 (ch./hr.): 75.62	No Data: 32.59	0-0.5 (mi.): 8.7
4-8 (ft): 2.59	5-20 (ch./hr.): 3.69	Surface Fire: 52.43	0.5-1.0 (mi.): 21.6
8-12 (ft): 0.61	20-50 (ch./hr.): 0.18	Passive Crown Fire: 7.32	1.0-1.5 (mi.): 28.5
>12 (ft): 17.51	>50 (ch./hr.): 20.51	Active Crown Fire: 7.66	>1.5 (mi.): 41.2

Fire Department Statistics

Fire stations: 1 Fulltime Firefighters: 2 Call Firefighters: 0 Volunteer Firefighters 34

Water Tender				Wildland Engines	
Type 1:	0			No. 4WD/AWD	Brush Breaker
Type 2:	0		Type 3:	0	0
Type 3:	0		Type 4:	4/2	0
Structure Engines			Type 5:	0	0
Type 1:	3		Type 6:	1/1	0
Type 2:	0		Type 7:	0	0
Port-A-Tanks:	0	Portable Pumps:	0		
Aerial Ladder	1				

Current Fire and Fuel Management Programs and Plans

-

1144 Survey Summary	
Positive Attributes (Low Scores)	Negative Attributes (High Scores)
• Road condition (primary roads)	• Ingress/Egress (Tashmoo)
• Fuel/vegetation type (Tisbury Airport)	• Water Access (Tashmoo)
• Topography	• Road width
• Fire history	• Building, fencing, and decking materials
• Water source (Tisbury Airport & Lagoon Pond)	• Water Source (Tashmoo)

Community Polygon NFPA 1144 Summaries	
Community Polygon Name	Total Score
Tashmoo	112
Lagoon Pond	82
Tisbury Forest	77

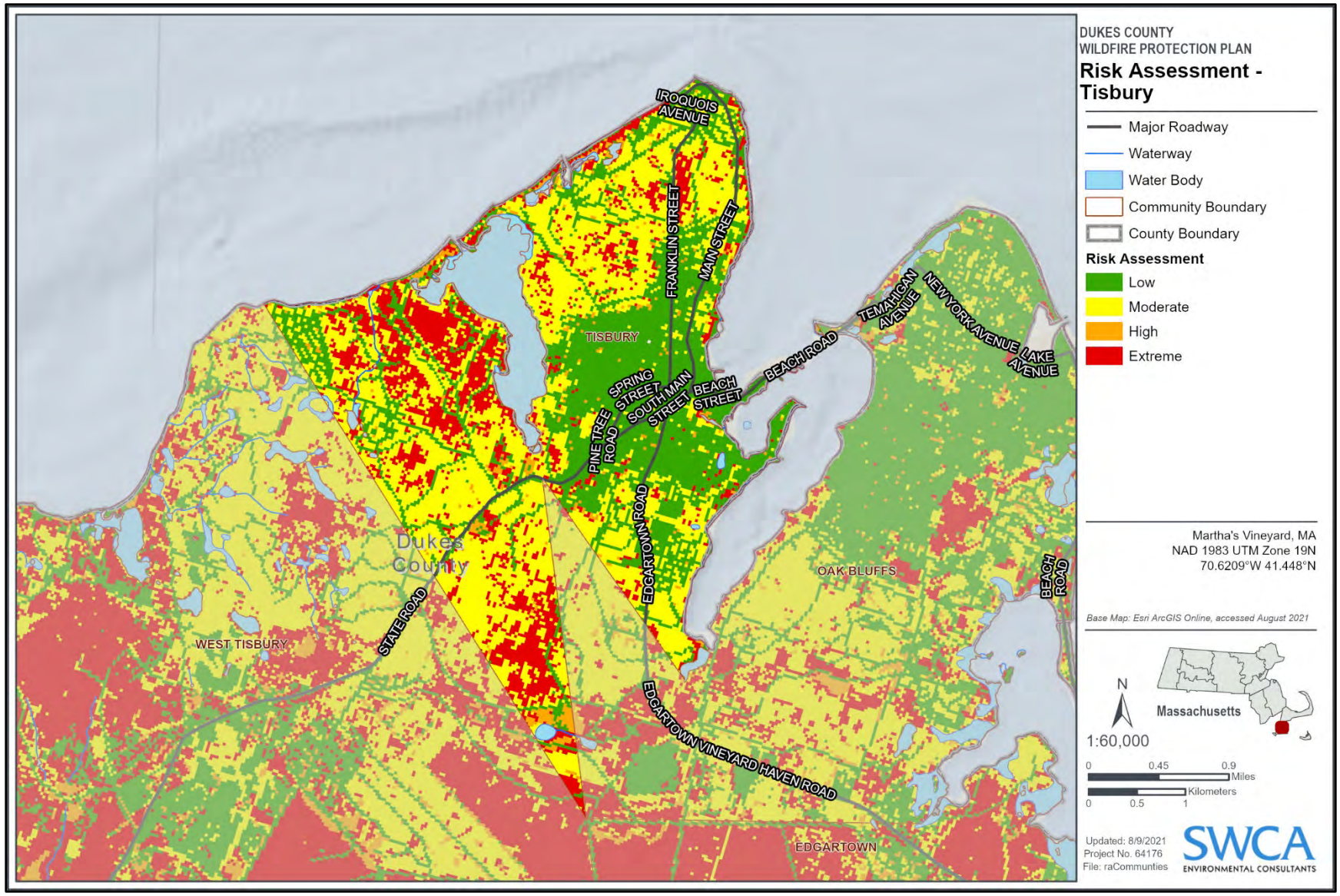

Figure D.6.a. Community Composite Hazard-Risk Assessment for Tisbury.

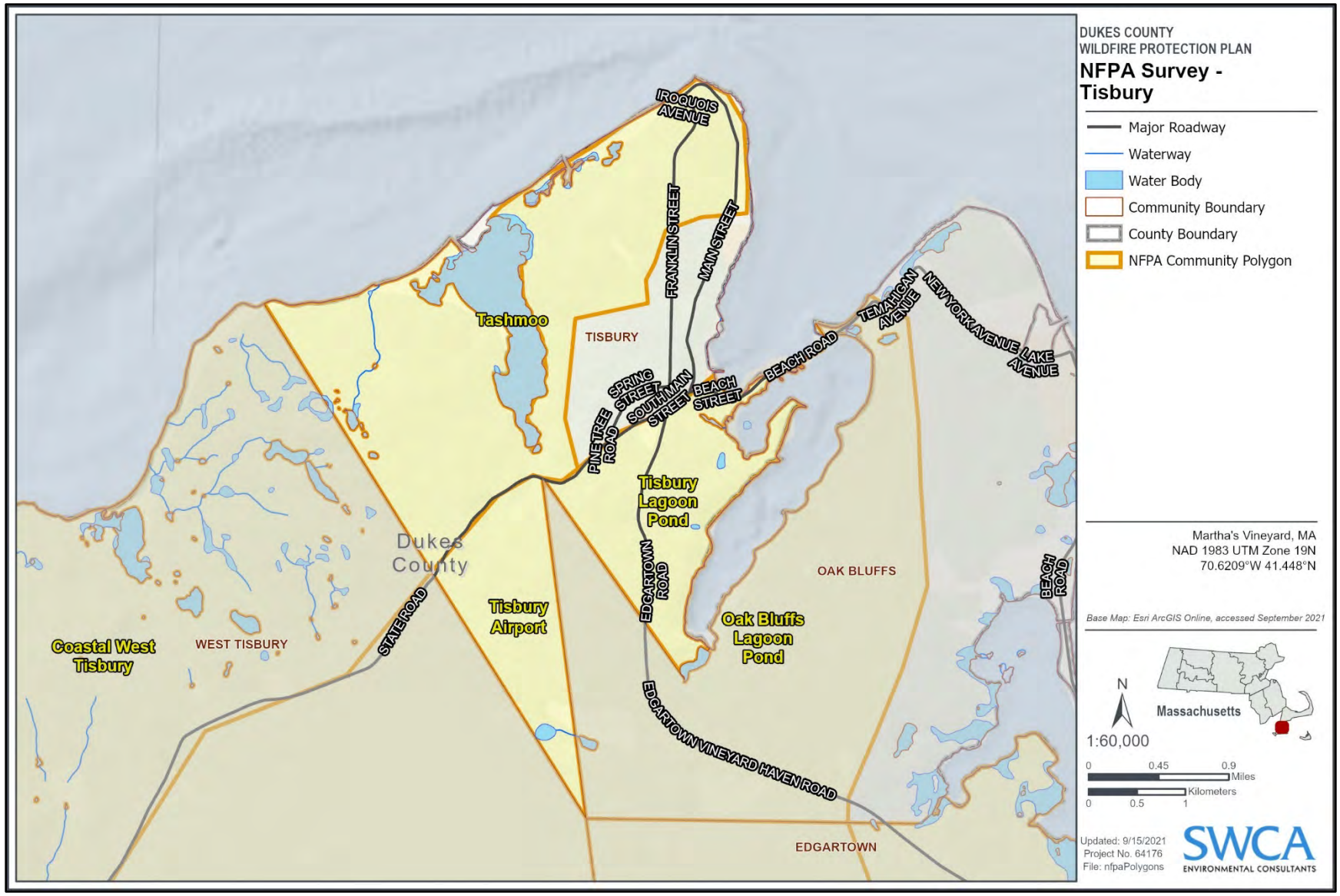

Figure D.6.b NFPA Community Survey Polygons for Tisbury.

Figure D-6.c. Narrow winding road within the Tisbury polygon.

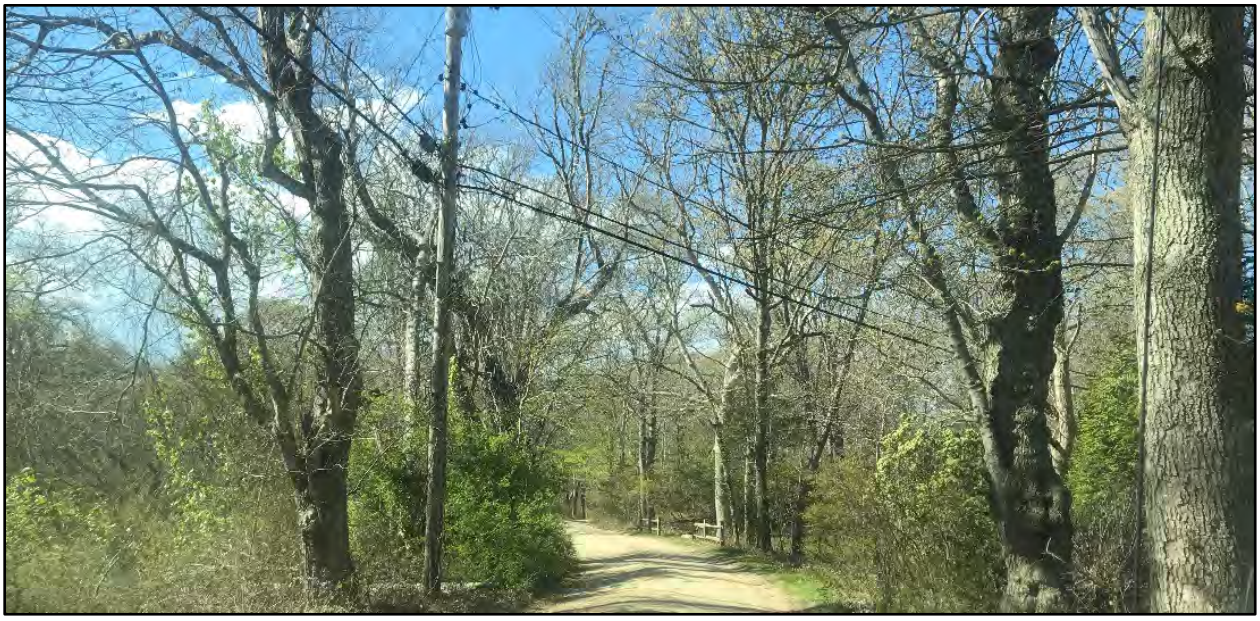

Figure D-6.d. Narrow road with extremely limited defensible space within the Tisbury polygon.

Tisbury Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Tisbury								
Protect Martha's Vineyard Family Campground	Public Campground on Edgartown Vineyard Haven Road	Private Landowner MVC	Increase fire breaks to double as fire access. Create defensible space around property. Institute an education campaign at the site to reduce campfire related wildfire ignitions. Implement public education campaign for safe campfire use. Install "fire box" to provide suppression equipment at campsite	Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. Create a fuel arrangement unlikely to support crown fire Ensure the protection of values at risk.	Within 2 years	H	Regular maintenance needed to ensure the fuel break remains clear of vegetation. Monitor for invasive species. Continued management of fire breaks maintained by grazing, brush breaking, controlled burns.	See Appendix F: Funding Sources
Increase use of prescribed fire where appropriate	As appropriate based on vegetation type and exposure to communities. See Chapter 4 'Cohesive Strategy Goals 1: Restore and Maintain Landscapes' for more information on prescribed fire treatments.	Town Private Landowners Conservation Orgs	Utilize prescribed burn planning that follows agency and regulator protocols. Closely follow plan prescriptions. Identify liability insurance needs and barriers. Seek a private vendor to conduct prescribed burns on private land (work with State Forest Fire Warden). Increase training of fire department personnel and volunteers through official prescribed burn program organized by DCR and Wildland Fire classes.	Protect communities and infrastructure by reducing fuel loads. Increase capacity and training for fire departments.	Within 5 years	M	Carry out inventory each year of number and acreage of prescribed fire completed.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Mitigate heavy and hazardous fuel loads close to structures	Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: Dog Park	State and Local MVC Conservation Orgs	Utilize the fire behavior modeling completed for the CWPP to identify areas that would burn with uncharacteristically high flame lengths and rapid rates of spread, to mitigate fire behavior and provide for areas where fire responders could more safely suppress future wildfire. Focus on following treatments: -Removing ladder fuels in pitch pine/scrub oak areas to reduce extreme fire behavior, intensity, and rates of spread. -Carryout understory vegetation management to minimize surface to canopy continuity. -Treat small patches of conservation land tucked into residential areas. -Create mosaic of vegetation types and stand ages (in grass and scrub types) to reduce vertical continuity of vegetation to limit fire spread. -Prepare to treat fine fuels that establish in areas of insect mortality and defoliation. Scrub oak shrublands are vulnerable to defoliation by the fall cankerworm. Defoliation occurs in spring when fire hazard is already high. Fine fuels in the understory dry out rapidly because of defoliation and increased sunlight to the understory. -Preferentially treat hazardous fuel types first- e.g., pitch pines. See Chapter 4 'Cohesive Strategy Goals 1: Restore and Maintain Landscapes' for treatment types in various vegetation types.	Assess hazard mitigation opportunities to protect values at risk within areas of highest exposure potential. Consider a full tool kit of mitigation measures.	Within 2 years	H	Carry out a 2-year review of accomplishments in reducing hazardous fuels. Calibrate fuel model based on treatment effectiveness at altering fuel loading. Re-run fire behavior modeling after 5 years to quantify impacts of treatment on fire behavior potential.	See Appendix F: Funding Sources

Tisbury Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Tisbury								
No specific actions for structural ignitability or public education and outreach identified. See Island-wide measures.								

Tisbury Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Tisbury								
Increase address signage visibility	Town-wide	Town	There is a need to educate homeowners on the law regarding maintaining good visibility of address markers. Implement program to replace existing house number markers with reflective markers that meet consistent standard. Education on proper placement and maintenance of address markers.	Improves fire response times and assists out-of-town responders who are not familiar with the local area, especially at night. Would need funding to implement program. Could consider private contributions.	Summer 2023	M	Document number of house markers distributed. Complete NFPA1144 assessments after 2 years to determine change in behavior.	See Appendix F: Funding Sources
Equip all personnel with PPE and wildfire equipment	Fire department	Fire department	Seek grant money to be spent on acquisition of PPE. Task a member of the department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by all personnel.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	See Appendix F: Funding Sources

TOWN OF WEST TISBURY SUMMARY STATISTICS

Town:	West Tisbury	**Population Density (people/*mi.²*):**	109.7
Land Area (*mi.²*)	25.03	**Home Density (housing units/ *mi.²*):**	88.1
		Town Housing Units Vacant for Seasonal/Recreational Use (%):	56.4
		Seasonal/Vacationers (%):	56.9

Percent of Town Classified by Wildland Urban Interface

82.57

Percent of Town by Modeled Wildfire Risk

Low	Moderate	High	Extreme
21.90	26.91	4.96	46.23

Percent of Town by Modeled/Calculated Wildfire Risk Inputs

Flame Length	Rate of Spread	Fire Type	Dist. From Fire Station
0-4 (ft): 48.57	0-5 (ch./hr.): 42.66	No Data: 13.02	0-0.5 (mi.): 3.1
4-8 (ft): 4.07	5-20 (ch./hr.): 6.25	Surface Fire: 51.71	0.5-1.0 (mi.): 9.4
8-12 (ft): 1.14	20-50 (ch./hr.): 0.41	Passive Crown Fire: 27.07	1.0-1.5 (mi.): 15.7
>12 (ft): 46.22	>50 (ch./hr.): 50.69	Active Crown Fire: 8.20	>1.5 (mi.): 71.8

Fire Department Statistics

Fire stations: 2 Fulltime Firefighters: 0 Call Firefighters: 0 Volunteer Firefighters 32

Water Tender			Wildland Engines	
Type 1:	0		No. 4WD/AWD	Brush Breaker
Type 2:	2	Type 3:	0	0
Type 3:	0	Type 4:	2/2	2
Structure Engines		Type 5:	0	0
Type 1:	2 (1 4WD/AWD)	Type 6:	0	0
Type 2:	0	Type 7:	1/1	0
Port-A-Tanks:	3	Portable Pumps:	1	

Current Fire and Fuel Management Programs and Plans

- Manual F. Correllus State Forest FMP

1144 Survey Summary

Positive Attributes (Low Scores)	Negative Attributes (High Scores)
• Vegetation management plans/history	• Ingress/Egress
• Topography	• Fuel/Vegetation type & load
• Water source (along primary access)	• Fire History
•	• Building, fencing, and decking materials
•	• Water Source
•	• Placement of gas and electric utilities

Community Polygon NFPA 1144 Summaries

Community Polygon Name	Total Score
Coastal West Tisbury	105
West Tisbury Airport	92
Long Point	85
West Tisbury - West	79

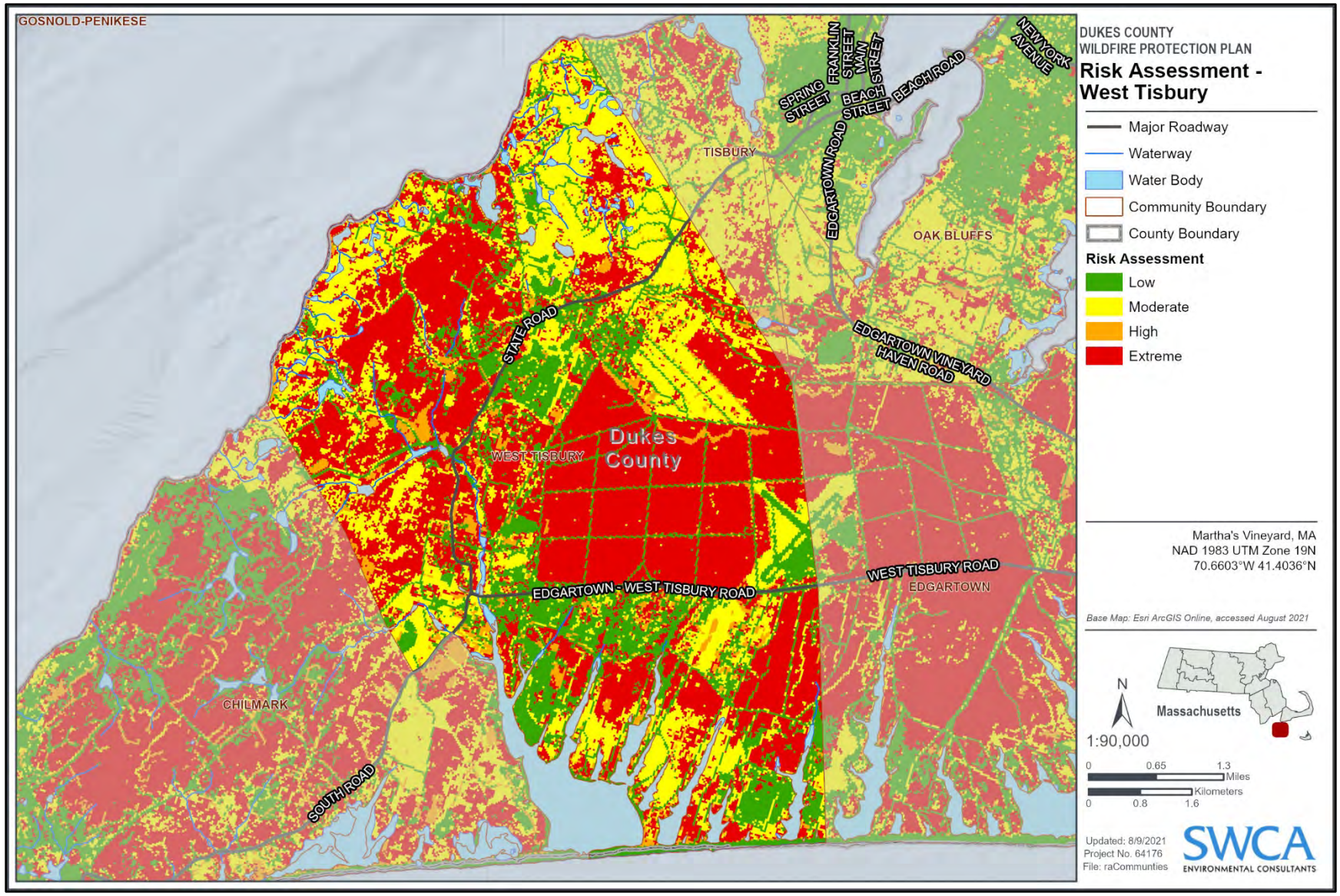

Figure D.7.a. Community Composite Hazard-Risk Assessment for West Tisbury.

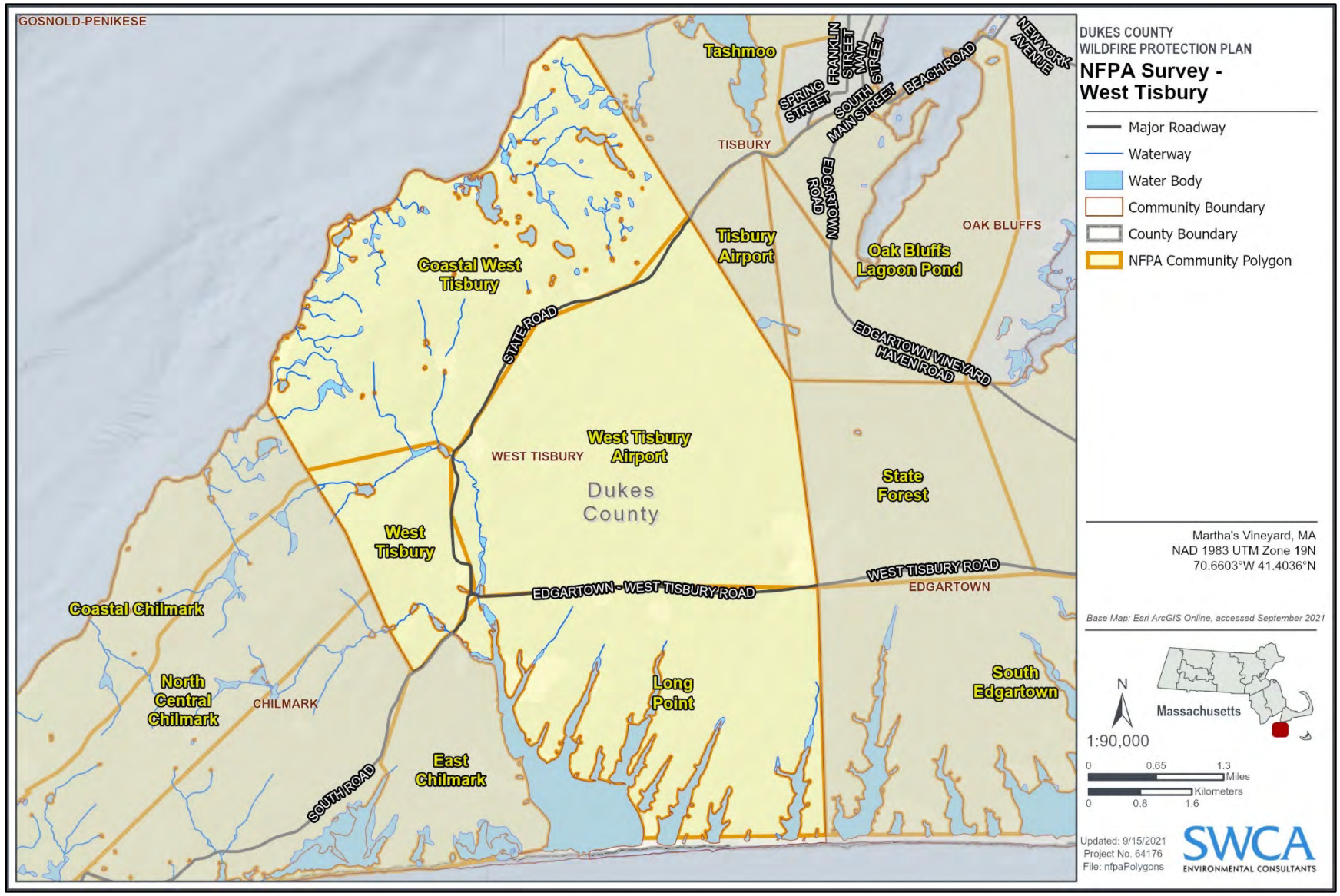

Figure D.7.b NFPA Community Survey Polygons for West Tisbury.

Figure D-7.c. Example of wooden fencing within the West Tisbury polygon.

Figure D-7.d. Narrow road with heavy fuel loads within the West Tisbury.

West Tisbury Recommendations for Creating Resilient Landscapes (Hazardous Fuels Reduction)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
West Tisbury								
Address potential wildfire spread from forested lands into communities	Prioritize areas rated as high and extreme risk, as identified in the Composite Hazard-Risk Assessment. State Forest and adjacent WUI Order of concern from FD: State forest and spread to the north Woods property South Shore	State Towns Conservation Orgs	Increase fire breaks to double as access on edges/within state forest/difficult to access areas and look for opportunities to widen some trails to better serve as fuel breaks/fire access roads. Encourage clearance of an additional width to accommodate UTV (at a minimum). Create additional turnout/buffer zones between existing development and the forest, ensuring fire suppression access. Maintain existing fire breaks and turnouts/buffers. Focus on following treatments: -Removing ladder fuels in pitch pine/scrub oak areas to reduce extreme fire behavior, intensity, and rates of spread. -Carryout understory vegetation management to minimize surface to canopy continuity. -Treat small patches of state land tucked into residential areas. -Create mosaic of vegetation types and stand ages to reduce vertical continuity of vegetation to limit fire spread.	Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. Create a fuel arrangement unlikely to support crown fire Ensure the protection of vulnerable ecosystems and values at risk.	Within 2 years	H	Regular maintenance needed to ensure the fuel break remains clear of vegetation. Monitor for invasive species. Continued management of fire breaks maintained by grazing, brush breaking, controlled burns.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
			-Prepare to treat fine fuels that establish in areas of insect mortality and defoliation. Scrub oak shrublands are vulnerable to defoliation by the fall cankerworm. Defoliation occurs in spring when fire hazard is already high. Fine fuels in the understory dry out rapidly because of defoliation and increased sunlight to the understory. -Preferentially treat hazardous fuel types first- e.g., pitch pines.					
Develop strategic road turnouts/buffers and fire breaks along poor access roadways	Prioritize roadways that abut high and extreme risk areas, as identified in the Composite Hazard-Risk Assessment. Order of concern from FD: Southern West Tisbury (forested areas and south shore) North of State Road	Town HOAs Roadway Associations Private Homeowners Conservation Orgs	<u>Roadway improvements:</u> While increasing roadway width is not feasible in many locations, create passing areas where possible should be prioritized. Grade and maintain roads to reduce hazards to emergency apparatus (potholes and poor surfacing) <u>Road ROW vegetation improvements:</u> Annual spring maintenance of ROW Treat surface fuels for a minimum of 10 ft turnout/buffer and up to 30ft where possible. Trim fuels (limbing-up timber) to allow safe passage of emergency vehicles Control for plants that may contribute to rapid fire spread (i.e., weeds and grasses).	Provides for safe and effective wildfire response capabilities Creates a strategic fuel break along roadways to create potential firebreak	Spring 2022	H	Regular maintenance needed to ensure the roads are drivable for emergency response vehicles	See Appendix F: Funding Sources

West Tisbury Recommendations for Fire Adapted Communities (Structural Ignitability and Public Education and Outreach)

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
West Tisbury								
No specific actions for structural ignitability or public education and outreach identified. See Island-wide measures.								

West Tisbury Recommendations for Safe and Effective Wildfire Response

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
West Tisbury								
Identify water sources	Town	Towns and County Conservation Orgs	Initiate a detailed study of feasible locations for water development improvements. Install dry hydrants to pump pond water for firefighting. If there is no pond nearby, install a water source. Install hand pumps or other methods independent of the grid for accessing private well water. Install staged water tanks. Purchase portable pump.	Improve fire-fighting response if water is more readily available or closest locations could be identified on a GIS map on a tablet/ computer. Alleviates public and agency concern for limited water supply in remote areas	Within 2 years	H	Convene annually Document number of meetings held Document number of actions taken	See Appendix F: Funding Sources
Increase access by emergency vehicles within the community	[*Need FD to provide specific areas that justify this action. This will help with grant applications in the future*]	Fire Department	Purchase smaller vehicles and additional corresponding mobile equipment to access narrow roads. Develop a list of the vehicles needed to increase the safety and capacity.	Improve fire-fighting response if smaller more agile vehicles are available to navigate the narrow unimproved roads	Within 2 years	H	NA	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Increase address and street signage visibility	Town-wide	Town	There is a need to educate homeowners on the law regarding maintaining good visibility of address markers. Implement program to replace existing house number markers with reflective markers that meet consistent standard. Education on proper placement and maintenance of address markers.	Improves fire response times and assists out-of-town responders who are not familiar with the local area, especially at night. Would need funding to implement program. Could consider private contributions.	Summer 2023	M	Document number of house markers distributed. Complete NFPA1144 assessments after 2 years to determine change in behavior.	See Appendix F: Funding Sources
Enhance access to wildfire training	Town-wide	Fire Department	NWCG Basic Wildland Fire Fighting and Fire Behavior, S-130/S-190 classes to VFDs every Fall with an option to attend on weekends. Possible incentives needed to encourage attendance. Use online forum to facilitate scheduling. Work with State and federal agencies to develop evening and weekend courses for volunteers. Pursue online training programs and have trainees work with an in-house trained mentor to complete training. Facilitate Annual refresher participation by having in-house refreshers available or convene departments to have a Duke County wide refresher. Utilize available funds for volunteers to participate in annual Wildfire Academy. Educate fire departments on the availability of volunteer fire assistance grants that could be used to purchase equipment and support training	Add more capacity and provide for safe and effective wildfire response.	Spring 2022	H	Annual review of training opportunities and barriers to attendance	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Equip all personnel with PPE and wildfire equipment	Fire department	Fire department	Seek grant money to be spent on acquisition of PPE. Task a member of the department to inventory PPE and investigate grant sources. Develop a schedule of equipment replacement to allow for allocation of funds and seeking of grants.	Provide for safe and effective wildfire response by all personnel.	Spring 2022	H	Annual inventory of equipment needs, including assessment of equipment condition	See Appendix F: Funding Sources
Increase participation in prescribed burns for training	Town-wide	Fire department DCR	Work collaboratively with the State DCR to identify prescribed fire training opportunities. [*Need assistance from DCR on how this program could be initiated/enhanced*]	Increase capabilities of existing personnel	Summer 2022	H	Record number of prescribed fires served.	See Appendix F: Funding Sources

Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To:	Timeline for Action	Priority (HML)	Monitoring/Maintenance Requirements	Funding Sources
Recruit and retain fire fighters	Fire department	Fire department Town	Methods that may be considered for addressing this and other training issues include the following: -Pursue a YCC grant. -Recruit young people locally and from major population centers who are interested in a fire service career for a summer residency program. In exchange for staffing the station several shifts per week, they will receive basic wildland fire and other training that can launch their careers. -Determine qualification needs and provide training to accomplish these needs. For example, in 3 years the department would like to have 10 Type II firefighters, four squad leaders, three driver/operators, three engine bosses, etc.. Defining specific goals would aid in recruiting strategies, resource allocations, mutual aid, and automatic aid. -Create an interagency training cadre to establish a routine class rotation. -Educate fire-fighters in WUI and Firewise procedures so that they can in turn educate residents during their daily interactions.	Improve capacity for fire response.	Within 5 years	M	Annual review of recruitment	See Appendix F: Funding Sources

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APPENDIX E:

NFPA 1144 Form

SWCA Wildfire Composite Hazard-Risk Assessment		
Community		**Notes:**
Surveyor		
Survey Date/Time		

Means of Access	
Ingress and Egress	
2 or more roads in and out score | 0	
1 road in and out | 7	
Road Width	
> 24 ft | 0	
> 20 ft < 24 ft | 2	
< 20 ft | 4	
Road Conditions	
Surfaced road, grade < 5% | 0	
Surfaced road, grade > 5% | 2	
Non-surfaced road, grade < 5% | 2	
Non-surfaced road, grade > 5% | 5	
Other than all season | 7	
Fire Access	
< 300 ft with turnaround | 0	
> 300 ft with turnaround | 2	
< 300 ft with no turnaround | 4	
> 300 ft with no turnaround | 5	
Street Signs	
Present – reflective | 0	
Present – non-reflective | 2	
Not present | 5	
Notes:	

Vegetation (Fuel Models)	
Predominant Vegetation	
Primary Predominant Vegetation	
Non-Burnable (NB) Score | 2	
Grass (GR) Score | 5	
Grass-Shrub (GS) Score | 10	
Shrub (SH) Score | 15	
Timber-Understory (TU) Score | 20	

Timber-Litter (TL) Score | 25	
Slash-Blow (TU) Score | 30	
Notes:	

Defensible Space	
> 100 ft around structure | 1	
> 70 ft < 100 ft around structure | 3	
> 30 ft < 70 ft around structure | 10	
< 30 ft around structure | 25	
Topography Within 300 ft of Structures	
Slope	
< 9% | 1	
10% to 20% | 4	
21% to 30% | 7	
31% to 40% | 8	
>41% | 10	
Additional Rating Factors (rate all that apply)	
Topographic features | 1-5	
History of high fire occurrence | 1-5	
Severe fire weather potential | 1-5	
Separation of adjacent structures | 1-5	
Notes:	
Roofing Assembly	
Roofing	
Class A - metal roof, clay/concrete tiles, slate, asphalt shingles | 0	
Class B - pressure treated composite shakes and shingles | 3	
Class C - untreated wood shingle, plywood, particle board | 15	
Unrated - Extremely poor roofing conditions | 25	
Notes:	
Building Construction	
Siding Materials (predominant)	
Non-combustible (brick/concrete) | 5	
Fire Resistive (stucco/adobe) | 10	
Combustible (wood or vinyl) | 12	

Deck and fencing (predominant)	
No deck or fence/non-combustible | 0	
Combustible deck and fence | 5	
Building Set-Back	
> 30 ft to slope | 1	
< 30 ft to slope | 5	
Notes:	

Available Fire Protection	
Water Sources	
Water Source? | yes/no	
Water Source Type | hydrant, water tank, other	
Other Water Source	
Water Source Score | Hydrant = 1 Water Tank = 3 No Source = 10	
Organized Response	
Station < 5 mi from community | 1	
Station > 5 mi from community | 3	
Notes:	
Placement of Gas and Electric Utilities	
Both underground | 0	
One above, one below | 3	
Both above ground | 5	
Values at Risk Observations	
Forest Health Observations	
Land Use Observations	
Misc Observations	
Total (<40 = Low; 40-70= Moderate; 70-112= High; > 112= Extreme)	

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APPENDIX F:

Funding Sources

CONTENTS

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FUNDING RESOURCES

The following section provides information on federal, state, and private funding opportunities for conducting wildfire mitigation projects.

FEDERAL FUNDING INFORMATION

Source: Pre-disaster Mitigation Grant Program

Agency: Department of Homeland Security (DHS) Federal Emergency Management Agency (FEMA)

Website: http://www.fema.gov/government/grant/pdm/index.shtm

Description: The DHS includes FEMA and the U.S. Fire Administration. FEMA's Federal Mitigation and Insurance Administration is responsible for promoting pre-disaster activities that can reduce the likelihood or magnitude of loss of life and property from multiple hazards, including wildfire. The Disaster Mitigation Act of 2000 created a requirement for states and communities to develop pre-disaster mitigation plans and established funding to support the development of the plans and to implement actions identified in the plans. This competitive grant program, known as Pre-Disaster Mitigation (PDM), has funds available to state entities, tribes, and local governments to help develop multi-hazard mitigation plans and to implement projects identified in those plans. The Pre-Disaster Mitigation program is currently in process of transitioning to the Building Resilient Infrastructure and Communities (BRIC) program. You can find more information on the BRIC program here: https://www.fema.gov/grants/mitigation/building-resilient-infrastructure-communities

Source: Funding for Fire Departments and First Responders

Agency: DHS, U.S. Fire Administration

Website: https://www.usfa.fema.gov/grants/

Description: Includes grants and general information on financial assistance for fire departments and first responders. Programs include the Assistance to Firefighters Grant Program, Reimbursement for Firefighting on Federal Property, State Fire Training Systems Grants, and National Fire Academy Training Assistance.

Source: Specific EPA Grant Programs

Agency: U.S. Environmental Protection Agency (EPA)

Website: https://www.epa.gov/grants/specific-epa-grant-programs

Description: Various grant programs are listed under this site. Listed below are examples of grants offered:

- Multipurpose Grants to States and Tribes: https://www.epa.gov/grants/multipurpose-grants-states-and-tribes
- Environmental Education Grants: https://www.epa.gov/education/grants
- Environmental Justice Grants: https://www.epa.gov/environmentaljustice/environmental-justice-grants-funding-and-technical-assistance

Source: Conservation Innovation Grants (CIG)

Agency: National Resource Conservation Service

Website: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/cig/

Description: CIG State Component. CIG is a voluntary program intended to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging federal investment in environmental enhancement and protection, in conjunction with agricultural production. Under CIG, Environmental Quality Incentives Program funds are used to award competitive grants to non-federal governmental or nongovernmental organizations, tribes, or individuals. CIG enables the Natural Resources Conservation Service (NRCS) to work with other public and private entities to accelerate technology transfer and adoption of promising technologies and approaches to address some of the nation's most pressing natural resource concerns. CIG will benefit agricultural producers by providing more options for environmental enhancement and compliance with federal, state, and local regulations. The NRCS administers the CIG program. The CIG requires a 50/50 match between the agency and the applicant. The CIG has two funding components: national and state. Funding sources are available for water resources, soil resources, atmospheric resources, and grazing land, and forest health.

Source: Volunteer Fire Assistance (VFA) Program

Agency: U.S. Forest Service

Website: https://www.mass.gov/service-details/volunteer-fire-assistance-vfa-program

Description: U.S. Forest Service funding will provide assistance, through the states, to volunteer fire departments to improve communication capabilities, increase wildland fire management training, and purchase protective fire clothing and firefighting equipment. This program has a cost-sharing rate of 50 percent. For more information, contact your state representative.

Source: Urban and Community Forestry Program, 2021 National Urban and Community Forestry Challenge Cost Share Grant Program

Agency: U.S. Forest Service

Website: https://www.fs.usda.gov/managing-land/urban-forests/ucf

Description: U.S. Forest Service funding will provide for Urban and Community Forestry Programs that work with local communities to establish climate-resilient tree species to promote long-term forest health. The other initiative behind this program is to promote and carry out disaster risk mitigation activities, with priority given to environmental justice communities. For more information, contact a Forest Service Regional Program Manager.

Source: Catalog of Federal Funding Sources; Land Resources

Agency: Multiple

Website: https://ordspub.epa.gov/ords/wfc/f?p=WFC:512

Description: The Land Finance Clearing House is a catalogue of Federal funding sources for all things land related.

Examples of the types of grants found at this site are:

- Forest and Woodlands Resource Management Grant: https://sam.gov/fal/a798ad78cac749639b48270db3e86fdc/view?index=cfda&page=2&organization_id=100011100
- Environmental Education Grant: https://www.epa.gov/education/grants
- Public Assistance Grant Program: https://www.fema.gov/assistance/public
- Hazard Mitigation Grant: https://www.fema.gov/grants/mitigation/hazard-mitigation

Source: Catalog of Federal Funding Sources; Water Resources

Agency: Multiple

Website: https://ordspub.epa.gov/ords/wfc/f?p=165:12:16135644465231:::12::

Description: The Water Finance Clearing House is a catalogue of Federal funding sources for all things water related.

Examples of the types of grants found at this site are:

- Water Conservation Field Services Program: https://www.usbr.gov/waterconservation/
- Forestry on Indian Lands Grant: https://www.federalgrantswire.com/forestry-on-indian-lands.html#.YUSkwrhKhPY

Source: Firewise Communities Programs

Agency: Multiple

Website: http://www.firewise.org

Description: Many different Firewise Communities activities are available to help homes and whole neighborhoods become safer from wildfire without significant expense. Community cleanup days, awareness events, and other cooperative activities can often be successfully accomplished through partnerships among neighbors, local businesses, and local fire departments at little or no cost.

The kind of help you need will depend on who you are, where you are, and what you want to do. Among the different activities that individuals and neighborhoods can undertake, the following often benefit from seed funding or additional assistance from an outside source:

- Thinning/pruning/tree removal/clearing on private property—particularly on very large, densely wooded properties
- Retrofit of home roofing or siding to non-combustible materials
- Managing private forest
- Community slash pickup or chipping
- Creation or improvement of access/egress roads
- Improvement of water supply for firefighting
- Public education activities throughout the community or region

Source: National Fire Plan (NFP) Grants

Agency: DOI and USDA

Website: https://www.federalgrantswire.com/national-fire-plan--rural-fire-assistance.html#.YUJ_Fp1KhPY and https://www.federalgrantswire.com/national-fire-plan-wildland-urban-interface-community-fire-assistance.html#.YUJ_Fp1KhPY

Description: Many states are using funds from the NFP to provide funds through a cost-share with residents to help them reduce the wildfire risk to their private property. These actions are usually in the form of thinning or pruning trees, shrubs, and other vegetation and/or clearing the slash and debris from this kind of work. Opportunities are available for rural, state, and volunteer fire assistance.

Source: Staffing for Adequate Fire and Emergency Response (SAFER)

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/firefighters/safer

Description: The purpose of SAFER grants is to help fire departments increase the number of frontline firefighters. The goal is for fire departments to increase their staffing and deployment capabilities and ultimately attain 24-hour staffing, thus ensuring that their communities have adequate protection from fire and fire-related hazards. The SAFER grants support two specific activities: (1) hiring of firefighters and (2) recruitment and retention of volunteer firefighters. The hiring of firefighters activity provides grants to pay for part of the salaries of newly hired firefighters over the five-year program.

Source: Fire Prevention and Safety (FP&S) Grants

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/firefighters/safety-awards#:~:text=Awards%20%20%20%20Organization%20%20%20,%20%20%241%2C499%2C957%20%2016%20more%20rows%20

Description: FP&S offers support to projects that enhance the safety of the public and firefighters who may be exposed to fire and related hazards. The primary goal is to target high risk populations and mitigate high incidences of death and injury. Examples of the types of projects supported by FP&S include fire-prevention and public-safety education campaigns, juvenile fire-setter interventions, media campaigns, and arson prevention and awareness programs. In fiscal year 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include firefighter safety research and development.

Source: Assistance to Firefighters Grants (AFG)

Agency: FEMA

Website: https://www.fema.gov/grants/preparedness/firefighters

Description: The AFG program provides resources to assist fire departments in attaining critical resources such as training and equipment.

Source: GSA-Federal Excess Personal Property

Agency: USFS

Website: https://gsaxcess.gov/

Description: The Federal Excess Personal Property (FEPP) program refers to Forest Service-owned property that is on loan to State Foresters for the purpose of wildland and rural firefighting. Most of the property originally belonged to the Department of Defense. Once acquired by the Forest Service, it is loaned to State Cooperators for firefighting purposes. The property is then loaned to the State Forester, who may then place it with local departments to improve local fire programs.

State Foresters and the USDA Forest Service have mutually participated in the FEPP program since 1956.

STATE AND PRIVATE FUNDING INFORMATION

Source: Forest Stewardship Program and Community Forest Stewardship Implementation Grant

Agency: Massachusetts Working Forest Initiative

Website: https://www.mass.gov/service-details/forest-stewardship-program

Description: Private landowners, joint landowners, groups and associations, non-profits, long term lease holders, and corporations without publicly traded stock can take advantage of this program. The Forest Stewardship program offers financial assistance for both forest stewardship planning with the help of a licensed forest consultant (for private landowner and municipalities) and community forest stewardship implementation (for municipalities). Between 2010 and 2019 Massachusetts DCR administered $2.7 million through this program. Forest landowners may be eligible for the same planning and financial assistance through the NRCS Environmental Quality Incentives Program (MA DCR 2020).

Source: MassWildlife Habitat Management Grant Program (MHMGP)

Agency: Massachusetts Division of Fisheries and Wildlife (MassWildlife)

Website: https://www.mass.gov/guides/masswildlife-habitat-management-grant-program-mhmgp#-mhmgp-overview-and-objectives-

Description: The MHMGP is administered by the Massachusetts Division of Fisheries and Wildlife for the conservation of fish, wildlife, and their habitats within the state. In conjunction with the Executive Office of Energy and Environmental Affairs, MassWildlife has increased its investment in habitat restoration and management on public and private lands across the state. The MHMGP program encourages landowners to take an active role in the management of habitat on their lands. Funds from the program can be used for activities such as mowing, tree clearing, seeding, and prescribed burning. Although this grant is not specifically for fire risk reduction or fire prevention, forest management practices are covered under this program.

Source: Community Forest Grant Program

Agency: U.S. Forest Service

Website: https://www.mass.gov/guides/community-forest-grant-program

Description: The Community Forest Grant Program is a competitive grant program by which local governments, tribal governments, and nonprofit organizations can apply for grant funding to establish or expand community forests. Grant applications must be submitted through either the State Forester or Tribal Official. This grant is not directly intended for fire risk reduction or fire prevention but provides for the establishment and expansion of healthy community forests.

Source: Urban and Community Forestry Eversource Partnership Challenge Grant

Agency: Eversource Energy

Website: https://www.mass.gov/guides/urban-and-community-forestry-eversource-partnership-challenge-grant

Description: The Massachusetts Department of Conservation and Recreation (DCR) Urban and Community Forestry Program in partnership with Eversource Energy is offering matching grants to municipalities within their service territory. Funds from this grant can be used for activities such as urban and community forestry management plans, ordinances and policies, staff training, and more. The purpose of this grant is not to reduce the risk of or prevent fire but does provide for management through advocacy, management plan creation, tree plantings, etc.

Source: Urban and Community Forestry National Grid Partnership Challenge Grant

Agency: National Grid Company

Website: https://www.mass.gov/guides/urban-and-community-forestry-national-grid-partnership-challenge-grant

Description: The Massachusetts Department of Conservation and Recreation (DCR) Urban and Community Forestry Program in partnership with National Grid Company is offering matching grants to municipalities in which National Grid has completed its Augmented Clearance of Trees Reliability Improvement Program, a tree management program that identifies low-performance power lines with persistent tree issues. Dead, dying, and diseased trees are identified, reviewed by community arborists in a public forum, and then removed at National Grid's expense. Funds from this grant can be used for activities such as urban and community forestry management plans, ordinances and policies, staff training, and more. The purpose of this grant is not to reduce the risk of or prevent fire but does provide for management through advocacy, management plan creation, tree plantings, etc.

Source: Urban and Community Forestry Challenge Grants

Agency: Massachusetts DCR Bureau of Forest Fire Control and Forestry

Website: https://www.mass.gov/guides/urban-and-community-forestry-challenge-grants

Description: This program offers 50-50 matching grants for municipalities and nonprofit organizations (75-25 for environmental justice neighborhoods) for the purpose of forestry management in partnership with residents in community institutions. Program funds can be used for building local capacity for urban and community forestry management. Although this grant is not specifically for fire risk reduction or fire prevention, forest management practices are covered under this program.

Source: Student Awareness of Fire Education (S.A.F.E.) and Senior SAFE

Agency: Massachusetts Department of Fire Services

Website: https://www.mass.gov/service-details/student-awareness-of-fire-education-safe

Description: These two programs are offered by the state of Massachusetts and available to fire departments for the purpose of educating students and senior citizens on fire and life safety. The S.A.F.E. program provides grants to local fire departments to teach students the dangers of fire and the fire hazards of tobacco products in developmentally appropriate ways. The Senior SAFE program aims to improve safety within older adult households due to the higher risk of fire and burns.

Source: National Association of State Foresters Grants

Agency: National Association of State Foresters

Website: https://www.stateforesters.org/appropriations/

Description: The National Association of State Foresters recommends that funds become available through a competitive grant process on Wildland Urban Interface hazard mitigation projects. State fire managers see opportunities to use both the State Fire Assistance Program and the Volunteer Fire Assistance Program to improve the safety and effectiveness of firefighters in the interface, as well as in other wildland fire situations. To ensure firefighter safety, minimize property and resource loss, and reduce suppression costs, land management agencies, property owners, local leaders, and fire protection agencies must work cooperatively to mitigate interface fire risks, as well as to ensure that wildland firefighters receive the training, information, and equipment necessary to safely carry out their responsibilities.

Source: State Farm Good Neighbor Citizenship Grants

Agency: State Farm

Website: https://www.statefarm.com/about-us/corporate-responsibility/community-grants/good-neighbor-citizenship-grants

Description: State Farm funding is directed at:

- Auto and roadway safety
- Teen Driver Education
- Home safety and fire prevention
- Disaster preparedness
- Disaster recovery

Source: The Urban Land Institute (ULI)

Website: http://www.uli.org

Description: ULI is a 501(c)(3) nonprofit research and education organization supported by its members. The institute has more than 22,000 members worldwide, representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. The mission of the ULI is to provide responsible leadership in the use of land to enhance the total environment. ULI and the ULI Foundation have instituted Community Action Grants (http://www.uli.org/Content/NavigationMenu/MyCommunity/CommunityActionGrants/Community_Action_Gr.htm) that could be used for Firewise Communities activities. Applicants must be ULI members or part of a ULI District Council. Contact actiongrants@uli.org or review the web page to find your District Council and the application information.

Source: Environmental Systems Research Institute (ESRI)

Website: http://www.esri.com/grants

Description: ESRI is a privately held firm and the world's largest research and development organization dedicated to geographic information systems. ESRI provides free software, hardware, and training bundles under ESRI-sponsored Grants that include such activities as conservation, education, and sustainable development, and posts related non-ESRI grant opportunities under such categories as agriculture, education, environment, fire, public safety, and more. You can register on the website to receive updates on grant opportunities.

Source: StEPP Foundation

Website: https://steppfoundation.org/

Description: StEPP is a 501(c)(3) organization dedicated to helping organizations realize their vision of a clean and safe environment by matching projects with funders nationwide. The StEPP Foundation provides project oversight to enhance the success of projects, increasing the number of energy efficiency, clean energy, and pollution prevention projects implemented at the local, state, and national levels for the benefit of the public. The website includes an online project submittal system and a Request for Proposals page.

OTHER FUNDING INFORMATION

The following resources may also provide helpful information for funding opportunities:

- USDA Information Center: https://www.nal.usda.gov/main/information-centers
- Forest Service Fire Management website: http://www.fs.fed.us/fire/
- Insurance Services Office Mitigation Online (town fire ratings): http://www.isomitigation.com/
- National Fire Protection Association: http://www.nfpa.org
- National Interagency Fire Center, Wildland Fire Prevention/Education: https://www.nifc.gov/fire-information/fire-prevention-education-mitigation
- Department of Homeland Security U.S. Fire Administration: https://www.usfa.fema.gov/index.html

APPENDIX G:

Homeowner's Guide

DUKES COUNTY CWPP

HOMEOWNER'S GUIDE

This guide has been developed by SWCA for MVC and other Core Team members to use in outreach efforts with the public. The guide can be tailored to specific community needs. The guide 1) suggests specific measures that can be taken by homeowners to reduce structure ignitability and 2) enhances overall preparedness in the planning area by consolidating preparedness information from several local agencies and departments.

BEFORE THE FIRE—PROTECTION AND PREVENTION

REDUCING STRUCTURE IGNITABILITY

Structural Materials

Roofing—The more fire-resistant the roofing material, the better. The roof is the portion of the house that is most vulnerable to ignition by falling embers, known as firebrands. Metal roofs afford the best protection against ignition from falling embers. Slate or tile roofs are also non-combustible, and Class-A asphalt shingles are recommended as well. The most dangerous type of roofing material is wood shingles. Removing debris from roof gutters and downspouts at least twice a year will help to prevent fire, along with keeping them functioning properly.

Siding—Non-combustible materials are ideal for the home exterior. Preferred materials include stucco, cement, block, brick, and masonry.

Windows—Double-pane windows are most resistant to heat and flames. Smaller windows tend to hold up better within their frames than larger windows. Tempered glass is best, particularly for skylights, because it will not melt as plastic will.

Fencing and trellises—Any structure attached to the house should be considered part of the house. A wood fence or trellis can carry fire to your home siding or roof. Consider using nonflammable materials or use a protective barrier such as metal or masonry between the fence and the house.

If you are designing a new home or remodeling your existing one, do it with fire safety as a primary concern. Use nonflammable or fire-resistant materials and have the exterior wood treated with UL-approved fire-retardant chemicals. More information on fire-resistant construction can be found at http://www.firewise.org.

SCREEN OFF THE AREA BENEATH DECKS AND PORCHES

The area below an aboveground deck or porch can become a trap for burning embers or debris, increasing the chances of the fire transferring to your home. Screen off the area using screening with openings no larger than one-half inch. Keep the area behind the screen free of all leaves and debris.

FIREWOOD, KINDLING, AND OTHER FLAMMABLES

Although convenient, stacked firewood on or below a wooden deck adds fuel that can feed a fire close to your home. Be sure to move all wood away from the home during fire season. Stack all firewood uphill, at least 30 feet and preferably 100 feet from your home.

When storing flammable materials such as paint, solvents, or gasoline, always store them in approved safety containers away from any sources of ignition such as hot water tanks or furnaces. The fumes from highly volatile liquids can travel a great distance after they turn into a gas. If possible, store the containers in a safe, separate location away from the main house.

CHIMNEYS AND FIREPLACE FLUES

Inspect your chimney and damper at least twice a year and have the chimney cleaned every year before first use. Have the spark arrestor inspected and confirm that it meets the latest safety code. Your local fire department will have the latest edition of National Fire Prevention Code 211 covering spark arrestors. Make sure to clear away dead limbs from within 15 feet of chimneys and stovepipes

FIREPLACE AND WOODSTOVE ASHES

Never take ashes from the fireplace and put them into the garbage or dump them on the ground. Even in winter, one hot ember can quickly start a grass fire. Instead, place ashes in a metal container, and as an extra precaution, soak them with water. Cover the container with its metal cover and place it in a safe location for a couple of days. Then either dispose of the cold ash with other garbage or bury the ash residue in the earth and cover it with at least 6 inches of mineral soil.

PROPANE TANKS

Your propane tank has many hundreds of gallons of highly flammable liquid that could become an explosive incendiary source in the event of a fire. It should be located at least 30 feet from any structure. Keep all flammables at least 10 feet from your tank. Learn how to turn the tank off and on. In the event of a fire, you should turn the gas off at the tank before evacuating, if safety and time allow.

SMOKE ALARMS

A functioning smoke alarm can help warn you of a fire in or around your home. Install smoke alarms on every level of your residence. Test and clean smoke alarms once a month and replace batteries at least once a year. Replace smoke alarms once every 10 years.

FIRE-SAFE BEHAVIOR

If you smoke, always use an ashtray in your car and at home.

Store and use flammable liquids properly.

Keep doors and windows clear as escape routes in each room.

DEFENSIBLE SPACE

The removal of dense, flammable foliage from the area immediately surrounding the house reduces the risk of structure ignition and allows firefighters access to protect the home. Pruning and limbing trees along with the selective removal of trees and shrubs is recommended to create a minimum defensible space area of 30 feet. Steep slopes require increased defensible space because fire can travel quickly uphill.

Within the minimum 30-foot safety zone, plants should be limited to fire-resistant trees and shrubs. Focus on fuel breaks such as concrete patios, walkways, rock gardens, and irrigated garden or grass areas within this zone. Use mulch sparingly within the safety zone, and focus use in areas that will be watered regularly. In areas such as turnarounds and driveways, nonflammable materials such as gravel are much better than wood chips or pine needles.

Vegetative debris such as dead grasses or leaves provide important erosion protection for soil but also may carry a surface fire. It is simply not feasible to remove all the vegetative debris from around your property. However, it is a good idea to remove any accumulations within the safety zone and extending out as far as possible. This is particularly important if leaves tend to build up alongside your house or outbuildings. Removing dead vegetation and leaves and exposing bare mineral soil are recommended in a 2-foot-wide perimeter along the foundation of the house. Also, be sure to regularly remove all dead vegetative matter including grasses, flowers, and leaf litter surrounding your home and any debris from gutters, especially during summer months. Mow the lawn regularly and promptly dispose of the cuttings properly. If possible, maintain a green lawn for 30 feet around your home.

All trees within the safety zone should have lower limbs removed to a height of 6 to 10 feet. Remove any branches within 15 feet of your chimney or overhanging any part of your roof. Ladder fuels are short shrubs or trees growing under the eaves of the house or under larger trees. Ladder fuels carry fire from the ground level onto the house or into the tree canopy. Be sure to remove all ladder fuels within the safety zone first. The removal of ladder fuels within about 100 feet of the house will help to limit the risk of crown fire around your home. More information about defensible space is provided at http://www.firewise.org.

FIRE RETARDANTS

For homeowners who would like home protection beyond defensible space and fire-resistant structural materials, fire-retardant gels and foams are available. These materials are sold with various types of equipment for applying the material to the home. They are like the substances applied by firefighters in advance of wildfire to prevent ignition of homes. Different products have different timelines for application and effectiveness. The amount of product needed is based on the size of the home, and prices may vary based on the application tools. Prices range from a few hundred to a few thousand dollars. An online search for "fire blocking gel" or "home firefighting" will provide a list of product vendors. Residents should research and consider environmental impacts of chemicals.

ADDRESS POSTING

Locating individual homes is one of the most difficult tasks facing emergency responders. Every home should have the address clearly posted with numbers at least three inches high. The colors of the address posting should be contrasting or reflective. The address should be posted so that it is visible to cars approaching from either direction.

ACCESS

Unfortunately, limited access may prevent firefighters from reaching many homes in the planning area. Many of the access problems occur at the property line and can be improved by homeowners. First, make sure that emergency responders can get in your gate. This may be important not only during a fire but also to allow access during any other type of emergency response. If you will be gone for long periods during fire season, make sure a neighbor has access, and ask them to leave your gate open in the event of a wildfire in the area.

Ideally, gates should swing inward. A chain or padlock can be easily cut with large bolt cutters, but large automatic gates can prevent entry. Special emergency access red boxes with keys are sold by many gate companies but are not recommended by emergency services. The keys are difficult to keep track of and may not be available to the specific personnel that arrive at your home. An alternative offered by some manufacturers is a device that opens the gate in response to sirens. This option is preferred by firefighters but may be difficult or expensive to obtain.

Beyond your gate, make sure your driveway is uncluttered and at least 12 feet wide. The slope should be less than 10%. Trim any overhanging branches to allow at least 13.5 feet of overhead clearance. Also make sure that any overhead lines are at least 14 feet above the ground. If any lines are hanging too low, contact the appropriate phone, cable, or power company to find out how to address the situation.

If possible, consider a turnaround within your property at least 45 feet wide. This is especially important if your driveway is more than 300 feet in length. Even small fire engines have a hard time turning around and cannot safely enter areas where the only means of escape is by backing out. Any bridges must be designed with the capacity to hold the weight of a fire engine.

NEIGHBORHOOD COMMUNICATION

It is important to talk to your neighbors about the possibility of wildfire in your community. Assume that you will not be able to return home when a fire breaks out and may have to rely on your neighbors for information and assistance. Unfortunately, it sometimes takes tragedy to get people talking to each other. Don't wait for disaster to strike. Strong communication can improve the response and safety of every member of the community.

PHONE TREES

Many neighborhoods use phone trees to keep each other informed of emergencies within and around the community. The primary criticism is that the failure to reach one person high on the tree can cause a breakdown of the system. However, if you have willing and able neighbors, particularly those that are at home during the day, the creation of a well-planned phone tree can often alert residents to the occurrence of a wildfire more quickly than media channels. Talk to your neighborhood association about the possibility of designing an effective phone tree.

NEIGHBORS IN NEED OF ASSISTANCE

Ask mobility-impaired neighbors if they have notified emergency responders of their specific needs. It is also a good idea for willing neighbors to commit to evacuating a mobility-impaired resident in the event of an emergency. Make sure that a line of communication is in place to verify the evacuation.

ABSENTEE OWNERS

Absentee owners are often not in communication with their neighbors. If a home near you is unoccupied for large portions of the year, try to get contact information for the owners from other neighbors or your neighborhood association. Your neighbors would probably appreciate notification in the event of an emergency. Also, you may want to contact them to suggest that they move their woodpile or make sure that the propane line to the house is turned off.

HOUSEHOLD EMERGENCY PLAN

A household emergency plan does not take much time to develop and will be invaluable in helping your family deal with an emergency safely and calmly. One of the fundamental issues in the event of any type of emergency is communication. Be sure to keep the phone numbers of neighbors with you rather than at home.

It is a good idea to have an out of state contact, such as a family member. When disaster strikes locally, it is often easier to make outgoing calls to a different area code than local calls. Make sure everyone in the family has the contact phone number and understands why they need to check in with that person in the event of an emergency. Also, designate a meeting place for your family. Having an established meeting site helps to ensure that family members know where to go, even if they can't communicate by phone.

CHILDREN

Local schools have policies for evacuation of students during school hours. Contact the school to get information on how the process would take place and where the children would likely go.

The time between when the children arrive home from school and when you return home from work is the most important time frame that you must address. Fire officials must clear residential areas of occupants to protect lives and to allow access for fire engines and water drops from airplanes or helicopters. If your area is evacuated, blockades may prevent you from returning home to collect your children. It is crucial to have a plan with a neighbor for them to pick up your children if evacuation is necessary.

PETS AND LIVESTOCK

Some basic questions about pets and livestock involve whether you can evacuate the animals yourself and where you would take them. Planning for the worst-case scenario may save your animals.
An estimated 90% of pets left behind in an emergency do not survive. Don't expect emergency service personnel to prioritize your pets in an emergency. Put plans in place to protect your furry family members.

PETS

Assemble a pet disaster supply kit and keep it handy. The kit should contain a three-day supply of food and water, bowls, a litter box for cats, and a manual can opener if necessary. It is also important to have extra medication and medical records for each pet. The kit should contain a leash for each dog and a carrier for each cat. Carriers of some kind should be ready for birds and exotic pets. In case your pet must be left at a kennel or with a friend, also include an information packet that describes medical conditions, feeding instructions, and behavioral problems. A photo of each pet will help to put the right instructions with the right pet.

In the event of a wildfire you may be prevented from returning home for your animals. Talk to your neighbors and develop a buddy system in case you or your neighbors are not home when fire threatens. Make sure your neighbor has a key and understands what to do with your pets should they need to be evacuated.

If you and your pets were evacuated, where would you go? Contact friends and family in advance to ask whether they would be willing to care for your pets. Contact hotels and motels in the area to find out which ones accept pets. Boarding kennels may also be an option. Make sure your pets' vaccinations are up to date if you plan to board them.

Once you have evacuated your pets, continue to provide for their safety by keeping them cool and hydrated. Try to get your pets to an indoor location rather than leaving them in the car.
Do not leave your pets in your vehicle without providing shade and water. It is not necessary to give your pets water while you are driving but be sure to offer water as soon as you reach your destination.

LIVESTOCK

Getting livestock out of harm's way during a wildfire is not easy. You may not be able or allowed to return home to rescue your stock during a wildfire evacuation. Talk to your neighbors about how you intend to deal with an evacuation. If livestock are encountered by emergency responders, they will be released and allowed to escape the fire on their own. Make sure your livestock have some sort of identification. Ideally, your contact information should be included on a halter tag or ear tag so that you could be reached if your animal is encountered.

If you plan to evacuate your livestock, have a plan in place for a destination. Talk to other livestock owners in the area to find out whether they would be willing to board your stock in the event of an emergency. Often in large-scale emergencies, special accommodations can be made at fair and rodeo grounds, but personal arrangements may allow you to respond more quickly and efficiently.

If you do not own a trailer for your horses or other livestock, talk to a neighbor who does. Find out whether they would be willing to assist in the evacuation of your animals. If you do own a trailer, make sure it is in working condition with good, inflated tires and functioning signal lights. Keep in mind that even horses that are accustomed to a trailer may be difficult to load during an emergency. Practicing may be a good idea to make sure your animals are as comfortable as possible when being loaded into the trailer.

HOUSE AND PROPERTY

Insurance companies suggest that you make a video that scans each room of your house to help document and recall all items within your home. This video can make replacement of your property much easier in the unfortunate event of a large insurance claim. See more information on insurance claims in the "After the Fire" section below.

PERSONAL ITEMS

During fire season, items you would want to take with you during an evacuation should be kept in one readily accessible location. As an extra precaution, it may be a good idea to store irreplaceable mementos or heirlooms away from your home during fire season.

It is important to make copies of all of your important household paperwork, such as birth certificates, titles, and so forth. Store them away from your home, such as in a safe deposit box. Important documents can also be protected in a designated firesafe storage box within your home.

IN THE EVENT OF A FIRE

NOTIFICATION

In the event of a wildfire, announcements from the local Emergency Management office will be broadcast over local radio and television stations. Media notification may be in the form of news reports or the Emergency Alert System. On television, the emergency management message will scroll across the top of the screen on local channels. The notice is not broadcast on non-local satellite and cable channels.

One good way to stay informed about wildfire is to use a National Oceanic and Atmospheric Administration weather alert radio. The radios can be purchased at most stores that carry small appliances, such as Target, Walmart, or Amazon. The radio comes with instructions for the required programming to tune the radio to your local frequency. The programming also determines the types of events for which you want to be alerted. The weather alert radio can be used for any type of large incident (weather, wildfire, hazardous materials, etc.), depending on how it is programmed. Local fire personnel can assist with programming if needed.

WHEN FIRE THREATENS

Before an evacuation order is given for your community, there are several steps you can take to make your escape easier and to provide for protection of your home. When evaluating what to do as fire threatens, the most important guideline is: **DO NOT JEOPARDIZE YOUR LIFE.**

Back your car into the garage or park it in an open space facing the direction of escape. Shut the car doors and roll up the windows. Place all valuables that you want to take with you in the vehicle. Leave the keys in the ignition or in another easily accessible location. Open your gate.

Close all windows, doors, and vents, interior doors, and garage doors. Disconnect automatic garage openers. Leave exterior doors unlocked. Move furniture away from windows and sliding glass doors.

If you have lightweight curtains, remove them. Heavy curtains, drapes, and blinds should be closed. Leave a light on in each room.

Turn off the propane tank or shut off gas at the meter. Turn off pilot lights on appliances and furnaces.

Move firewood and flammable patio furniture away from the house or into the garage.

Connect garden hoses to all available outdoor faucets and make sure they are in a conspicuous place. Turn the water on to "charge," or fill your hoses and then shut off the water.

Place a ladder up against the side of the home, opposite the direction of the approaching fire, to allow firefighters easy access to your roof.

EVACUATION

When evacuation is ordered, you need to go ***immediately***. Evacuation not only protects lives; it also helps to protect property. Some roads are too narrow for two-way traffic, especially with fire engines. Fire trucks often can't get into an area until the residents are out. Also, arguably the most important tool in the WUI toolbox is aerial attack. Airplanes and helicopters can be used to drop water or retardant to help limit the spread of the fire, but these resources cannot be used until the area has been cleared of civilians.

Expect emergency managers to designate a check-out location for evacuees. This process helps to ensure that everyone is accounted for and informs emergency personnel as to who may be remaining in the community. Every resident should check out at the designated location before proceeding to any established family meeting spot.

A light-colored sheet closed in the front door serves as a signal to emergency responders that your family has safely left. This signal saves firefighters precious time, as it takes 12–15 minutes per house to knock on each door and inform residents of the evacuation.

AFTER THE FIRE

RETURNING HOME

First and foremost, follow the advice and recommendations of emergency management agencies, fire departments, utility companies, and local aid organizations regarding activities following the wildfire. Do not attempt to return to your home until fire personnel have deemed it safe to do so.

Even if the fire did not damage your house, do not expect to return to business as usual immediately. Expect that utility infrastructure may have been damaged and repairs may be necessary. When you return to your home, check for hazards, such as gas or water leaks and electrical shorts. Turn off damaged utilities if you did not do so previously. Have the fire department or utility companies turn the utilities back on once the area is secured.

INSURANCE CLAIMS

Your insurance agent is your best source of information as to the actions you must take in order to submit a claim. Here are some things to keep in mind. Your insurance claim process will be much easier if you photographed your home and valuable possessions before the fire and kept the photographs in a safe place away from your home. Most if not all of the expenses incurred during the time you are forced to live outside your home could be reimbursable. These could include, for instance, mileage driven, lodging, and meals. Keep all records and receipts. Don't start any repairs or rebuilding without the approval of your claims adjuster. Beware of predatory contractors looking to take advantage of anxious homeowners wanting to rebuild as quickly as possible. Consider all contracts very carefully, take your time to decide, and contact your insurance agent with any questions. If it appears to be a large loss, consider whether you should hire a public adjuster that is licensed by the state department of insurance who will represent

and advocate for you as the policyholder in appraising and negotiating the claimant's insurance claim to ensure you get the best outcome and recovery from your insurance company. Most public adjusters charge a small percentage of the settlement that is set by the state and primarily they appraise the damage, prepare an estimate and other claim documentation, read the policy of insurance to determine coverages, and negotiate with the insurance company's claims handler.

POST-FIRE REHABILITATION

Homes that may have been saved in the fire may still be at risk from flooding and debris flows. Burned Area Emergency Rehabilitation (BAER) teams are professionals who work to mitigate the effects of post-fire flooding and erosion. These teams often work with limited budgets and manpower. Homeowners can assist the process by implementing treatments on their own properties as well as volunteering on burned public lands to help reduce the threat to valuable resources. Volunteers can assist BAER team members by planting seeds or trees, hand mulching, or helping to construct straw-bale check dams in small drainages.

Volunteers can help protect roads and culverts by conducting storm patrols during storm events. These efforts dramatically reduce the costs of such work as installing trash racks, removing culverts, and re-routing roads.

Community volunteers can also help scientists to better understand the dynamics of the burned area by monitoring rain gauges and monitoring the efficacy of the installed BAER treatments.

APPENDIX H:

Community Outreach

PUBLIC OUTREACH

Table H.1 presents examples of the public outreach completed as part of the CWPP development. Due to the COVID-19 pandemic, public gatherings were not permitted. Therefore, online resources were used to provide information to the public and solicit feedback.

Table H.1. Public Outreach Resources and Meetings Log

Resource/Meeting Description	Location	URL	Date Published
MVC Receives Grant to Develop Wildfire Preparedness Plan		Vineyard Gazette MVC Receives Grant - Wildfire Preparedness Plan	Nov 11 2020
Update on CWPP planning with land conservation groups	Virtual meeting		May 6 2021
Update on CWPP planning with Aquinnah Climate & Energy C'tee	Virtual meeting		March 8 2021
Update on CWPP planning with West Tisbury Climate Advisory C'tee	Virtual meeting		March 3 2021
CWPP planning effort announcement posted to MVC website "Headlines"		https://www.mvcommission.org/	May 2021
*Update on CWPP planning effort to Oak Bluffs BOS during Hazard Mitigation Plan presentation	Virtual meeting		Aug 24 2021
*Update on CWPP planning effort to West Tisbury BOS during Hazard Mitigation Plan presentation	Virtual meeting		
*Update on CWPP planning effort to Gosnold BOS during Hazard Mitigation Plan presentation	28 Tower Hill Rd, Gosnold - Cuttyhunk Island		Sept. 2 2021
*Update on CWPP planning effort to Aquinnah BOS during Hazard Mitigation Plan presentation	955 State Rd, Aquinnah		Sept. 7 2021
Review of CWPP draft report with land conservation groups	Virtual meeting		Sept 8 2021
*Update on CWPP planning effort to Chilmark BOS during Hazard Mitigation Plan presentation	Virtual meeting		Sept 14 2021
*Update on CWPP planning effort to Tisbury BOS during Hazard Mitigation Plan presentation	Virtual meeting		Sept 21 2021
*Update on CWPP planning effort to Edgartown BOS during Hazard Mitigation Plan presentation	Virtual meeting		Sept 27 2021

* The CWPP was formally included as an Amendment to the Dukes County 2021 Hazard Mitigation Plan Update.