BAINBRIDGE ISLAND

Community Wildfire Protection Plan

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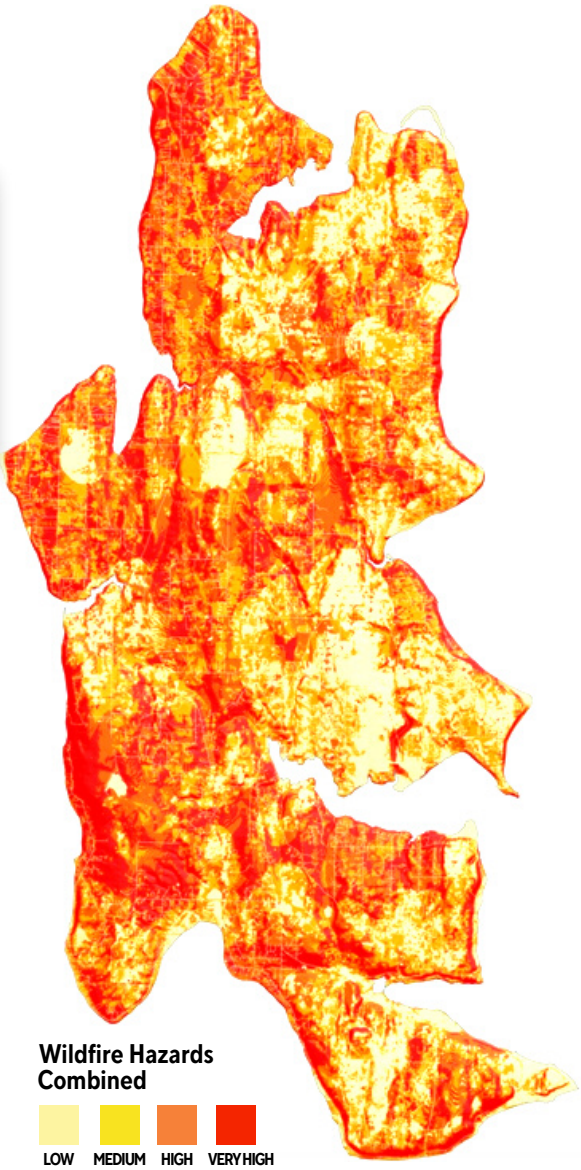

Prepared by Bainbridge Island Fire Department 2022

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I. INTRODUCTION

Message from the Fire Chief

On behalf of the Bainbridge Island Fire Department, I am pleased to present the 2022 update to the Community Wildfire Protection Plan (CWPP). This is the first update to the original 2010 CWPP.

Since the adoption of the original plan, the cooperation of the community and other government agencies has significantly shifted in support of reducing wildfire risk to our community.

The goal of the 2022 CWPP update is to help residents understand the wildfire risk in our community and to provide easy-to-understand guidelines for voluntary compliance for wildfire mitigation.

The implementation of the CWPP update will support the safeguarding of life, property, infrastructure, natural resources, and the unique ecosystems on Bainbridge Island, from the risks of wildfire.

This new team approach of government agencies working with the community will enable us to work together in reducing the risk of wildfire here on Bainbridge Island.

Since the original development of the CWPP, significant objectives have been accomplished in an effort to improve wildfire mitigation and preparation for our Island community. Improvements in firefighter staffing, fire station opening, wildfire training, and local municipal code improvements are just a few of the significant changes (Figure 1).

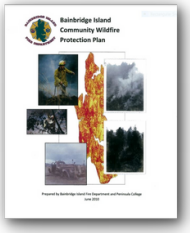
"Since the adoption of the original plan, the cooperation of the community and other government agencies has significantly shifted in support of reducing wildfire risk to our community."

Fire Chief Teran

Hank Teran, Fire Chief
Bainbridge Island Fire Department

II. TEN YEARS IN REVIEW

Figure 1: Community Wildfire Protection Plan - Ten Years in Review



CWPP Adopted by COBI - **2010**

2010 - Staffing of Station 22

New Brush Truck in service - **2014**

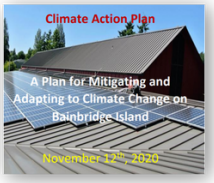
2015 - WSRB rating improves to Class 5

Staffing of Station 23 - **2016**

2018 - Paradise CA fire results in growing community wildfire awareness

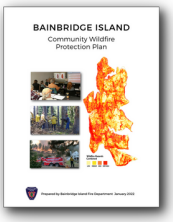
Launch of wildfire risk reduction & mitigation education program - **2019**

2020 - WSRB rating improves to Class 4



COBI Adopts Climate Action Plan - **2020**

2021 - COBI Tree Ordinance Update



CWPP Update - **2022**

III. OVERVIEW

Wildfires Are a Growing Hazard on Bainbridge Island

Wildfires are a growing hazard in many regions of the United States, posing a threat to life, property, and natural and cultural resources. Our Bainbridge Island community is no exception. This is especially true where development mixes with wildlands, the area that firefighters call the Wildland-Urban Interface (WUI). In addition, the secondary effects of wildfires on lives, livelihoods, and infrastructure—including erosion, landslides, the introduction of invasive species, and changes in water quality—can sometimes be more disastrous than the fire itself.

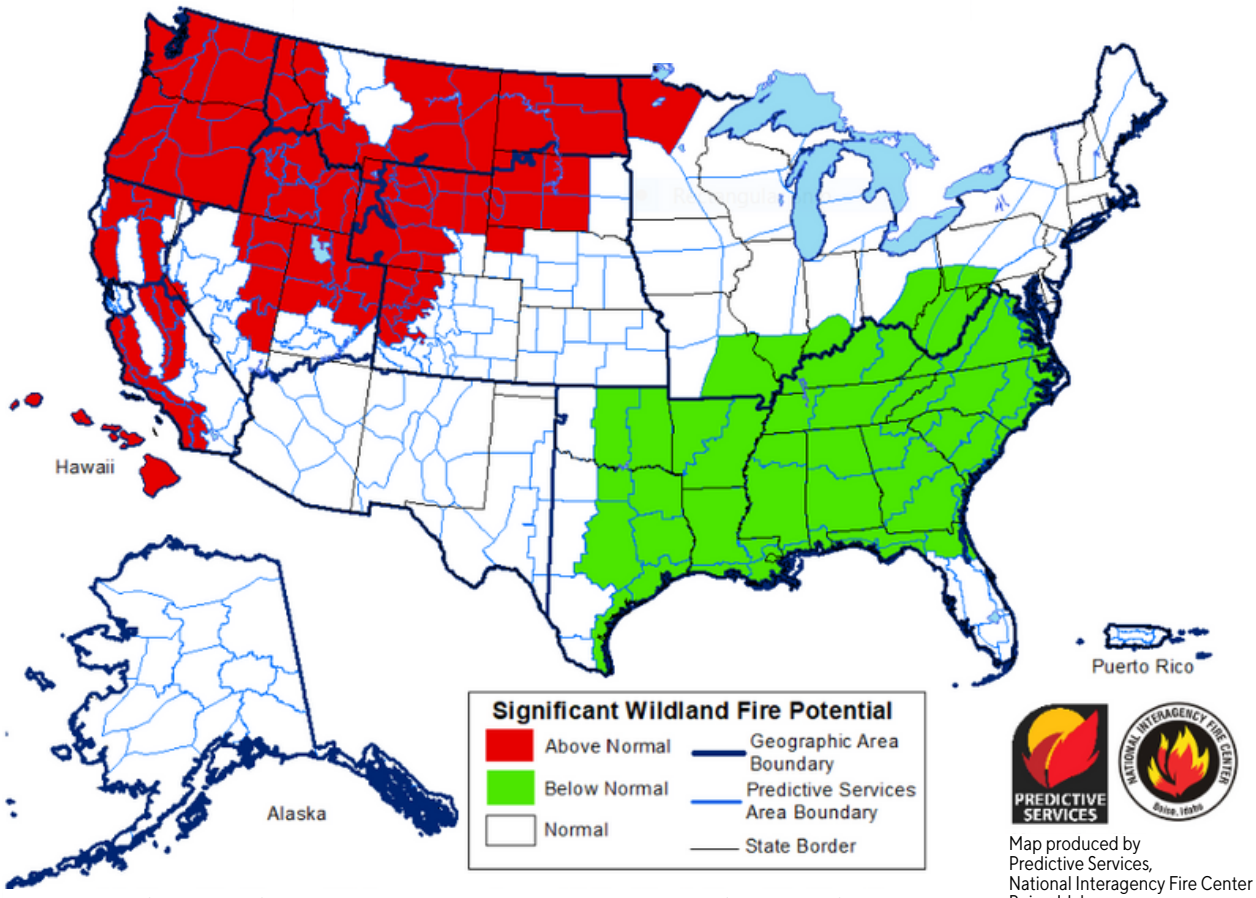
Wildfires are a natural and often beneficial ecological disturbance process, influencing species composition and vegetative structure across the landscape. Decades of timber harvest and fire suppression policies have altered this process in many areas, often creating a more dense forest environment that can burn more intensely than in the past. While the Puget Sound Region may be known for its high levels of rainfall, fire is a common ecological influence in the area. Summer droughts occur here, which can elevate the risk of ignition in drier areas. Though Bainbridge Island has not experienced a large wildfire in recent years, the risk is still present. Each year, many small wildfires occur across our community. The potential for a major wildfire disaster is very high due to the combination of having a seasonally dry climate and high vegetative fuel loads—all it would take is an ignition under the right weather conditions.

The risk wildfire poses to life, property, and the environment in our community is increased by the growing numbers of homes located within the Bainbridge WUI. Currently, in our community, many homes are being built in the wildland interface areas without consideration of wildfire, some in semi-isolated areas surrounded by dense vegetation or adjacent to green belts, and some in neighborhoods that have decreased separation between homes. The condition of our vegetation and forests are ripe to support intense, high severity fires, making the likelihood of effective fire-starts more prevalent. Many new and long-time residents assume that wildfire isn’t a problem on the western side of the Pacific Northwest, yet there is evidence that our climate patterns are changing and the window of susceptibility to a large-scale wildfire in the Puget Sound area has increased.

A few years ago, our susceptibility window was weeks long, now it is months long. Historically the Puget Sound area seldom had fires greater than a thousand acres. The fire weather window was short, and effective fire starts were infrequent, but that is changing:

- Weather pattern changes have allowed more fire starts to become large.
- Hotter, drier climates cause snow packs to melt months earlier, reducing natural moisture in high-risk areas.
- Higher population and more time in nature have increased the risk of human-caused wildfires.
- Increasing acreage of young forest landscapes increases fire susceptibility.
- Many predictive models show that wildfire susceptibility is increasing (Figures 2, 3, & 4).

Figure 2: Significant Wildfire Potential Outlook for July 2021



Above normal significant wildland fire potential indicates a greater than usual likelihood that significant wildland fires will occur. Significant wildland fires should be expected at typical times and intervals during normal significant wildland fire potential conditions. Significant wildland fires are still possible but less likely than usual during forecasted below normal periods.

Map produced by
Predictive Services,
National Interagency Fire Center
Boise, Idaho
Issued July 1, 2021
Next issuance August 1, 2021

Figure 3: Total Precipitation Anomaly: July 2021 (Base period: 1991-2020)

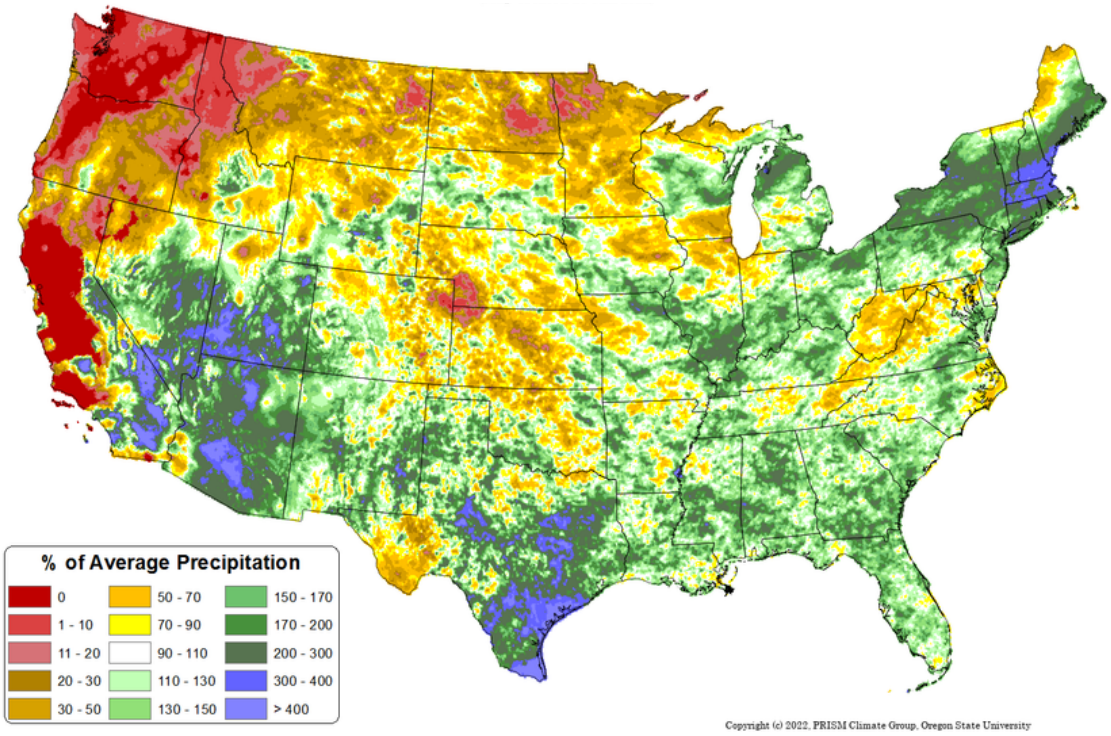
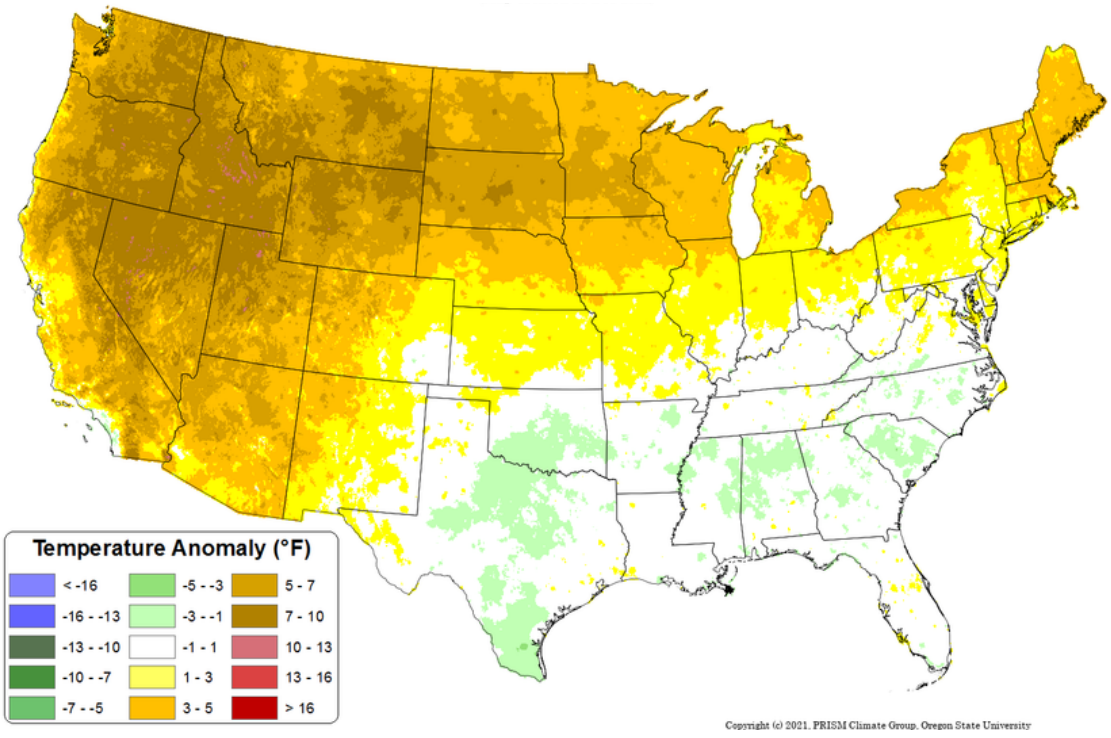


Figure 4: Daily Mean Temperature Anomaly: June 2021 (Base period: 1991-2020)



IV. WILDFIRE RISK AND HAZARD ASSESSMENT

Wildfires can result in significant, long-lasting impacts on ecological, social, and economic systems; therefore, it is necessary to identify and quantify the risks posed by wildfires and to subsequently develop cost-effective mitigation strategies. To do so, fire and fuel managers require information on where fires are likely to occur, the intensity at which they might occur, and what impacts they may have on highly valued resources and assets.

Values at Risk

Identifying the values in need of protection is often the first step in hazard planning. Wildfire hazard mitigation efforts typically focus on protecting structures. In addition, every community has sites of social, environmental, historic, or infrastructure importance that should also receive priority during protection planning. These can include protected areas, historic sites, schools, clinics, evacuation routes, utilities, etc.

Figure 5: Bainbridge Island Values at Risk, 2021

Wildfire risk assessment results provide a snapshot of current landscape conditions and associated risks. Periodic assessment over time can provide critical information for monitoring trends in risk and evaluating the performance of previous risk mitigation investments. It is also possible to modify assessment inputs (for example, fuel conditions) to reassess risks in a comparative risk assessment framework to evaluate the likely cost-effectiveness of future mitigation investments.

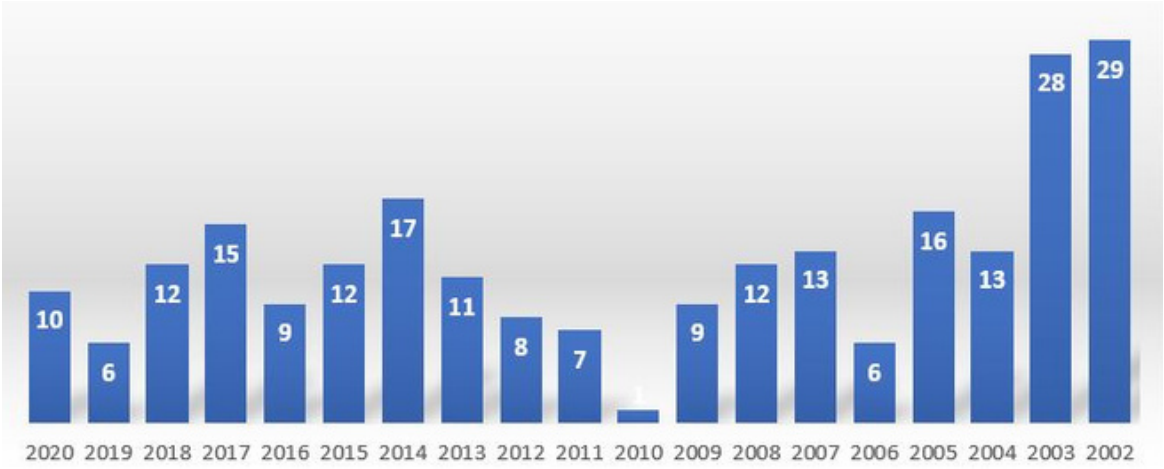
Wildfire risk is based on several factors: likelihood, intensity, exposure, and susceptibility. While it would be impossible to predict exactly when and where wildfires will occur in the future, homeowners and fire planners should be aware of fire-prone areas when prioritizing areas for mitigation activities. A community's wildfire risk is the combination of likelihood and intensity (together called "hazard") and exposure and susceptibility (together called "vulnerability").

Figure 6: Understanding Risk

Fire History on Bainbridge Island

Often overlooked in the Puget Sound Region, wildfire is an age-old element of these forests and prairies, and fires of varying severity have occurred both historically and in recent times. Although fire history in the area is difficult to trace back more than 350 years, wide-spread stands of Douglas-fir (a fire-dependent forest type), tree-stand age classes, fire-scarred trees, and charcoal layers suggest that major fires burned in Kitsap County 450, 480, 540, and 670 years ago. Medium-sized, less intense fires occur on a several-decade scale, and small fires of a few acres or less occur every year on Bainbridge Island (Figure 7).

Figure 7: Number of natural vegetation fires on Bainbridge Island, 2002-2020



Statewide Trends and Patterns

The National Interagency Fire Center (NIFC), the nation's support center for wildland firefighting, keeps records of wildfire occurrences across the nation. Wildfires and acres burned in Washington State from 2002-2020 are listed in Table 1. NIFC records of human vs. lightning-caused fires in the Northwest (OR and WA) from 2002 through 2020 are listed in Table 2.

Table 1: Wildfire occurrence for Washington State, 2002-2020

Year	Fires	Total Acres Burned
2020	1646	**842,370**
2019	1394	**169,742**
2018	1743	**438,834**
2017	1346	**404,223**
2016	1272	**293,717**
2015	2013	**1,137,664**
2014	1480	**386,972**
2013	1527	**44,016**
2012	1342	**259,526**
2011	993	**17,480**
2010	870	**56,820**
2009	1976	**77,250**
2008	1303	**147,264**
2007	1268	**214,925**
2006	1579	**410,060**
2005	998	**185,748**
2004	1674	**92,617**
2003	1373	**200,517**
2002	1285	**92,742**

Table 2: Lightning and human-caused wildfires in the Northwest (OR and WA), 2002-2020

Year	Lightning Caused Fires	Lightning Caused Burn Acres	Human Caused Fires	Human Caused Burn Acres	Total Fires	Total Acres
2020	746	467,060	3,107	1,516,910	**3,853**	**1,983,970**
2019	1,430	109,155	2,260	140,321	**3,690**	**249,476**
2018	977	726,518	2,787	609,578	**3,764**	**1,336,096**
2017	1,254	655,578	2,150	465,864	**3,404**	**1,121,442**
2016	437	77,120	2,082	436,106	**2,519**	**513,226**
2015	1,705	1,121,267	2,898	702,206	**4,603**	**1,823,473**
2014	2,417	1,235,931	2,155	147,583	**4,572**	**1,383,514**
2013	2,282	388,151	2,107	115,842	**4,389**	**503,993**
2012	856	1,388,293	1,449	127,303	**2,305**	**1,515,596**
2011	808	273,222	1,342	30,038	**2,150**	**303,260**
2010	1,110	79,869	1,078	70,684	**2,188**	**150,553**
2009	1,843	148,328	1,624	29,592	**3,467**	**177,920**
2008	1,624	183,253	1,365	99,706	**2,989**	**282,959**
2007	1,486	618,879	2,346	244,335	**3,832**	**863,214**
2006	2,170	843,984	2,666	112,098	**4,836**	**956,082**
2005	901	122,131	1,924	219,012	**2,825**	**341,143**
2004	2,042	64,460	1,901	58,178	**3,943**	**122,638**
2003	1,605	234,331	2,370	126,381	**3,975**	**360,712**
2002	1,797	988,527	2,148	105,544	**3,945**	**1,094,071**

Historic Fire Regime

Fire regimes can be characterized by a wide variety of spatial and temporal scales which may range from highly site-specific to regional scales and from a few years to thousands of years. Understanding the variability of the fire regime across these scales is crucial to understanding fire regimes and accomplishing conservation or management goals. Distinctions should be made between "fire history" and "historic fire regimes". Fire history is a more general term that measures the frequency of fires in a landscape. Historic fire regimes describe the characteristics of fires across a landscape and the relationship and interactions between ecosystem structure and processes. A natural fire regime is a general classification of the frequency and role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning. The five regimes are described in (Figure 8).

Figure 8: Historic Fire Regime on Bainbridge Island

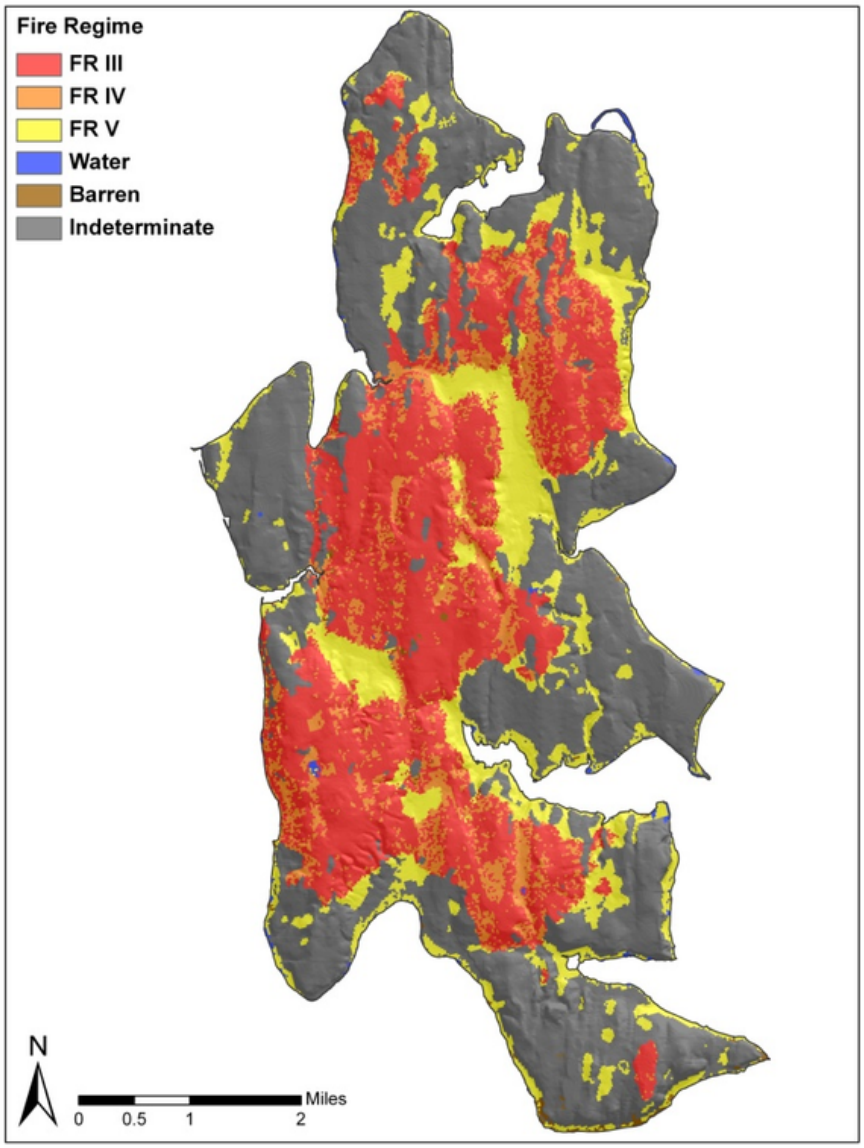
Fire Regime I
0-35 year frequency with low to mixed-severity (mostly surface fires)

Fire Regime II
0-35 year frequency with high severity (stand replacement fires)

Fire Regime III
35-100+ year frequency with mixed severity

Fire Regime IV
35-100+ year frequency with high severity (stand replacement fires)

Fire Regime V
200+ year frequency with high severity (stand replacement fires)



This historic fire regime data is a 30-meter resolution data set developed by the LANDFIRE Project, a federal program devoted to providing spatial data to wildland managers (www.landfire.gov). The data represents an integration of the spatial fire frequency and severity regime characteristics simulated using a vegetation and disturbance dynamics model. This information is an approximate representation of the general conditions present in an area and should be used for reference only.

The majority of forested land on Bainbridge Island is classified as a moderate to high fire severity regime (Figure 8). "High" severity fire regimes are characterized by infrequent severe crown fires, surface fires that cause high tree mortality or stand replacement fires that typically result in total stand mortality and moderate-to-high loss of the duff-litter layer. Unlike moderate severity fire regimes, the landscape following high severity regimes is usually dominated by a lack of remnant survivor trees. The complete loss of the overstory results in the eventual development of an even-aged forest stand. These stand-replacing fires in western Washington are generally associated with drought years and east wind weather events (which lower humidity). Fires are often of short duration, but of high intensity and severity.

Fire Regime Condition Classes

A fire regime condition class (FRCC) is a classification of the degree of departure from the natural regime. The condition class scale was developed to generally describe how the current severity, intensity, and frequency of fires have affected key vegetative components of the ecosystem, as compared to historic or reference conditions. The majority of Bainbridge Island is within the Fire Regime Condition Class 2* (Figure 9). The three condition classes are described as follows:

Condition Class 1

Fire frequencies are within or near the historical range, and have departed from historical frequencies by no more than one return interval; vegetation attributes are intact and functioning within the historic range. The risk of losing key ecosystem components is low.

Condition Class 2*

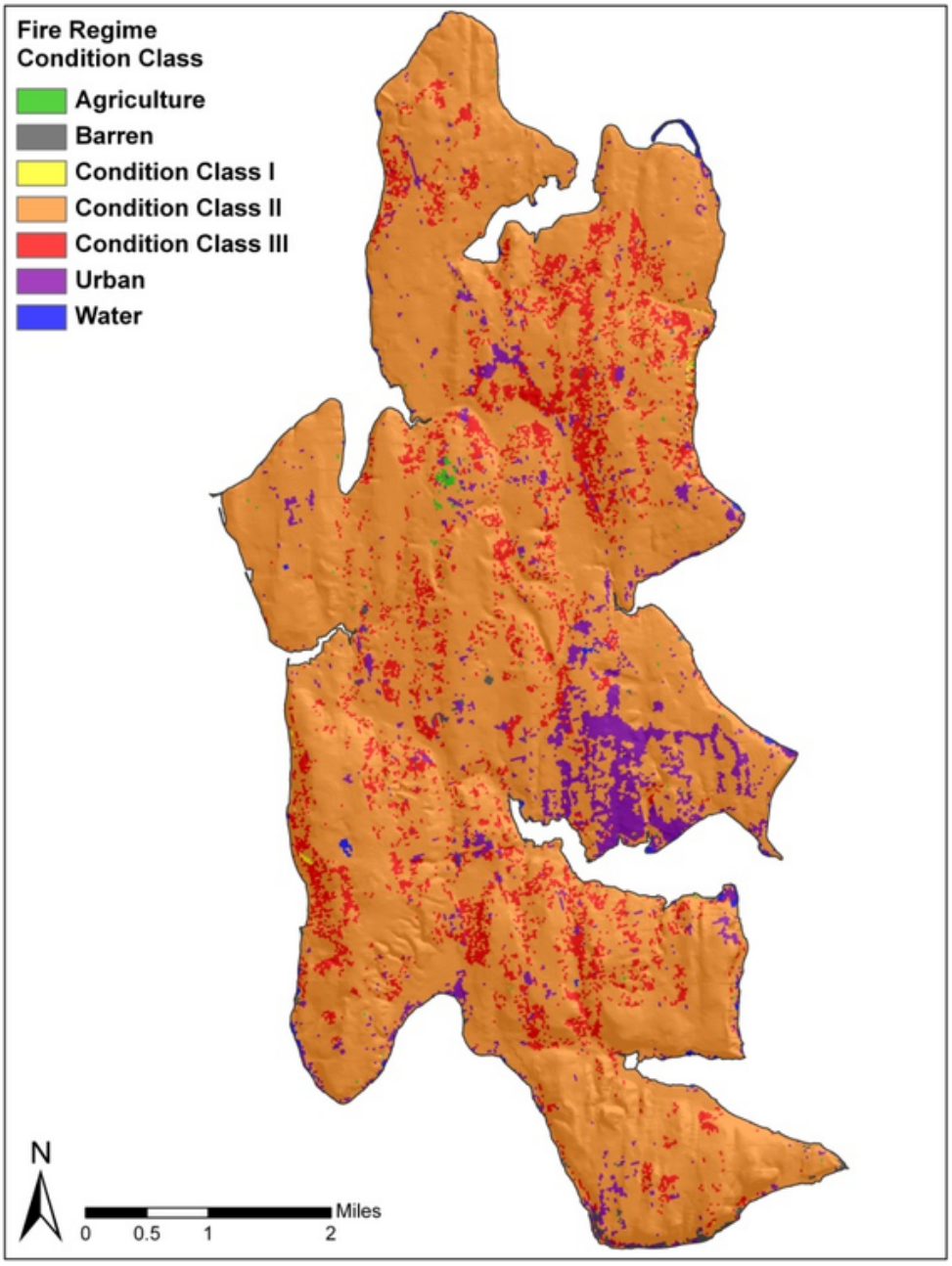
Fire frequencies and vegetation attributes have been moderately altered from the historical range and fire frequencies have departed from historical frequencies by more than one return interval. The risk of losing key ecosystem components is moderate. As you can see in Figure 9, most of Bainbridge Island Fire Regime Condition Class 2.

Condition Class 3

Fire frequencies and vegetation attributes have been significantly altered

from the historical range and fire frequencies have departed from historical frequencies by multiple return intervals. The risk of losing key ecosystem components is high.

Figure 9: Fire Regime Condition Classes

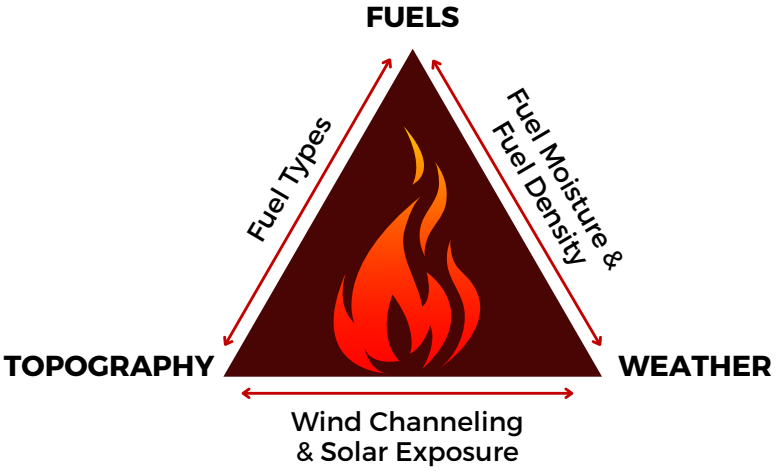


Wildfire Conditions

Wildfire behavior is driven by the interaction of a few factors: weather, vegetation type (commonly called “fuels”), and topography. The wildfire

triangle (Figure 10) is a simple graphic used in wildland firefighter training courses to illustrate how the environment affects fire behavior. Each point of the triangle represents one of the three main factors that drive wildfire behavior. The sides represent the interplay between the factors that are seen on the ground as they affect wildfire behavior. The potential for wildfires to become severe depends on these factors. For example, large fires in Western Washington typically occur on steep south-facing slopes and often result from a combination of circumstances including a source of ignition in areas of dry, heavy fuels, an extended period of drought, and dry east winds. Wildfires here usually occur during the dry summer months of July, August, and early September, but they can occur anytime between April and October given the right conditions. Fire hazard increases in the late summer and early fall when hot, dry east winds occur more frequently and the area has experienced the low point of the annual precipitation cycle.

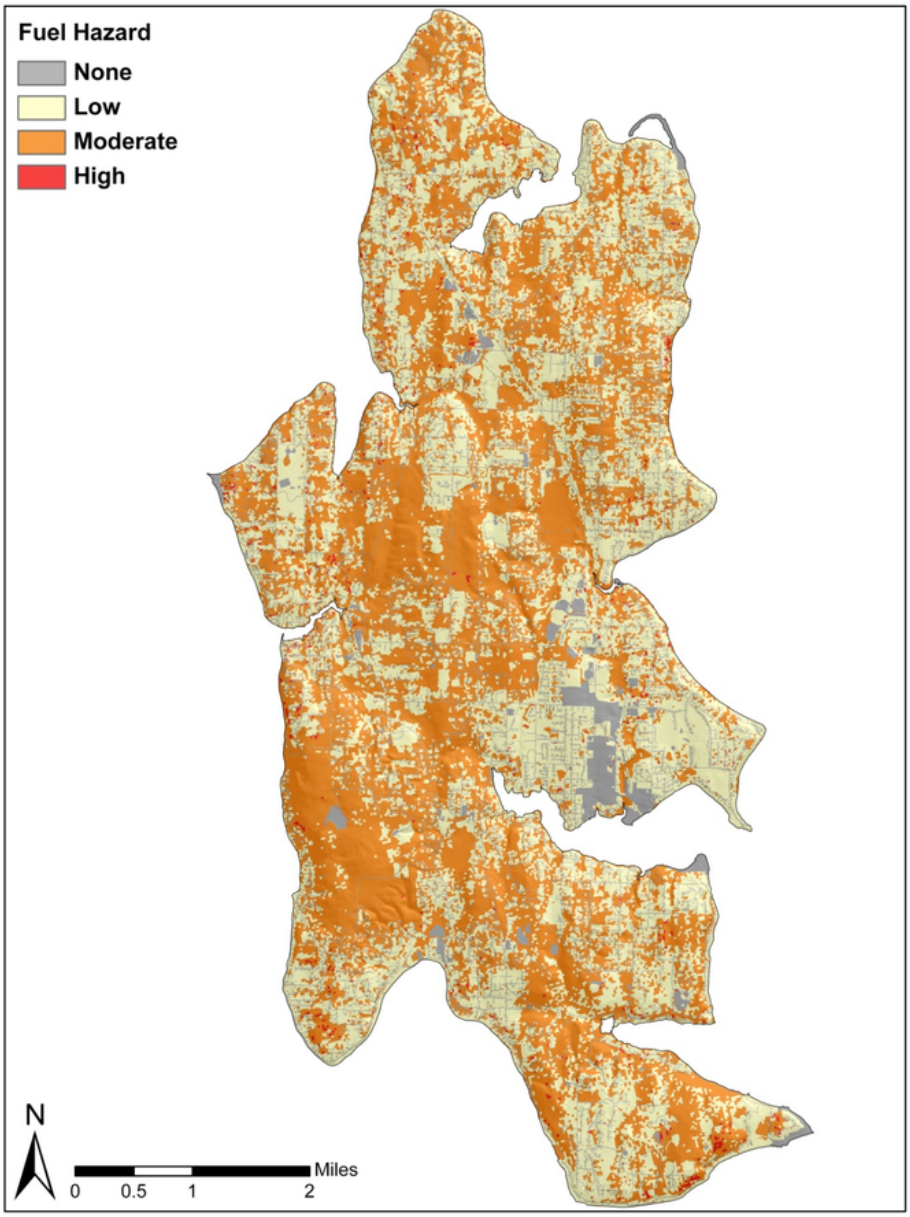
Figure 10: Wildfire Triangle



Vegetative Fuels

The presence of living or dead vegetative fuels can be the greatest contributor to wildfire hazards. Combustion of vegetation can create flame lengths exceeding 100', radiate heat capable of igniting structures 100' away, and cast off firebrands that can travel well over a mile. The fuel hazard assessment (Figure 11) uses the 40 Scott & Burgan fire behavior fuel model descriptions to classify vegetation hazards into categories of non-burnable (e.g., roads, extensive areas of concrete, etc.), light (grasses, forests with light litter; fuel loading <1.10 tons/acre), medium (most forests; fuel loads ~1.1 to 2.5 tons/acre), heavy (dense forests; fuel loads >5 tons/acre), and slash (none present in this database). The fuels are ranked according to the National Fire Protection Agency (NFPA) 1144 criteria. Populated areas on Bainbridge Island are predominantly exposed to wildfire from direct sources, such as adjacent flammable vegetation.

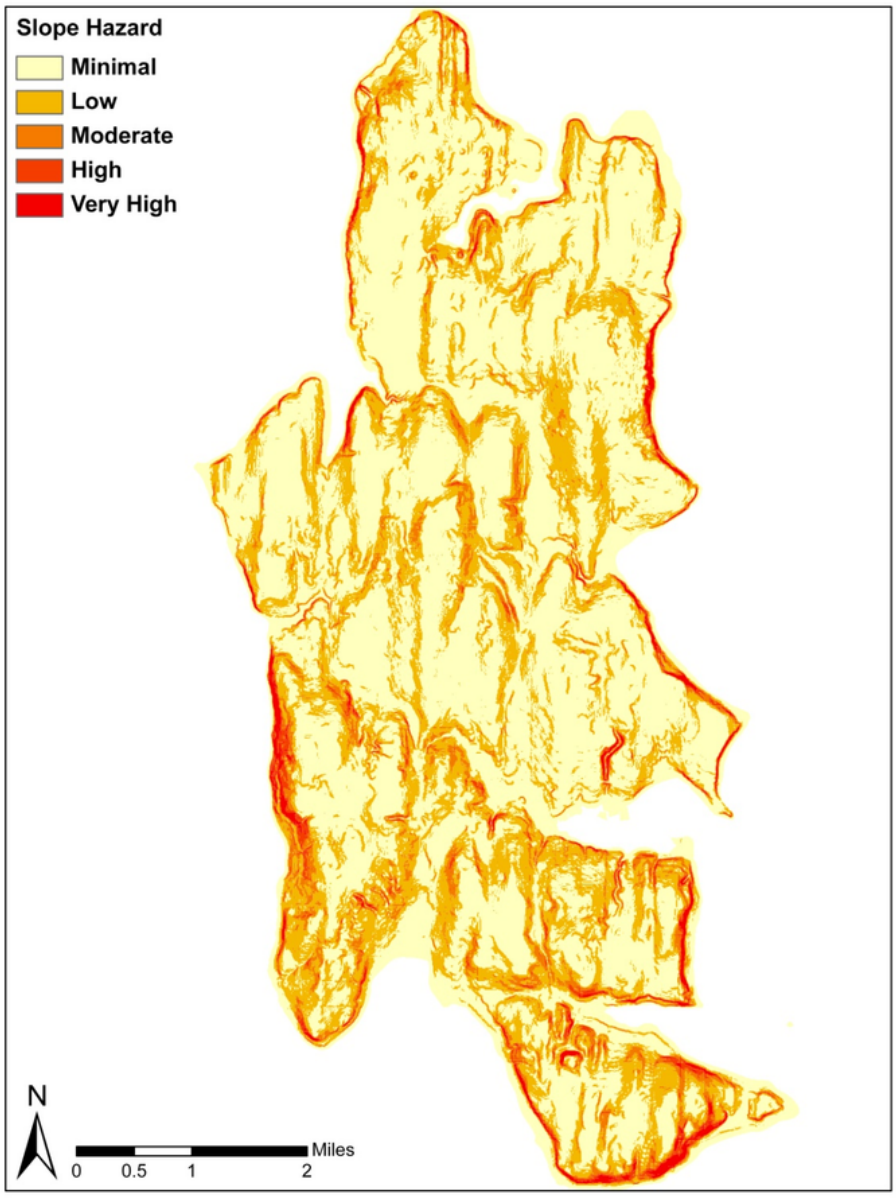
Figure 11: Hazard levels for the Vegetative Fuels factor



Slope

Steep slopes increase a fire's rate of spread uphill and can create topographic influences on wind. Topography is mostly low, rolling hills with several ridges oriented north to south. The percent slope is derived from the 10 m digital elevation model supplied by the Washington Department of National Resources (DNR). The slope hazard rating is a large contributor to the overall hazard rating because of its influence on fire spread and the increased difficulty of fighting wildfire as the slope steepens (Figure 12).

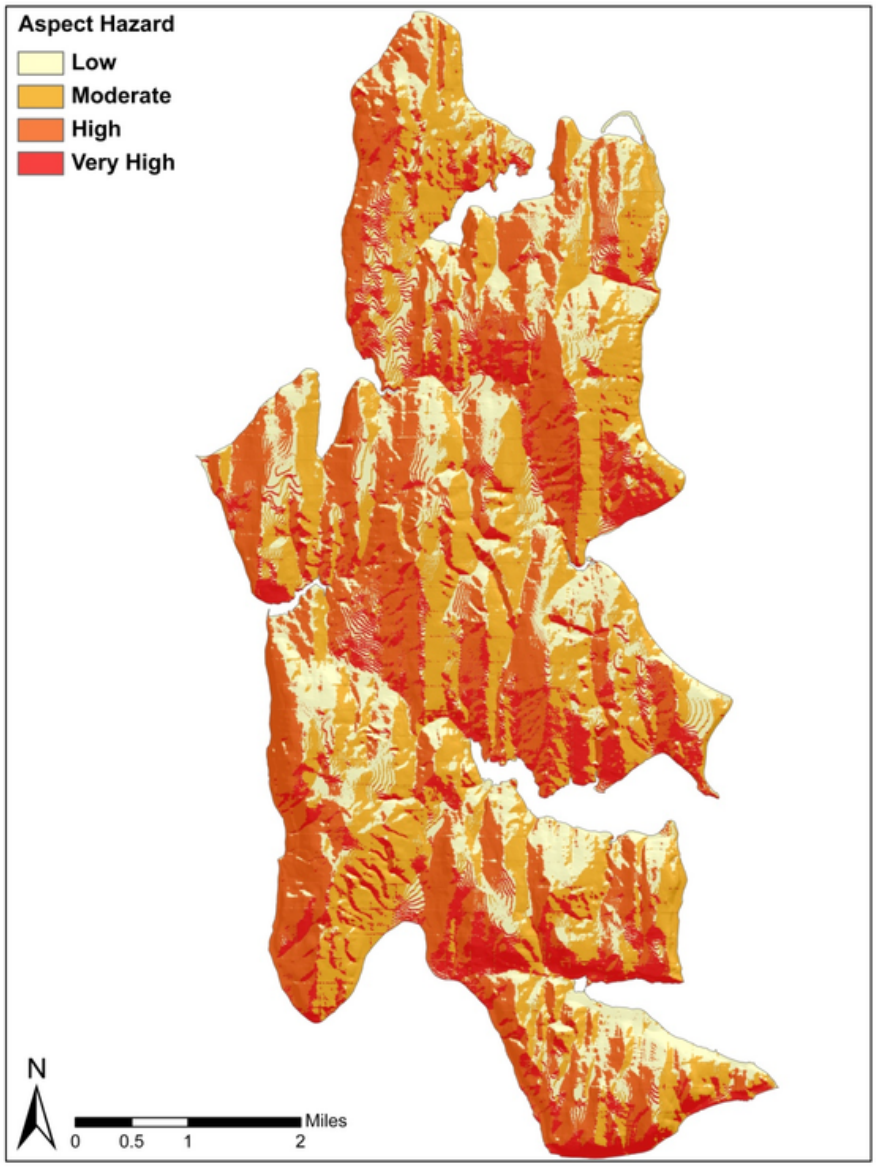
Figure 12: Hazard levels for Slope factor



Aspect

Bainbridge Island has many cloudy days, but solar insolation still has a large effect on fuels, especially during fire season. South-facing slopes receive much more solar radiation than slopes with a north aspect, due to the island's mid-latitude location near the 48th parallel. South slopes thus typically have drier fuels and soils, which affects fuel types and densities that can be grown on the slopes, as well as potential fuel moisture levels. While important, aspect hazard is not a major driver of fire behavior and thus accounts for a smaller amount of the hazard ratings (Figure 13).

Figure 13 Hazard levels for the Aspect factor



Wildfire Types

Four main types of wildfires can occur: ground fires, surface fires, crown fires, and spotting fires. Depending on the conditions of the fire event, one or multiple types of fires can occur at a time.

Ground Fires

Ground fires burn in the natural litter, duff, roots, and sometimes high organic soils. Once started, they are very difficult to detect and control. Occasionally, especially during prolonged drought, such fires can smolder all winter underground and then emerge at the surface again in spring.

Surface Fires

Surface fires burn on the surface of the ground and are primarily fueled by low-lying vegetation. They may move rapidly and ease of control depends upon the fuel involved.

Crown Fires

Crown fires burn in the tops of trees. Once started, they are very difficult to control since wind plays an important role in crown fires. They can advance at great speed from crown to crown, often well in advance of the fire on the ground. These are the most intense and dangerous wildland fires.

Spotting Fires

Spotting fires can be produced by crown fires as well as wind and topography conditions. Large burning embers are thrown ahead of the main fire and can travel as much as 1.5 miles ahead of the flame front. Once spotting begins, the fire is extremely difficult to control.

Ground Fire

Crown Fire

Surface Fire

Hazard Assessment

In the 2010 CWPP, a Geographic Information System (GIS) analysis was used to model and analyze wildfire hazards and risks. Three spatially explicit data sets of factors critical to wildfire behavior (fuels, slope, and aspect) were combined with proximity to hydrants and past vegetation fires to develop the overall wildfire hazard map of Bainbridge Island (Figure 14). Each factor was assigned a numeric weight based on its potential contribution to fire behavior (Table 3), following point-rating conventions based on NFPA 1144 (2008, Annex A). The points for each of the factors were then added together to create a hazard rating. The hazard rating was combined with risk based on previous fire history. The final map was then scaled into quartiles to provide a relative ranking of low to high hazards (Figure 14). An overview of the assessment factors and their relative ratings are listed in Table 3.

Table 3: Hazard assessment criteria and ratings

CATEGORY	ITEM	POINTS	POINT CATEGORY	HAZARD RATING	% OF OVERALL RATING
Spatial Hazard	Fuels	0 5 10 20 25	non-burnable light medium high slash	none low moderate high very high	50%
	Slope	1 4 7 10 15	<10% 10-20% 21-30% 31-40% >40%	minimal low moderate high very high	25%
	Aspect	0 2 3 5	N E W S	low moderate high very high	8.3%
Protection Hazard	Hydrants	0 5	Hydrant within 1000' Hydrant >1000' away	low high	8.3%
Ignition Risk	Past Vegetation Fires*	1 2 4 5	0 fires / sq. mile** >5-5.4 fires / sq. mile >5-14 fires / sq. mile >14 fires / sq. mile	low moderate high very high	8.3%
	Maximum Possible	60			100%

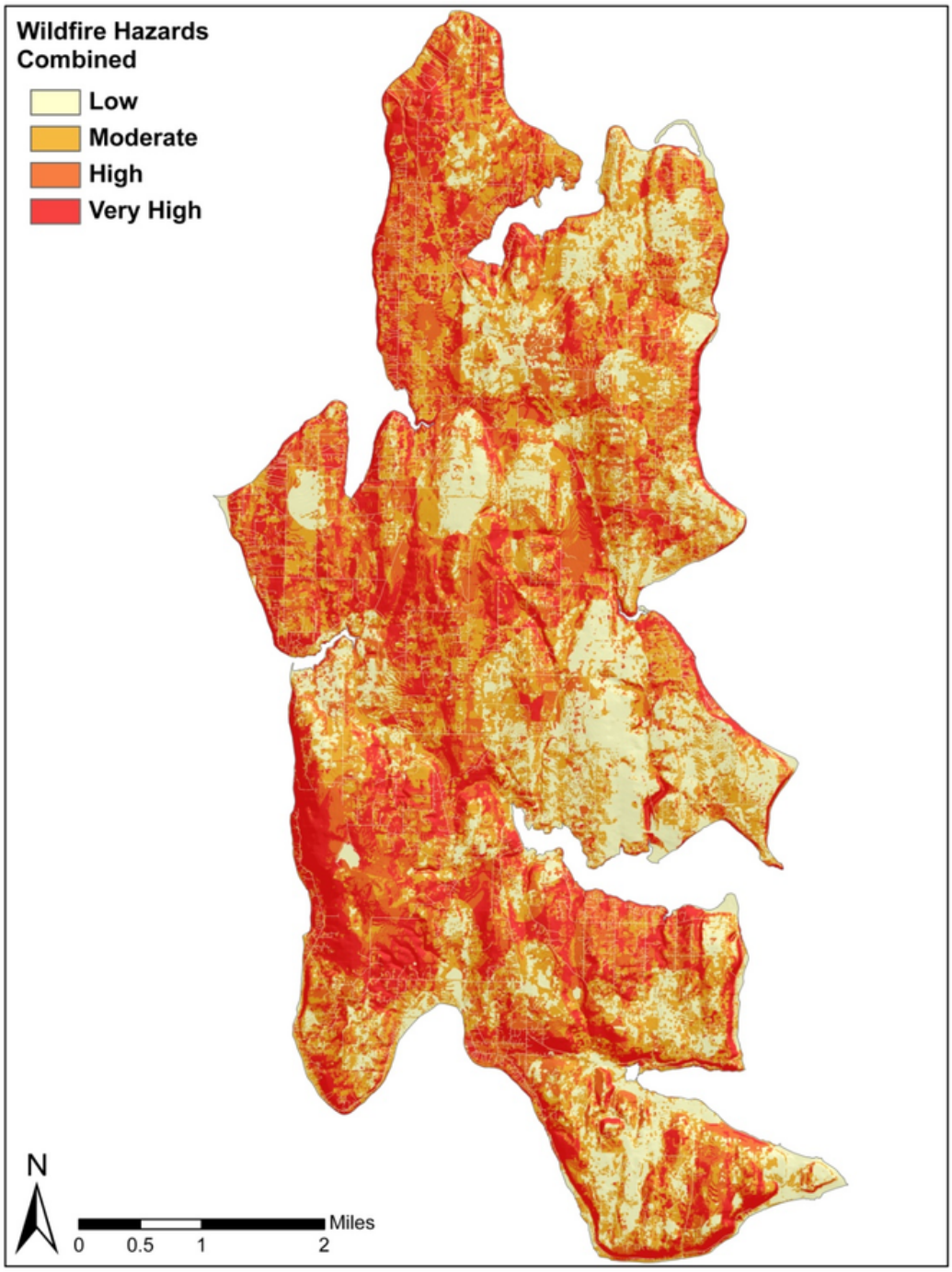
* Category values were derived from the entire data set of 21 years (1989- 2009), and are not annual values.

** The four groups represent quartiles of the results; for example, the Low (1 point) category is the lowest quartile of the data (0-25th percentile).

Overall Wildfire Hazard

To create the final hazard rating map, all of the assessment maps were summed using the point scale in Table 5 and classified from low to very high by quartile (Figure 14).

Figure 14: Overall Wildfire Hazard levels for Bainbridge Island



V. WUI AND PRIORITY MITIGATION AREAS

Wildland-Urban Interface

The term Wildland-Urban Interface (WUI) is defined simply as an area where humans and human development meet or intermix with wildland (vegetative) fuels. In an effort to further refine this definition, the Healthy Forest Restoration Act (HFRA) has identified two levels of the WUI designation: Interface and Intermix communities. The federal definition of an interface community is an area in or adjacent to (within 1.5 miles) wildland vegetation where development densities are at least three residential, business, or public building structures per acre. For less developed areas, the intermix community has development densities of at least one residential structure per 40 acres. By definition, the majority of Bainbridge Island does not meet the interface density definition, but rather of an intermix density. However, in practice, fire managers across the western U.S. use the 1 structure/40 acres definition to delineate WUI areas. Further, there are no wildland areas of Bainbridge Island further than 1.5 miles from human development. Thus, all of Bainbridge Island is considered Wildland-Urban Interface.

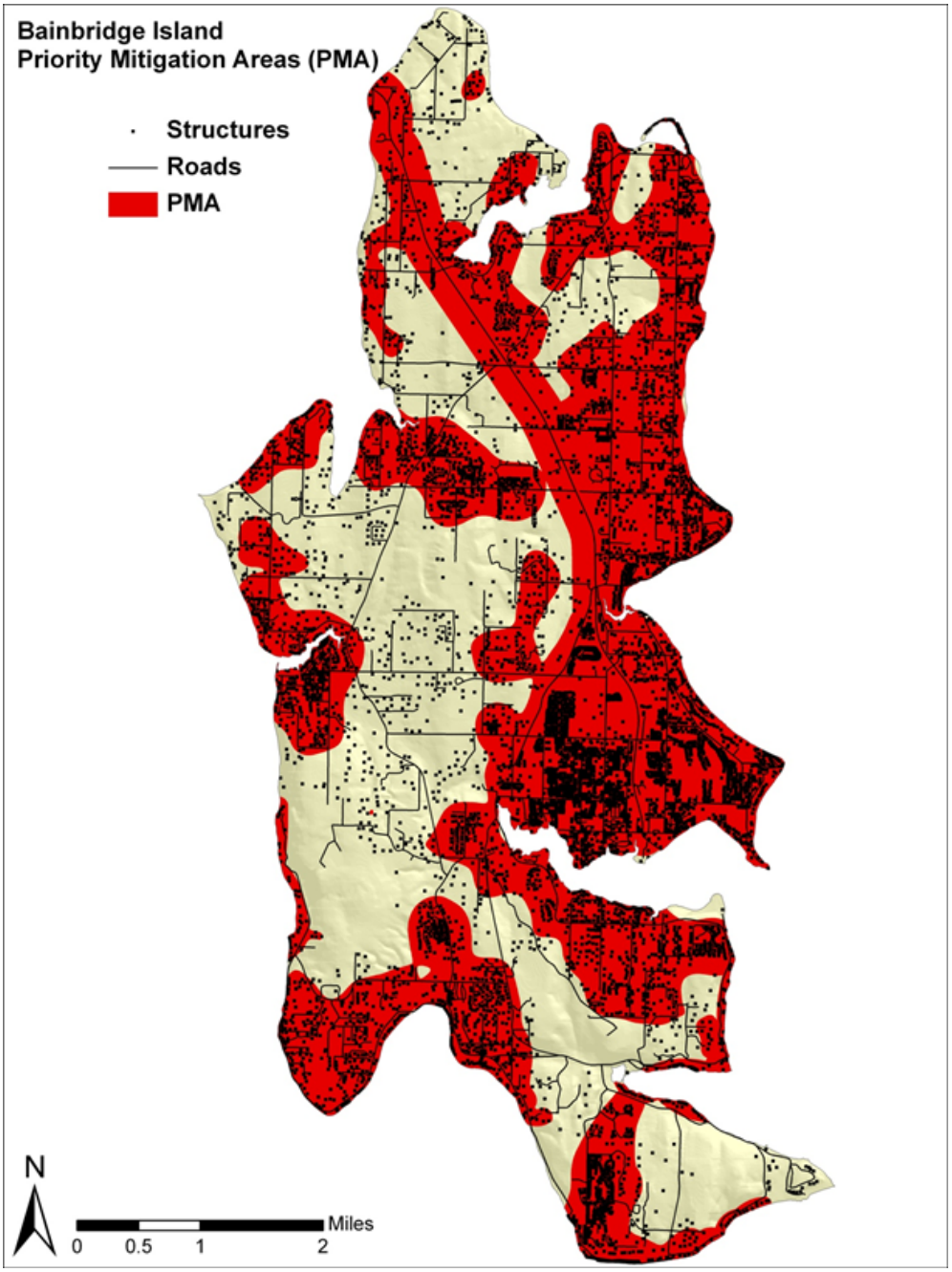
Priority Mitigation Areas

A 1990 Washington Department of Natural Resources (DNR) wildfire hazard assessment delineated all of Bainbridge Island as a high-risk area. This was refined somewhat by DNR in 2000, but without a description of methods used. In 2005, a U.S.-wide WUI was developed using GIS by the U.S. Forest Service to support the HFRA and national policymakers, and it also designated all of Bainbridge Island as “at-risk.” All of these efforts incorporated GIS analysis, but were limited by a lack of transparency in their development or were evaluated at a spatial scale that rendered community/neighborhood-level assessment impossible.

Because all of Bainbridge Island lies in the WUI, a more sophisticated GIS analysis was done for this CWPP to determine where initial mitigation efforts would have the greatest potential to protect the greatest number of structures, an area termed the Primary Mitigation Area (PMA). To do this, the overall wildfire hazard map (Figure 14, previous page) was used to select structure addresses/footprints lying in areas with moderate to very high hazards (i.e, low overall hazard areas were removed from consideration). Structure density was calculated from the clipped address map for a 1,489’ radius moving window (the diameter of a 40-acre circle), and the results were classified to meet the local WUI definition of ≥1 house/40 acres. A 1,000’ buffer was added to State

Route 305 and included in the PMA, as it is the main ingress/egress route for the island. The PMA map developed for this CWPP is shown in Figure 15.

Figure 15: Bainbridge Island Priority Mitigation Areas



VI. MITIGATION STRATEGIES

Risk assessments do not necessarily reveal appropriate mitigation strategies. Other factors to consider are relevant laws and regulations, strategic objectives, broader land and resource management plans, treatment opportunities, and likely effectiveness and negative consequences of various treatment alternatives. However, assessments of wildfire risk are critical for informing the development and implementation of cost-effective risk mitigation efforts and can be used as a basis to evaluate different treatment alternatives. Designing efficient fire management strategies involves asking:

- Where can wildfire risk be best mitigated?
- What treatments and management activities are feasible?
- Where can different treatments be implemented, and to what extent?
- How will treatments affect various risk factors (likelihood and intensity)?
- What combinations of activities can most cost-effectively mitigate wildfire risk?

Many residents of Bainbridge Island may be unaware of the concept of defensible space or unaware that the concept is directly applicable to their property, adding to the potential for severe WUI incidents in the future. Should we face a major wildfire it is possible that the Island could become a major disaster zone with heavy property losses and potential loss of human life. However, with careful planning and collaboration among public agencies and community members, it is possible to minimize the losses that can result from wildfire.

In 2019, the Bainbridge Island Climate Change Advisory Committee was directed by the City Council to develop a Climate Action Plan (CAP) that is consistent with the Island's Comprehensive Plan. On November 10, 2020, the City of Bainbridge Island City Council Approved the Climate Action Plan- A Plan for Mitigating and Adapting to Climate change on Bainbridge Island. The CAP recognizes the need to adjust to our changing climate and prepare for more frequent and intense climate change impacts and the increased potential for wildfire in our community. It provides a pathway to enhance our community resilience by including approved wildfire mitigation strategies for both public and private landowners.

The City's Comprehensive Plan also references municipal codes pertaining to the care of trees, vegetation, and forested areas on Bainbridge Island (Figure 20, page 30). Its policies and nonregulatory provisions pertain especially to the

plans and ongoing activities of Island residents, on their own property when the use and enjoyment of the property involve stewardship and maintenance of trees and vegetation. Chapter 16.18 of the City of Bainbridge Island Municipal Code provides specific actions property owners may take to reduce fuel hazards on their property.

Hazardous Fuel Reduction

While weather and topography are factors beyond human control, wildfire behavior can be influenced by modifying fuel load and continuity across the landscape. Reducing hazardous fuels around homes, along transportation corridors, and in the City's landscape, can significantly minimize losses to life, property, and natural and cultural resources in the event of a major wildfire. Forests that are managed for resistance to fire damage will also be more resistant to damage by insects, disease, organisms, and extreme weather conditions, further protecting fish, wildlife, watersheds, and other public resources. Any fuel treatments, including tree removal, must meet the requirements of the Bainbridge Island Consolidated Tree Ordinance. Common methods for fuel reduction treatments include:

- Fire
- Mechanical
- Hand labor
- Chemical/Herbicide
- Grazing
- A combination of the above

Types of fuel reduction projects can include:

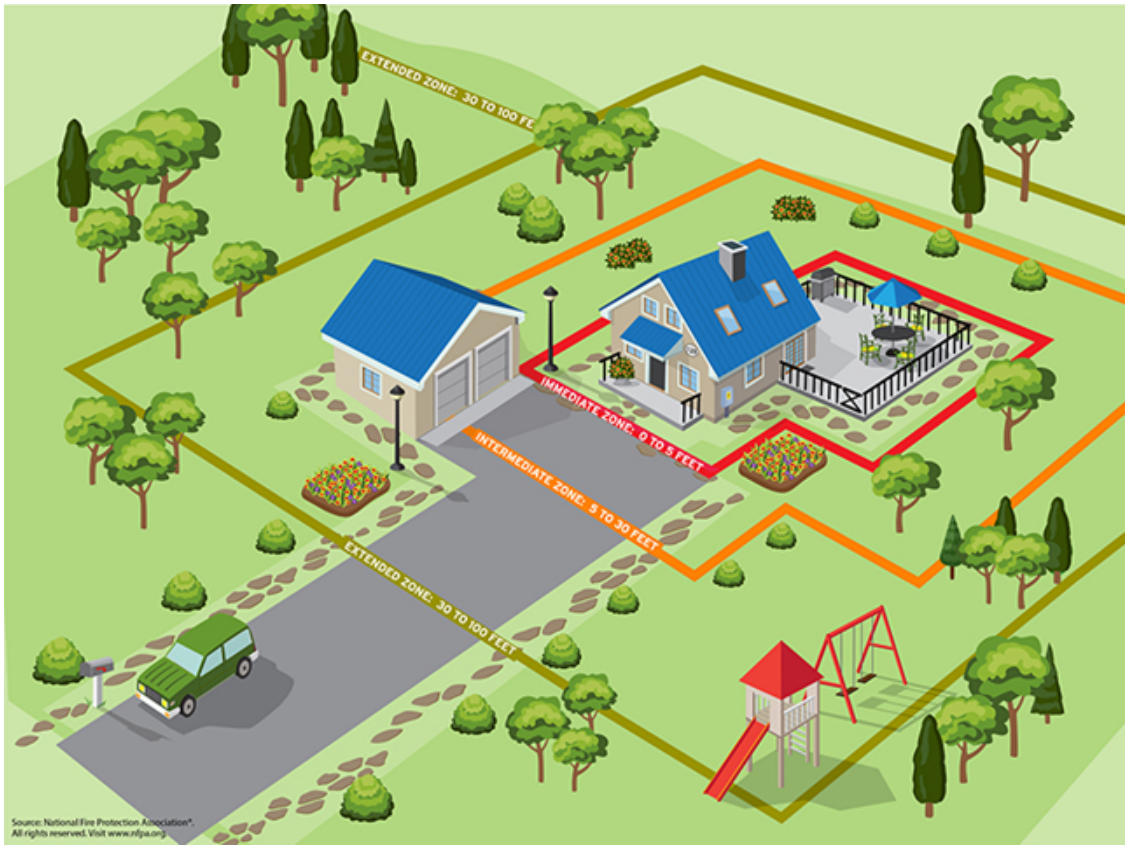
- Stand thinning
- Pruning/thinning
- Reduction of disease stands
- Prescribed fires
- Fuel breaks
- Defensible space
- Fire-resistant plantings

Defensible Space

Defensible space is the area around a home or structure that has been maintained and designed to reduce fire danger. This defensible space reduces the risk that fire will spread from one area to another, or to a structure, and provides firefighters access and a safer area from which to defend a threatened area. Research around home destruction vs. home survival in wildfires points to embers and small flames as the main way that the majority of homes ignite

in wildfires. Embers are burning pieces of airborne wood and/or vegetation that can be carried more than a mile through the wind causing spot fires and igniting homes, debris, and other objects. There are methods for homeowners to prepare their homes to withstand ember attacks and minimize the likelihood of flames or surface fire touching the home or any attached structures. Experiments, models and post-fire studies have shown homes ignite due to the condition of the home and everything around it, up to 200' from the foundation. This is called the Home Ignition Zone. There are three "zones"- Immediate, Intermediate, and Extended Home Ignition Zones (Figure 16).

Figure 16: Firewise Home Ignition Zones



Learn more about Firewise Home Ignition Zones:
https://www.nfpa.org

Home Ignition Zones

Immediate Zone

The home and the area 0-5' from the furthest attached exterior point of the home; defined as a non-combustible area. Science tells us this is the most important zone to take immediate action on as it is the most vulnerable to embers. Start with the house itself then move into the landscaping section of the Immediate Zone. Best practice includes:

- Clean roofs and gutters of dead leaves, debris, and needles.
- Replace or repair any loose or missing shingles or roof tiles to prevent ember penetration.
- Reduce embers that could pass through roof and eave vents by installing 1/4 inch or smaller metal mesh screening.
- Clean debris from exterior attic vents and install 1/8 inch metal mesh screening to reduce embers.
- Repair or replace damaged or loose windows and screens.
- Screen or box-in areas below patios and decks with wire mesh to prevent debris and combustibles from accumulating.
- Move any flammable material away from wall exteriors – wood mulch, flammable plants, leaves and debris, firewood piles – anything that can burn. Remove flammables stored underneath decks or porches.

Intermediate Zone

The area 5-30' from the furthest exterior point of the home. Best practices include employing landscaping and/or hardscaping that creates breaks that can help influence and decrease fire behavior.

- Clear vegetation from under large stationary propane tanks.
- Create fuel breaks with driveways, walkways/paths, patios, and decks.
- Keep lawns and native grasses mowed to a height of four inches.
- Remove ladder fuels (vegetation under trees) so a surface fire cannot reach the crowns. Prune trees up to six to ten feet from the ground; shorter trees do not exceed 1/3 of the overall tree height. (Figure 17)
- Space trees to have a minimum of eighteen feet between crowns with the distance increasing with the percentage of slope (Figure 18).
- Tree placement should be planned to ensure the mature canopy is no closer than ten feet to the edge of the structure.
- Tree and shrubs in this zone should be limited to small clusters of a few each to break up the continuity of the vegetation across the landscape.

Figure 17: Tree Pruning

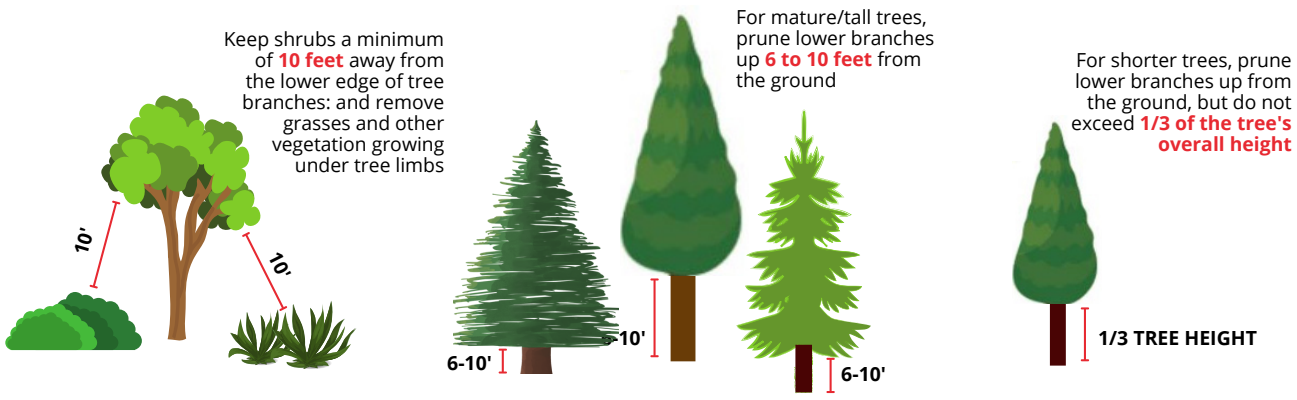
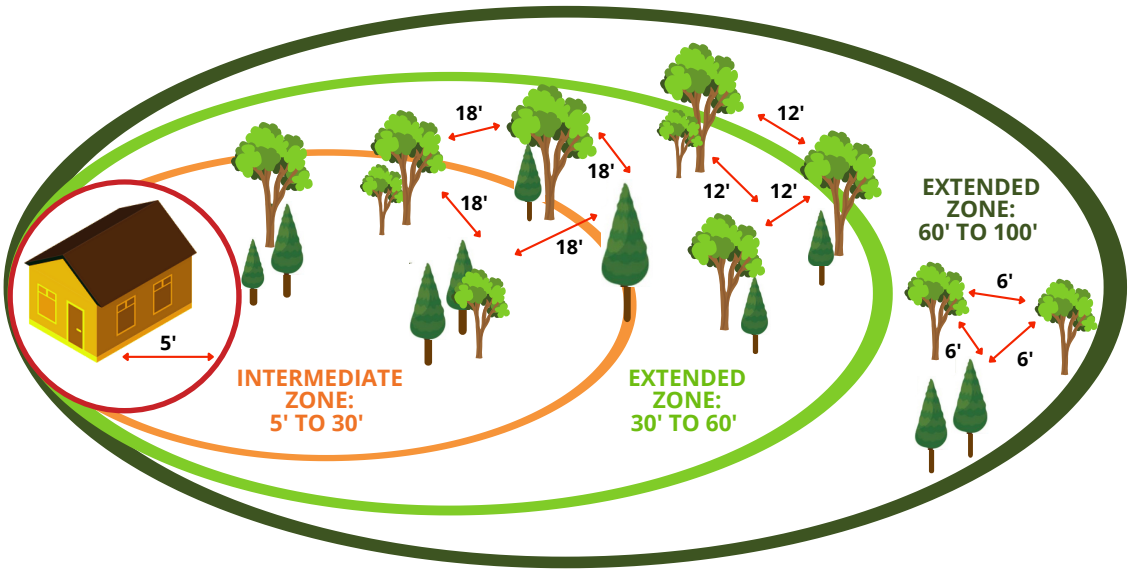


Figure 18: Tree Spacing



Extended Zone

30-100 feet, out to 200 feet. Landscaping – the goal here is not to eliminate fire but to interrupt fire's path and keep flames smaller and on the ground.

- Dispose of heavy accumulations of ground litter/debris.
- Remove dead plant and tree material.
- Remove small conifers growing between mature trees.
- Remove vegetation adjacent to storage sheds or other outbuildings within this area.
- Trees 30 to 60 feet from the home should have at least 12 feet between canopy tops.
- Trees 60 to 100 feet from the home should have at least 6 feet between the canopy tops.

Reduction of Structural Ignitability

The risk wildfire poses to forest lands and homes in our community is inseparable; wildland fires can burn homes, and structural fires can spread to the adjacent forested areas.

Defensible space, as outlined in the previous section, provides a mechanism to reduce the likelihood of direct flame impact to or from structures and adjacent vegetation. COBI's recent adoption of provisions that allow property owners to perform this type of protection within the 'immediate zone' is a step in the right direction towards risk reduction.

Further measures are necessary, however, to protect homes through building construction and maintenance. Embers are a major factor in wildland fires where structures are lost. The International Wildland-Urban Interface Code and National Fire Protection Association 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire are two examples of national consensus codes that address building construction features that contribute to structural ignitability.

In 2021, COBI adopted limited provisions of the International Wildland-Urban Interface Code pertaining to the construction and replacement of roofs. These provisions require an assessment of the property for wildfire hazards and the use of roofing materials and techniques that make the roof more fire-resistant.

Other recommendations, that should be considered for future code adoption include, but are not limited to:

- Ignition-resistant construction of exterior walls, eaves, and underfloor areas
- Non-combustible gutters and downspouts
- Exterior window glazing
- Screening vents in attics, subfloors, and foundations with ¼" or smaller mesh to prevent embers from entering
- Ignition-resistant deck construction

Numerous other provisions related to construction that assist the fire department in responding to fires should continue to be reviewed on a regular basis and improvements made, whenever possible. Such areas include:

- Roadway and driveway access provisions including width, overhead clearance, turning radius, surfaces, grades, angles of approach and departure, turnarounds, etc. Access during wildfire conditions exacerbates any access problems or limitations already in place.
- Posting of addresses and naming of private driveways. While the Fire Code already requires addresses to be posted, requiring the use of non-

combustible signage would be a benefit.

- Fire protection water supply infrastructure. Around 50% of the island is served by fire hydrants. Expansion of fire protection water supply infrastructure makes firefighting operations more effective and efficient. Capacity and reliability of these systems is also of vital importance.

Firewise Landscaping

When landscaping around a home, most homeowners are interested in creating a landscape that is aesthetically pleasing, complements their home, and has variations in color, texture, flowers, and foliage. When selecting plants, you should also consider the flammability of plants (i.e., fuel), particularly if your home is located in or adjacent to a forest. Homeowners should take active steps to minimize or reduce the fuel and fire hazards around their homes, including the use of fire-resistant plants in the landscape. Equally important are proper plant placement, plant spacing, and ongoing plant maintenance. These practices, when combined, can create a fuel break and help protect your home by blocking intense heat (Figure 19).

Figure 19: Landscaping that Includes Fire-Resistant Plants and Fuel Breaks

Creating a defensible space around your home includes using fuel breaks and fire-resistant plants in the landscape. Fire-resistant plants are those that do not readily ignite from a flame or other ignition sources. These plants can be damaged or even killed by fire; however, their foliage and stems do not significantly contribute to the fuel and, therefore, the fire's intensity. Plants that are fire-resistant have the following characteristics:

- Leaves are moist and supple.
- Plants have little dead wood and tend not to accumulate dry, dead material within the plant.
- Sap is water-like and does not have a strong odor.
- Sap or resin materials are low.
- Most deciduous trees and shrubs are fire-resistant.

Figure 20: City of Bainbridge Island Ordinance No. 2021-07, pertaining to wildfire mitigation activities

ORDINANCE NO. 2021- 07

AN ORDINANCE of the City of Bainbridge Island, Washington, revising and amending Chapter 16.18 of the Bainbridge Island Municipal Code related to the applicability of that chapter, fire safety measures, and wildfire mitigation activities for residents of Bainbridge Island, and the definitions section of that chapter. View Ordinance No. 2021-07 in full at: www.bainbridgewa.gov

Below are sections from Ordinance No. 2021-07 that addresses wildfire mitigation on Bainbridge Island:

16.18.025 Purposes. This chapter is adopted for the following purposes:

Section D: To implement goals and policies in the current comprehensive plan, the Community Forest Management Plan (2006), the Bainbridge Island Open Space Study (October 2008), and the Bainbridge Island Community Wildfire Protection Plan (2010), or subsequent updated versions.

Section F: To implement a long-range policy of maintaining the island's forest canopy cover while taking measures to prevent wildfires and protect structures in accordance with recommendations of the Bainbridge Island fire department.

16.18.040 Activities allowed without a permit.

Section H: Voluntary wildfire mitigation activities, other than tree and vegetation removals requiring a permit in BIMC 16.18.050.A. or Chapter 16.32 BIMC (Protection of Landmark Trees), within a 30-foot defensible space of habitable structures, including, but not limited to, the following:

- Vegetation removal underneath a propane tank;
- For trees less than 30 feet in height, pruning up to ten feet from the ground to remove ladder fuels, as long as pruning doesn't exceed 1/3 of tree height;
- Removal of trees to provide at least 18 feet between crowns;
- Removal of trees within 5 feet of the furthest attached exterior point of a habitable structure.

Property owners may obtain assistance with wildfire mitigation activities from the Bainbridge Island Fire Department, the City Arborist, and private tree professionals in accordance with City prepared guidance. Further information can be obtained from the applicable sections of the Fire Code (Chapter 20.04 BIMC), the Climate Action Plan, and the Bainbridge Island Community Wildfire Protection Plan. The Fire Department and Department of Planning and Community Development will maintain a checklist to provide guidance in implementing wildfire mitigation, and it is the intent that both the checklist and this code section will be reviewed annually to ensure they are consistent with best practices to mitigate wildfire danger.

16.18.130 Definitions.

"Defensible space" means an area either natural or person-made where material capable of causing a fire to spread has been treated, cleared, reduced, or changed to act as a barrier between an advancing wildfire and the loss to life, property, or resources. In practice, "defensible space" is defined as an area a minimum of 30 feet around a habitable structure that is cleared of flammable brush or vegetation.

"Ladder fuels" means fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and assure the continuation of crowning.

VII. FIRE DEPARTMENT READINESS & RESPONSE

Fire Department Readiness

The Bainbridge Island Fire Department's (BIFD) preparedness for wildfires can be broken down into three areas: training, equipment, and experience.

Training

Because of the risk of wildfire on Bainbridge Island, BIFD extensively trains its firefighters in wildland firefighting. Our Island's firefighters are trained to the Wildland Firefighter Type 2 standard established by the National Wildfire Coordinating Group. This training includes classroom instruction as well as practical, hands-on training. Annual refresher training for all response personnel is also required. In addition, BIFD officers have advanced National Incident Management System *Incident and Wildland Urban Interface Firefighting* training. Many of our members are also state and nationally credentialed at levels above the basic wildland firefighter standard, which allows them to work on larger wildfires on the eastern side of the Cascades, or even out-of-state.

Equipment

The BIFD has a variety of apparatus to be used for fighting wildfires:

- Four Type 1 structural engines, each one carries wildland-specific firefighting tools, hose, and equipment, and holds 750 gallons of water;
- Three water tenders, each carries 3000 gallons of water;
- One Type 6 brush engine, designed specifically for wildland firefighting, and is 4x4 off-road capable.

In addition to apparatus, all BIFD responders are issued wildland firefighting protective gear. Additional equipment includes field-programmable Bendix King radios, GPS units, hand-held weather stations, a portable fire pump that can be carried to hard-to-reach areas, and iPads with field mapping applications.

The BIFD is also in the process of acquiring a Type 3 wildland urban interface engine as well as installing a remote automatic weather station (RAWS) that will be linked via satellite to the National Interagency Fire Center in Boise, Idaho, to provide local fire weather information.

Experience

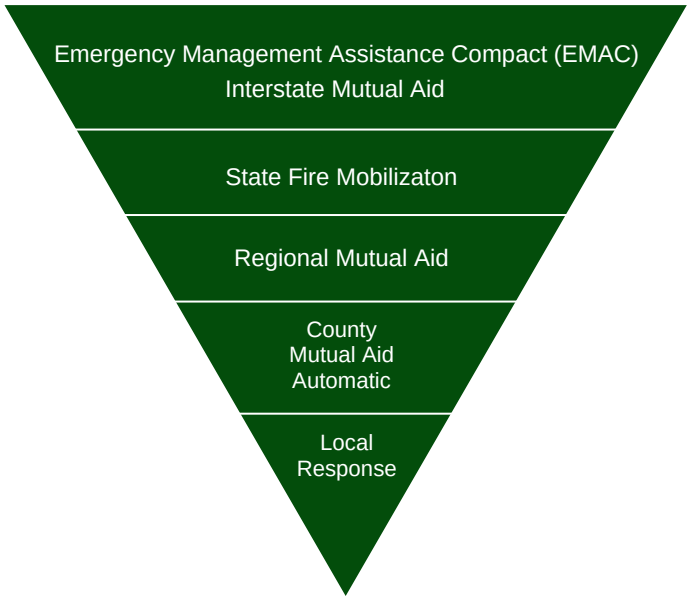
There is no better way to learn how to fight fire, than by actually going out and fighting real fire. Much of the extensive experience acquired by the BIFD responders has been through our participation in state mobilizations, interstate mobilizations, and regional mutual aid fire events. The Department also has members with experience managing large-scale wildfire events in Washington, Oregon, and California with inter-agency incident management teams (Type 2 and Type 3). A number of BIFD members also have come to the Department with extensive wildland firefighting experience, including service on contract wildland firefighting engines, deployments with WA DNR, participation with other fire departments fighting wildfires, and experience with a Type 1 inter-agency "Hot Shot" crew.

Fire Department Wildfire Response

In the event of a wildfire on Bainbridge Island, the initial response would come from the local fire stations on the island. If more resources are needed than what the BIFD has at the time of the event, in-county mutual aid would be dispatched to provide additional resources. It is important to note that the in-county response is automatic, and it happens seamlessly. If county resources are not enough, in-region mutual aid will be requested. If the fire event will be prolonged, or regional resources have been exhausted, a state fire mobilization can be requested from resources across

Washington State. If we run out of resources within the state, we have access through an EMAC request, to get help from out-of-state. Through the tiered response model (See Figure 20) the BIFD has access to any and all assets necessary to fight wildfire effectively in our community.

Figure 21: Wildfire Tiered Response



Response Actions - "Size-Up"

The initial response to wildfires in our community will be based on 9-1-1 dispatch information. Once on scene, a "windshield size-up" is made, and an initial radio report is made based on what the on-scene responders see from the apparatus. Responders will then get out of the apparatus to get eyes on the fire to see what is burning, how big the fire is, how fast is traveling, what kind of fuels are burning, and if there are any exposures that need protecting. Once that information has been gathered, a follow-up report will be made. At that time any additional resource requests can be made.

Response Actions - Engagement

Engagement is the act of attacking the fire. There are different ways to fight the fire depending on what the conditions are. Attacking the fire may involve hand tools, hose lines, air assets, and/or heavy machinery. If structures are in the fire zone, an assessment of those structures will be made (structural triage) to determine which can be saved and which cannot be saved. Wildfire mitigation and defensible space are critical to protecting a structure from wildfire. Once the fire is under control, it will be monitored and patrolled for a few days to make sure the fire remains extinguished and the site is secure.

VIII. EVACUATION

City of Bainbridge Evacuation Response

The Bainbridge Island Wildfire Response and Evacuation Annex was developed in partnership with the City of Bainbridge Island Emergency Management Coordinator, the Bainbridge Island Police Department, and the Bainbridge Island Fire Department. The purpose of this annex is to serve as a supplemental document to the Comprehensive Emergency Management Plan that provides wildfire-specific information and response procedures related to firefighting, evacuation, and emergency public information.

During a wildfire on Bainbridge Island, community members may be told to "prepare to evacuate" or be provided with "voluntary evacuation" or "mandatory evacuation" orders.

- A "voluntary evacuation" order means that the threat to lives is not yet imminent but conditions exist or such circumstances may exist in the near future. It is "recommended" that people relocate to a safer location.
- A "mandatory evacuation" order means that there is an imminent threat to life and property. People and their pets in the mandatory evacuation order zone(s) should evacuate as soon as they receive the order.

Figure 22: City of Bainbridge Island Wildfire Readiness Infographic

Bainbridge Island has been divided up into 12 evacuation zones; making it extremely important for every resident to know their evacuation zone (Figure 22). Real-time information will be used to determine which evacuation zones need to be evacuated. Information regarding specific evacuation routes (Figure 23) will be conveyed to the community based on the location of the hazard. Throughout the emergency, the size and location of the danger area will be continuously reevaluated and, if necessary, advise the evacuation of additional areas. In general, evacuation routes will direct people to get away from the hazard area and to report to a temporary reception center. If off-island evacuation is needed, evacuation routes will head north on State Route 305 to the Agate Pass Bridge or south to the ferry terminal in downtown Winslow.

Figure 23: Bainbridge Island Evacuation Zones

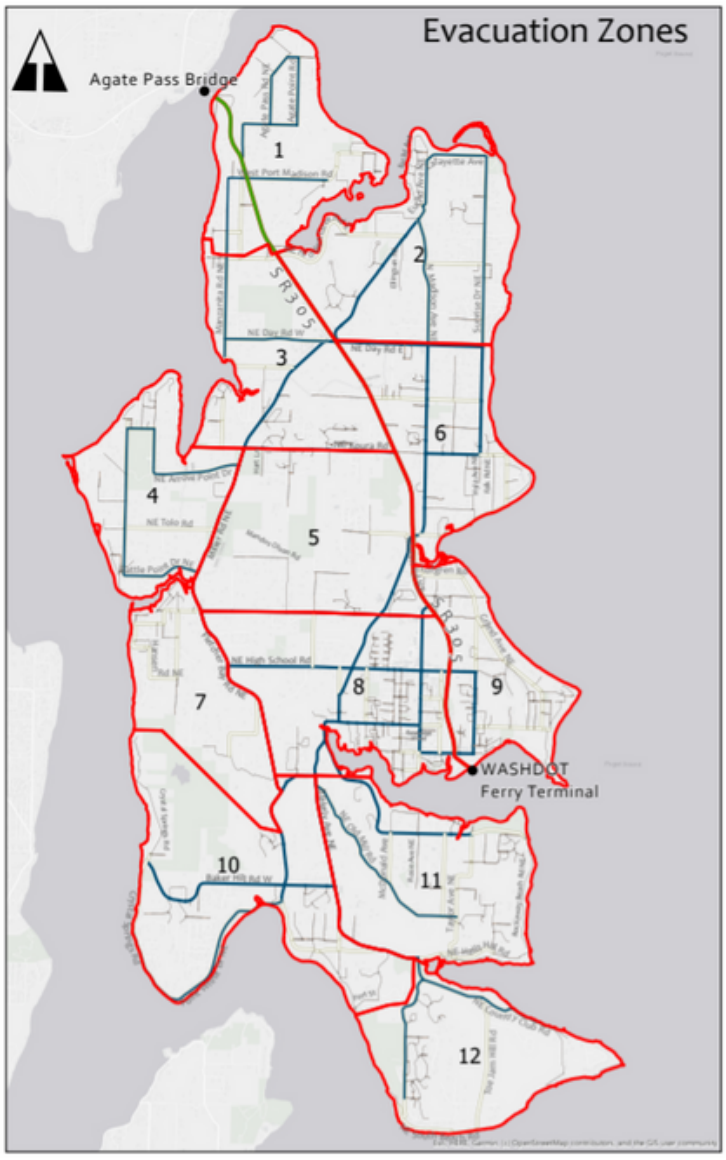
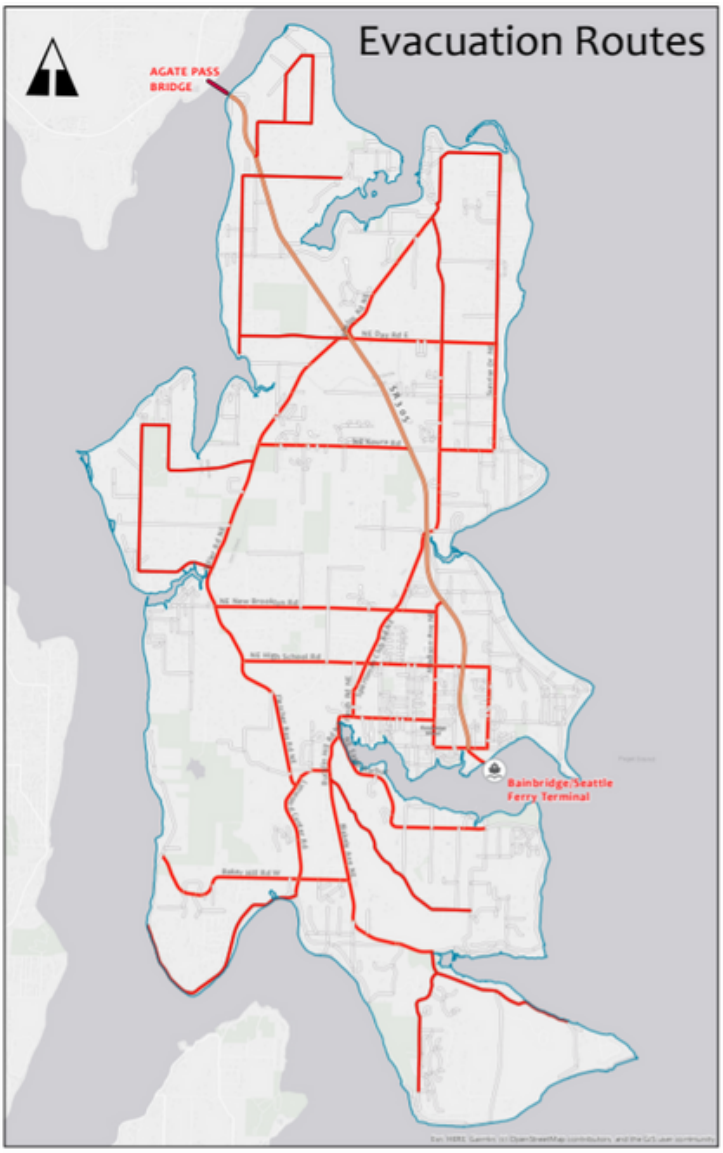


Figure 24: Evacuation Routes



Emergency Messaging

The City of Bainbridge Island uses NIXLE to send out emergency texts and email messages. At the time of this Update, about 50% of Island residents subscribe to NIXLE emergency alerts (Figure 25). The messaging will include information about the situation, recommended protective actions, evacuation route information, road closures, locations of assembly points for those without access to vehicles, where to go for care and shelter, and other pertinent information. Other methods of communication may include:

- Kitsap County AlertSense mass notifications
- Wireless Emergency Alerts through Kitsap County or the State

- City website and social media sites
- Police and Fire vehicle public address systems
- Print, radio, and television media
- Message boards throughout the community
- Amateur Radio System (ham radio)

Figure 25: NIXLE

NIXLE® is the Island's official emergency notification and alerting system.

Sign-up to receive free public safety notifications and emergency alerts from the City of Bainbridge Island and the Bainbridge Island Fire Department.
Alerts are sent for events impacting Bainbridge Island only.
Examples include: Road closure notices, missing persons alerts, and emergent public safety alerts

Signing up is EASY: Text 98110 to 888777, or visit www.nixle.com and enter your zip code.

IX. GOALS & OBJECTIVES

It is critical that goals and objectives be identified in this CWPP update to move the culture forward with advancements in both wildfire education and mitigation. Cultural change can sometimes take time when advancing wildfire mitigation in a community. The process of setting goals, in partnership with the community, and including other governmental stakeholders is a key element in developing this new culture. Therefore, the following goals have been identified as important measures over the next five years:

- Conduct community-wide wildfire mitigation educational presentations annually
- Adapt the “Map Your Neighborhood” curriculum to include wildfire mitigation
- Conduct annual voluntary home wildfire mitigation inspections
- Annual presentation to community service clubs (i.e. Rotary and Kiwanis)
- Annual wildfire mitigation status presentation to Fire Commissioners
- Annual wildfire mitigation progress presentation to City Council
- Continued enhancements in the Bainbridge Island Municipal Code for wildfire mitigation
- Annual community activities around Wildland Community Preparedness Day

It is the hope that by the next CWPP update, significant and measurable progress has been made towards wildfire risk reduction on Bainbridge Island.

To learn more about Firewise and wildfire risk reduction and mitigation, visit www.bifd.org