

JUNE 2024

JEFFERSON COUNTY

COMMUNITY WILDFIRE PROTECTION PLAN

Working together to build
fire adapted communities,
resilient to wildfire



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ENVIRONMENTAL CONSULTANTS

We would like to formally thank the Advisory Group and all stakeholders, notably Jefferson County, all Fire Departments and Fire Protection Districts including Brinnon Fire Department, Clallam County Fire District No. 1 and 3, Discovery Bay Volunteer Fire & Rescue, East Jefferson Fire Rescue, Jefferson County Fire Protection District No. 7, Quilcene Fire Rescue, Jefferson Land Trust, Washington State Department of Natural Resources, the Hoh Indian Tribe, Quinault Indian Nation, Olympic Interagency Fire Management Zone, Jefferson Public Utility District, the City of Port Townsend, Olympic National Forest, Port Ludlow Village Council, and the U.S. Navy, for contributing their time and expertise throughout the planning process. Your participation in formulating this document will contribute to creating resilient landscapes, implementing public education, reducing structural ignitability, and ensuring safe and effective wildfire response.

This plan was prepared by the following members of the SWCA team: Emily Geery, Vicky Amato, Lexi Roberts, Ryan Saggese, Liz Hitzfelder, Erica Jansen, and Christian Testerman

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For additional information, questions, or concerns regarding this project, please contact Project Manager Emily Geery at egeery@swca.com

We would like to thank our partners who contributed to this project.

Ladris AI developed the Evacuation Analysis.

Jerry McAdams, MC Fire LLC, and Justice Jones, Wildfire Justice LLC, developed the Building Code Recommendations, Appendix I.

In memory of Chris Goy, whose passion and leadership helped spark this project's beginning and will ensure its successful completion—serving as a lasting tribute to his beloved community and our surrounding forests.

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DISCLAIMER

The purpose of the risk assessment process described herein is solely to provide a community and landscape-level overview of general wildfire risks within County as of the date hereof, and to provide a potential resource for community pre-fire planning. This risk assessment process is premised on various assumptions and models which include and are based upon data, software tools, and other information provided by third parties (collectively, "Third-Party Information and Tools"). SWCA, Incorporated, doing business as SWCA Environmental Consultants ("SWCA") relied on various Third-Party Information and Tools in the preparation of this Plan and SWCA shall have no liability to any party in connection with this Plan including, without limitation, as a result of incomplete or inaccurate Third-Party Information and Tools used in the preparation hereof. SWCA hereby expressly disclaims any responsibility for the accuracy or reliability of the Third-Party Information and Tools relied upon by SWCA in preparing this Plan. SWCA shall have no liability for any damage, loss (including loss of life), injury, property damage, or other damages whatsoever arising from or in connection with the risk assessment products contained herein, including any person's use or reliance on the information contained in those risk assessment products. Any reproduction or dissemination of the risk assessment products or any portion hereof shall include the entirety of this Plan disclaimer.

FORWARD

Impacts to communities from wildfires are becoming increasingly common. In recent years, there have been many fires in western Washington resulting in evacuations and other impacts to local communities. It's crucial for the communities of Jefferson County, especially those in eastern Jefferson County, to be prepared for the impact of a wildfire. We live in a fire-prone area where wildfire has the potential to affect our health and safety, local economy, infrastructure, and environmental ecosystems. Understanding these impacts empowers the community to develop proactive measures and strategies to mitigate the risks.

A community wildfire protection plan (CWPP) has multiple benefits to the community, including providing our eligibility to unlock federal and state funding sources for preparedness and mitigation efforts that would not be accessible otherwise. With the future of a state-adopted Wildland-Urban Interface Code uncertain, a CWPP also helps fill the void with recommendations for defensible space, fuels reduction, and other mitigation measures. Jefferson County has programs in place for flood damage prevention, earthquake preparedness, and other substantial events, and the addition of this CWPP is another tool to aid in community resiliency.

A CWPP is a key element in increasing public awareness and education, as well as establishing strategies for a stronger, healthier, more resilient community. This effort is a proactive approach to prevention, preparedness and response, and can also help facilitate a robust recovery after a destructive event. Jefferson County is proud to introduce a multiyear effort with stakeholders from the community, service agencies, and social partners from across the region.

~Jefferson County CWPP Advisory Group



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EXECUTIVE SUMMARY

WHAT IS THE PURPOSE OF THE JEFFERSON COUNTY COMMUNITY WILDFIRE PROTECTION PLAN?

The purpose of the 2024 Jefferson County Community Wildfire Protection Plan (CWPP) update is to

- provide a countywide scale of wildfire risk and protection needs,
- bring together all responsible wildfire management and suppression entities in the planning area to address identified needs, and
- provide a framework for future planning and implementation of necessary mitigation measures.

This CWPP aims to assist in protecting human life and reducing property loss due to wildfire throughout the county. This 2024 Plan was compiled from reports, documents, and data, as Jefferson County's first CWPP. This CWPP has been developed in response to the federal Healthy Forests Restoration Act of 2003 (HFRA).

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

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

WHAT ARE THE KEY ISSUES ADDRESSED?

Below are descriptions of the key issues addressed in this CWPP concerning fuels, fire response, and the development of fire-adapted communities.

Fuels-Related Issues:

- Map wildfire risk across the county and assess communities for structural ignitability and wildfire preparedness.
- Recommend fuel treatments for land management agencies and homeowners to mitigate hazard and risk. Ensure that residents are not complacent regarding their wildfire risk.
- Prioritize hazardous fuels reduction in the wildland-urban interface (WUI).
- Raise awareness about the natural role that fire plays in ecosystems and maintaining resilient landscapes.

- Use constant and consistent messaging for residents and visitors.
- Address fuel loads on and adjacent to roadways.
- Provide landscaping and defensible space guides to aid residents in making their homes and landscapes fire resilient.
- Identify approaches and resources for educating tourists on the fire environment and their role in protecting resources.
- Jefferson County offers excellent recreational opportunities, attracting numerous tourists, particularly during the summer months. Identify approaches and resources for educating tourists on the fire environment and their role in protecting resources, as well as establishing evacuation routes for recreationists.
- Assess evacuation routes and notifications to identify opportunities for improvement and clarity in evacuation resources.
- A large portion of the county is owned by timber companies emphasizing long-term production, maintaining multiple age classes, and replanting post-harvest. The CWPP should be implemented with a focus on reducing the impact of wildfire on valuable timber resources.

Fire Response:

- Invest in and support fire response at all levels.
- Bolster fire response in rural areas, most notably on the west side of the county.

People and Fire-Adapted Communities:

- Conduct public education and outreach to homeowners to enable individuals to reduce the risk of fire to their properties, particularly with an emphasis on the importance of personal responsibility in rural areas as additional time is required for fire response to remote communities.
- Manage fire to protect values and accomplish resource management goals, including protection and enhancement of wildlife habitat, water supply and quality, and mitigation against forest insect and disease outbreaks.
- Plan for future fire risk with attention to climate change and its effects on vegetation and the wildland fire environment.
- Address community concerns and vulnerable locations.
- Collaboratively plan fuels treatment projects and address mitigation actions across jurisdictions and with multiple agencies.
- Implement special consideration and planning for socially vulnerable populations.

HOW IS THE PLAN ORGANIZED?

The CWPP provides a risk assessment, action items, project recommendations, and background information about Jefferson County's wildland fire environment as well as land management plans and agencies. Most of the background information is housed in several appendices.

Chapter 1 provides a general overview of the CWPP; information on the Advisory Group, planning area, land ownership, and public involvement; and background information on planning area components such as transportation routes, population, and vegetation and ecology.

Chapter 2 includes an overview of the fire environment in the county and response resources. WUI conditions are discussed along with broader county fire regimes, climate patterns, and past fire events in the county.

Chapter 3 describes the field assessment, Composite Risk-Hazard Model data inputs, and valued community resources.

Chapter 4 provides mitigation strategies in accordance with the National Cohesive Wildland Fire Management Strategy goals of restoring and maintaining landscapes, fostering fire-adapted communities, and safe and effective wildfire response. Each Cohesive Strategy goal includes recommendations for the county to improve on these goals.

Chapter 5 presents monitoring strategies to assist in tracking project progress and in evaluating work accomplished.

Appendix A discusses ordinances, legislation, and land management strategies that dictate fire mitigation and response approaches. This section is broken out into local, state, federal, and tribal directives and includes information on previous planning efforts.

Appendix B presents additional supporting maps related to fuels and the Composite Risk-Hazard Assessment.

Appendix C includes community-specific information from the field assessments including community maps, the rating given to each community, and key observations.

Appendix D lists funding sources and programs at the federal, state, and private level. A short description of each program and a link to the program's website is also included.

Appendix E provides home hardening and fuels treatment methods for homeowners and land managers. Descriptions of multiple fuel treatment methods, landscaping, and planning considerations are included.

- **Insurance Institute for Business and Home Safety (IBHS) Wildfire Prepared Home:** <https://wildfireprepared.org/>
- **National Fire Protection Association (NFPA) Preparing Homes for Wildfire:** <https://www.nfpa.org/Education-and-Research/Wildfire/Preparing-homes-for-wildfire>
- **Fire-Resistant Plants for Home Landscaping:** <https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/pnw590.pdf>
- **Bainbridge Island Fire-Resistant Landscaping Guide:** <https://www.bifd.org/pdfs/Fire-Resistant%20Landscaping.pdf>

Appendix F discusses post-fire response and rehabilitation methods and resources. This chapter includes homeowner recovery discussions such as insurance and community safety and support resources as well as larger-scale recovery including timber salvage and erosion prevention measures.

Appendix G presents results from the community survey that was available during the planning process. The survey included questions on at-risk areas, community perception, and methods of improving preparedness.

Appendix H includes recommendation matrices aligned with the National Cohesive Wildland Fire Management Strategy.

Appendix I lists recommendations for building code and WUI code changes that could reduce structural ignitability and urban conflagration.

Appendix J provides recommendations for improving evacuation including additional resource and notification needs and evacuation route mapping and definition.

WHAT IS THE GOAL OF A CWPP?

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

Collaboration: A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies or other interested parties.

Prioritized Fuel Reduction: A CWPP must identify and prioritize areas for hazardous fuel modification and recommend the types and methods of treatment that will protect one or more at-risk communities and their essential infrastructure.

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.

HOW WAS THE JEFFERSON COUNTY CWPP DEVELOPED?

The CWPP update was developed collaboratively by a broad group of land and emergency managers and other key stakeholders in Jefferson County. The planning process was initiated in 2023 and was finalized and signed in 2024. To initiate the planning process, a diverse Advisory Group was developed consisting of representatives from Jefferson County, municipalities, tribal nations, Jefferson Conservation District, Olympic National Park, and Olympic National Forest. The development of the Plan relied heavily on modeling and mapping wildfire hazards and, through comprehensive field assessments, identifying landscape and physical characteristics that impact the threat of wildfire to communities. This analysis aided the Advisory Group in prioritizing treatment recommendations to reduce wildfire risk. Community engagement also played a large role in plan development as county residents and community members were encouraged to provide feedback through a public survey. Additional information on the role of the key stakeholders and the public is included in Chapter 1.

WHO PARTICIPATED IN DEVELOPING THE PLAN?

The Jefferson County administrators invited engagement from local and regional government agencies, as well as county residents, in the development of the Jefferson County CWPP. This group, along with some additional community and organization representatives, served as the Advisory Group for this CWPP update and drove the decision-making process. Several Advisory Group members have experience working together in fire management for the county and have contributed their expertise to this CWPP. The project was kicked off on May 18, 2023; the Advisory Group met for the first time on June 21, 2023, convened again on September 22, 2023, met for the third time on January 23, 2024, and met for the final time April 23, 2024.

WHERE IS THE PLANNING AREA?

The planning area includes the entirety of Jefferson County, Washington, as delineated by its geographic and political boundaries. The project boundary encompasses all communities that are included in the county.

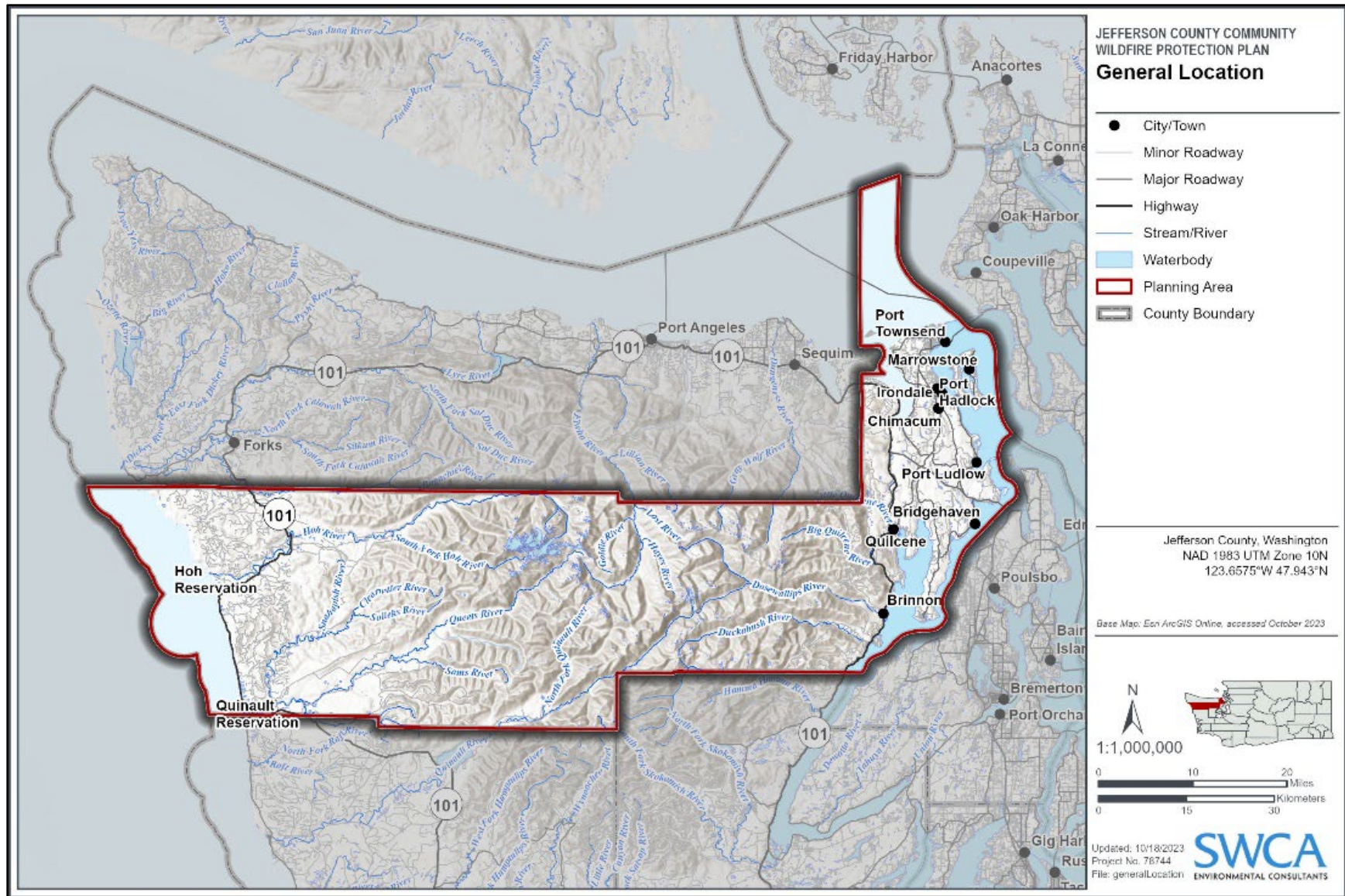


Figure ES.1. Jefferson County CWPP planning area.

HOW WAS THE PUBLIC ENGAGED?

Every effort was made to include a broad cross section of residents living in the county in the outreach process. All county residents were welcomed and encouraged to participate in the community events. Moreover, all county residents were provided multiple opportunities to provide input, such as the community survey and public comment period for the draft Plan review.

- SWCA conducted a community survey that received over 800 responses.
 - A summary of the community responses is available in Appendix G.
- Diverse outreach efforts included:
 - Social media
 - Radio interviews
 - Email distributions
 - In-person activities
- Engaged the community at the Quilcene Fair and Parade (approximately 300 attendees) and the Chimacum Farmers' Market (approximately 100 attendees).
- Stakeholder interviews were conducted with the following, with quotes included in the CWPP:
 - Jefferson Land Trust
 - Rayonier
 - Jefferson County Sheriff's Office
 - Olympic Interagency Fire Management Zone
- Public education and outreach is a shared priority among relevant agencies; recommendations for future engagement are provided in [Chapter 4](#).

WHAT IS THE CURRENT WILDFIRE SITUATION?

The topography and vegetation of the county is diverse, consisting of rolling hills, coastlands, mountainous terrain, and river valleys that are heavily vegetated. A large portion of the county is within a coastal rainforest. The portion of the county east of Mount Olympus falls within a rain shadow and is significantly drier than the rest of the county and receives a fraction of the precipitation western portions receive.

Fire return intervals in the county vary, with the mean return fire interval ranging from 100 to 300 years. The eastern portion of the county experiences a return interval of close to 50 years. Fires have become more frequent across the county over the last 100 years as fuel loads grow, climate change impacts average temperatures and precipitation, and urban development pushes further into forested areas. Diseases and insect infestations have impacted forest health and have increased fuel loads by killing trees or reducing their resilience to low-intensity fires. These include pine and fir beetles, blister rust, and root rot. Drought and declining groundwater levels also play a significant role in forest health as prolonged drought kills or weakens trees by reducing water availability. Increasing human demands on groundwater, especially during severe droughts, may contribute to declining groundwater levels in certain areas, impacting water access and the health of vegetation. Reduced precipitation, lowered snowpack, and higher rates of evapotranspiration all influence drought conditions, which impact forest resilience to wildfire. A major concern is fuel loading due to concentrated die-off and understory litter. As the regional

climate becomes more variable, a region that typically experiences consistent water availability will experience higher rates of tree mortality, which results in a standing, dead and dense, dry understory. Additionally, as the population of the county grows, so does development in forested areas which can lead to increased human ignitions in already weakened forest stands.

The eastern portion of the county is the most heavily developed, which coincides with forests with more frequent expected wildfire events. Additional activity and fuels in these forested areas creates high-risk conditions for WUI wildfire events. Since 1970, the highest number of fire occurrences has been in the eastern part of the county, including near Port Townsend, Chimacum, Quilcene, and Brinnon. Most fires throughout the county have been caused by human ignitions such as fireworks, cigarettes, outdoor burning, and equipment or vehicle ignitions. The loss per fire incident has been highest with debris fires such as slash burning. Naturally occurring fires also play a significant role in fire occurrences in the county, primarily lightning ignitions. This is especially true in the western portion of the county. In spite of the many known causes of ignition, many fires within the county still have undetermined ignition sources. Natural ignitions are also fairly common, especially in the Olympic National Park and Forest. In 2023, the Delabarre Fire began with a series of lightning strikes and burned a total of 4,795 acres. Generally, the county averages 5 to 10 acres of wildland fire annually.

WHAT RECENT FIRES OCCURRED HERE?

In the last 10 years, multiple large fires have occurred in the county, including the 2015 Paradise Fire (2,798 acres), the 2016 Hayes Fire (2,389 acres), and the 2023 Delabarre Fire (4,795 acres). The most recent fires have occurred mostly within Olympic National Park. The fire season in the county generally spans from the end of June through the end of September. In recent years, the season has extended further into October as dry, warm conditions linger. Reoccurring dry conditions and wildland encroachment have resulted in a regular brush fire season that has required rapid response from local fire departments to limit impacts. This is a departure from the expected fire occurrences according to historical data and fire regimes.

WHAT IS THE PURPOSE OF THE COMPOSITE RISK-HAZARD ASSESSMENT?

The Composite Risk-Hazard Model for the CWPP is twofold, including a desktop spatial model of risk and hazard based on fire behavior and fuels modeling (Chapter 3). The purpose of this model is to provide information about wildfire hazard and risk to highly valued resources and assets (HVRAs) for Jefferson County.

The Composite Risk-Hazard Model considers:

- Likelihood of fire burning
- Intensity of a fire
- Exposure of assets and resources based on their locations
- Susceptibility of those assets and resources to wildfire

Based on the Composite Risk-Hazard Model, some of the highest risk areas identified in the planning area are communities located along the eastern portion of the county, with extreme risk areas particularly concentrated along the Puget lowlands on the eastern coast in the communities of Port Townsend, Irondale, Port Hadlock, Chimacum, and Quilcene due to the associated exposure of assets.

WHAT IS THE PURPOSE OF THE FIELD ASSESSMENTS?

Field assessments describing risk and hazard rankings for communities located in the WUI, throughout the county, are provided in this Plan and described in detail in Appendix C. A team from SWCA Environmental Consultants conducted field assessments throughout the county in September 2023, using the National Fire Protection Association (NFPA) 1144 standard for assessing structure ignitability in the WUI. Using this standard provided a consistent process for assessing wildland fire hazards around existing structures to determine the potential for structure ignition from wildland fire ignitions. The assessments provide a total score of risk and hazard based on various parameters observed during the surveys, and a corresponding rating of low, moderate, or high are available in Appendix C. These field assessments are used in conjunction with the Composite Risk-Hazard Model described above to inform the development of wildfire mitigation recommendations.

WHAT IS THE DIFFERENCE BETWEEN THE COMPOSITE RISK-HAZARD MODEL AND A FIELD ASSESSMENT?

The key differences between the Composite Risk-Hazard Model discussed in Chapter 3 and the on-site field assessments presented in Appendix C lie in their approaches and focus areas.

Composite Risk-Hazard Models analyze potential wildfire behavior by considering the interplay of fuels, topography, and weather using established fire behavior models like FARSITE, FSim, FlamMap, BehavePlus, and FireFamily Plus, along with ArcGIS Desktop Spatial Analyst tools. These models rely heavily on data obtained from national sources like LANDFIRE to evaluate fire behavior and determine treatment strategies and priorities in the WUI, and are focused on a countywide scale, which may present generalization issues when examining discrete locations in urban areas. These are the best available data sources for modeling fire behavior, but use coarse scale inputs (30-meter resolution) and therefore may not identify nuances on the ground.

It is important to note that, unlike the Composite Risk-Hazard Model, the purpose of the WA-WUI map is to show where people and property are located relative to wildland vegetation; the WA-WUI map should not be confused with a wildfire risk map. The WA-WUI map was designed as a tool to help municipalities design or update WUI codes or building codes but not assess wildfire risk or hazard.

Field Assessments (described in Appendix C), conducted using the NFPA Structure Ignition Form 1144, concentrate on structure hazards observed across communities. These assessments, conducted by trained personnel with support from local authorities, involve direct observation of community conditions, including access, vegetation, defensible space, topography, building characteristics, fire protection availability, and utility placement, resulting in ratings of low, moderate, high, or extreme risk. It is important to note that the risk/hazard map in Chapter 3 does not integrate findings from the field assessments since

each methodology is focused on different parameters (wildland fuels versus structure types) and completed at a different scale (countywide versus community). Due to the differing focus and resolutions associated with these two methodologies, there may be deviations between the resulting risk rating outputs. Though important to note, this is expected when analyzing wildfire risk and hazard across scales. It is important to note that the Composite Risk-Hazard Model in Chapter 3 does not integrate findings from the field assessments since each methodology is focused on very different parameters (wildland fuels versus structure types) and completed at a different scale (countywide versus community).

WHAT ARE THE STRATEGIES TO ADDRESS WILDFIRE CONCERNS?

Goal 1 of the Cohesive Strategy and the Western Regional Action Plan is **Restore and Maintain Landscapes**: Landscapes across all jurisdictions are resilient to fire and other disturbances in accordance with management objectives.

Recommendations for hazardous fuels treatments include:

- Allocate resources for fuels management on county, state, and U.S. Forest Service (USFS) roads and rights-of-way.
- Utilize the risk and hazard analysis to identify specific areas in need of vegetation and brush removal.
- Address fuels treatment in moderate, high, and extreme risk areas, and promote equity in fire mitigation efforts.

Goal 2 of the Cohesive Strategy/Western Regional Action Plan is: **Fire-Adapted Communities**: Human populations and infrastructure can withstand wildfire without loss of life and property.

Recommendations for public outreach and education include:

- Implement a comprehensive and standardized countywide public education program.
- Create demonstration sites for healthy forests and defensible space.
- Coordinate city and county codes.
- Ensure residents understand their role and responsibility in wildfire risk reduction.

Goal 3 of the Cohesive Strategy/Western Regional Action Plan is **Wildfire Response**: All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

Some of the high-priority recommendations for wildfire response that the Advisory Group developed include:

- Prioritize a strategy to secure funding for wildland firefighting equipment, especially water tenders.
- Conduct a comprehensive review and redesign standards for new subdivisions with a focus on wildfire safety.
- Increase access for fire response.

WHAT DOES POST-FIRE RESPONSE AND RECOVERY INVOLVE?

There are many aspects to post-fire response recovery, including but not limited to:

- Returning home and checking for hazards
- Coordinating and mobilizing a group of teams in the community to respond to emergencies
- 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
- Prioritizing the needs of vulnerable and disadvantaged communities during response and disaster recovery efforts
- Evaluating and updating disaster recovery plans every 5 years to respond to changing needs and characteristics of the community
- Coordinating with planning, housing, health, and human services, and other local, regional, or state agencies to develop contingency plans for meeting the short-term, temporary housing needs of those displaced during a catastrophic wildfire event

HOW WILL THE PLAN BE IMPLEMENTED?

The CWPP 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, tribes, and local, state, and federal governments. This CWPP creates a navigable foundation for the County to plan, develop, and execute strategies to mitigate and manage wildfire. This CWPP encourages agencies, organizations, and the public to see wildfire-related projects to completion. It is recommended that the Advisory Group or newly formed Fire Safe Council, (developed as a recommendation during this planning process) serve as a guiding entity for the agencies within the County and remain an integral part of the planning process for future development and implementation of the Plan. This Plan is a living document and should be regularly reviewed and updated as conditions change.

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 WUI areas and are expected to reduce the loss of life and property.

In addition, 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. In an effort to streamline project implementation, this CWPP has identified the pertinent land management/ownership agencies associated with each recommendation. On-the-ground implementation of the recommendations in the CWPP planning area will require development of an action plan and assessment strategy for completing each project. Additionally, a partnership with Washington State Department of Natural Resources (WA DNR) at the operational level will be required to complete many of the suggested projects. Many high-priority projects suggested in this Plan will affect State lands directly within WA DNR jurisdiction or areas where they have suppression responsibilities.

WHEN DOES THE CWPP NEED TO BE UPDATED?

The CWPP should be treated as a live document, and projects should be updated annually or immediately following a significant fire event. A comprehensive Plan update should occur every 5 years. The Plan should continue to be revised to reflect changes, modifications, or new information as it becomes available. This may include new data to reflect risk, hazard, and delineation of WUI areas. These datasets evolve as new technology, scientific methods, and risk management approaches are developed across the region. Integrating these elements into mitigation planning are essential to the success of mitigating wildfire risk throughout the county and will be critical in guiding and maintaining the ideas and priorities of the Plan and the communities in the future.

ACKNOWLEDGEMENTS

Thank you to the Advisory Group and all stakeholders who participated in the planning process, gave their time, and shared their expertise. These contributions lead to creating resilient landscapes, implementing public education, reducing structural ignitability, and ensuring safe and effective wildfire response.

Funding for this project was provided by the Secure Rural Schools Act Title III.



CHAPTER 1 – INTRODUCTION

The United States is facing urgent forest and watershed health concerns. In the last decade years, the 2020 fire season had the most acreage impacted in a single year at 10.1 million acres nationally, and 2018 was the second highest with 8.8 million acres (Congressional Research Service 2023). In addition, Washington state is experiencing an increase in drought conditions, and in 2024 the Washington State Department of Ecology (2024) declared a drought emergency for the state. These statistics demonstrate that wildfires and concerns for watershed health are becoming larger and increasingly impactful.

As wildfire severity increases, communities need a plan to help prepare for, reduce the risk of, and adapt to wildfire 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 wildfire. This CWPP document will be referred to as the Plan.

The responsibility for implementing wildfire mitigation treatments lies at the discretion of the landowner.

The development of the Plan is rooted in meaningful collaboration among many stakeholders, including local, state, federal, and tribal officials. The Plan ultimately identifies existing wildfire hazard and risk throughout Jefferson County and provides recommended actions to mitigate those hazards and risk utilizing relevant science and literature from the western region of the United States.

The Plan reviews, verifies, and/or identifies potential new priority areas where mitigation measures are needed to protect the life, property, and critical infrastructure in the county from wildfire. This Plan 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. The Plan will only identify potential treatments and a suggested priority for these projects.

1.1 GOAL OF A COMMUNITY WILDFIRE PROTECTION PLAN

The goal of a CWPP is to enable local communities to improve their capacity to reduce the risk of wildfire while working with government agencies to identify high-fire-risk areas and prioritize areas for mitigation, fire suppression, and emergency preparedness, and to enhance public awareness by helping residents better understand the natural and human-caused risks of wildfires that threaten lives, safety, and the local economy. The minimum requirements for a CWPP, as stated in the Healthy Forests Restoration Act of 2003 (HFRA), are:

- **Collaboration:** A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies or other interested parties.
- **Prioritized Fuel Reduction:** A CWPP must identify and prioritize areas for hazardous fuel modification treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and their essential infrastructure.
- **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.

The Advisory Group established the following overarching goals for the Plan:

- Improve wildfire resilience and adaptation of the county.
- Develop actions to mitigate risks to human health and safety.
- Develop a CWPP with broad public and stakeholder input and support.
- Develop a CWPP that will serve as a source and guide for accessing grant opportunities and funding.
- Implement a process to quantify improvements in community resiliency over time and track planned and completed projects and community outreach success.

Additional information on the planning process is available in Appendix A.

1.2 PLAN ALIGNMENT WITH THE NATIONAL COHESIVE STRATEGY

The 2024 CWPP is aligned with the Cohesive Strategy and its Phase III Western Regional Action Plan by adhering to the nationwide goal “to safely and effectively extinguish fire, when needed; use fire where allowable; manage our natural resources; and collectively, learn to live with wildland fire.”

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

- **Resilient Landscapes** – Landscapes, regardless of jurisdictional boundaries are resilient to fire, insect, disease, invasive species and climate change disturbances, in accordance with management objectives.

- **Fire-Adapted Communities** – Human populations and infrastructure are as prepared as possible to receive, respond to, and recover from wildland fire.
- **Safe, Effective, Risk-based Wildfire Response** – All jurisdictions participate in making and implementing safe, effective, efficient risk-based wildfire management decisions.

For more information on the Cohesive Strategy, please visit:

<https://www.forestsandangelands.gov/strategy/index.shtml>

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 CWPP 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)

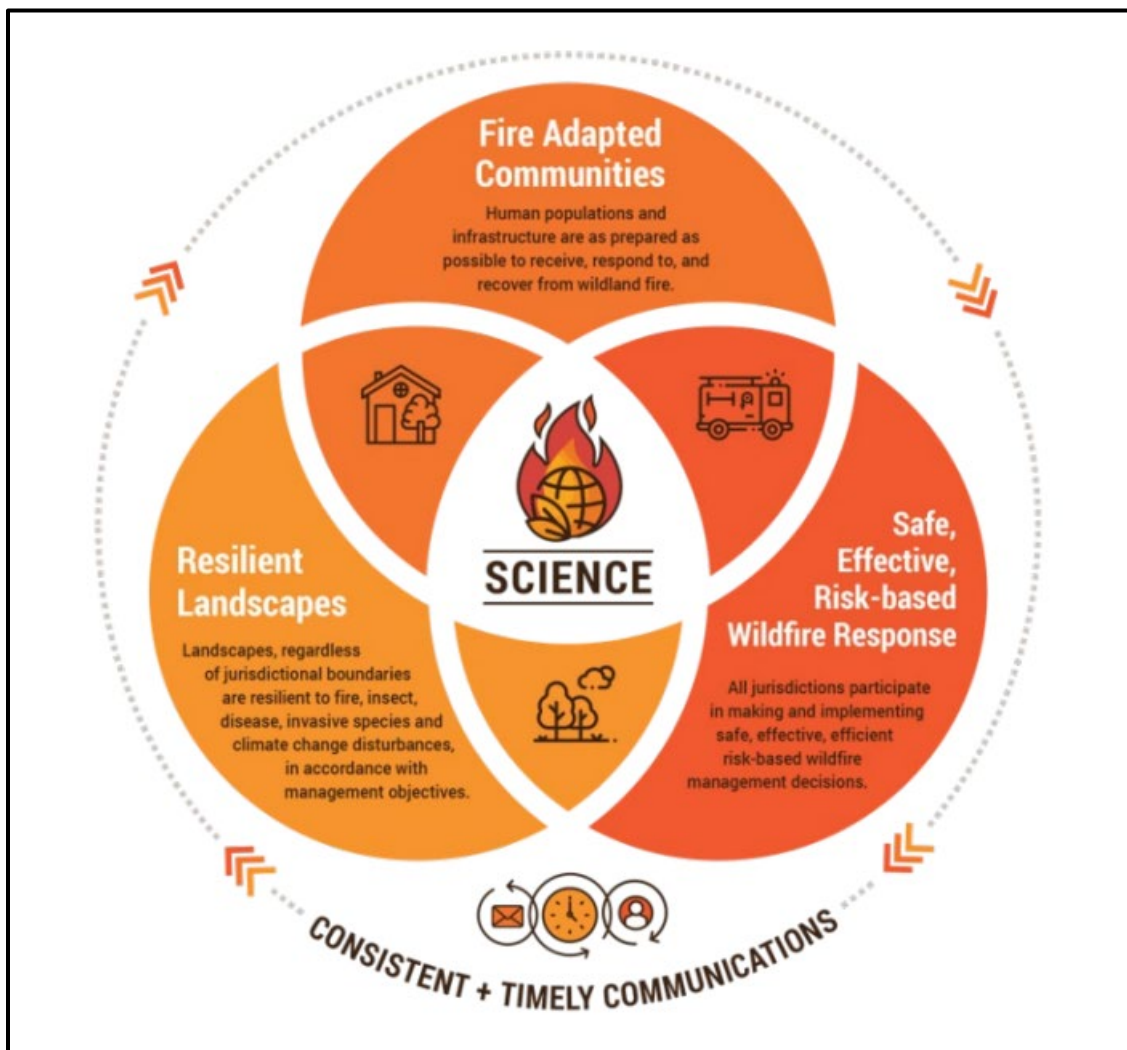


Figure 1.1. The CWPP incorporates the three primary goals of the Cohesive Strategy with post-fire recovery to serve as holistic plan for fire prevention and resilience.

1.3 ADVISORY GROUP

The Jefferson County administrators invited engagement from local and regional government agencies in the development of the Jefferson County CWPP. Stakeholder involvement is critical in producing a meaningful document that includes all collaborators' diverse perspectives. The project was kicked off on May 18, 2023; the Advisory Group met for the first time on June 21, 2023, convened again on September 22, 2023, met for the third time on January 23, 2024, and met for the final time April 23, 2024.

Members of the Advisory Group are listed below.

Table 1.1. Advisory Group

Name	Organization
Heidi Eisenhour	Jefferson County
Mark McCauley	Jefferson County
Chris Goy	Jefferson County
Wendy Davis	Jefferson County
Bret Black	East Jefferson Fire and Rescue
Greg Brotherton	Jefferson County
Phil Cecere	Jefferson County
Willie Bence	Jefferson County
Joe Holtrop	Jefferson County Conservation District
Erik Kingfisher	Jefferson Land Trust
Malloree Weinheimer	Consultant to Jefferson County
Randy Edwards	Port Ludlow Village Council
Matt Logue	City of Port Townsend
Steve King	City of Port Townsend
Emma Bolin	City of Port Townsend
Eric Flanigan	Washington State Department of Natural Resources, Olympic Region
Susan Beall	Olympic National Forest
Alfred Watson	Olympic National Forest
Bob Smith	Hoh Indian Tribe
Travis Peek	Quinault Indian Nation
Jerald Weaver	Olympic National Park, Wildland Fire Program
George Calbert	Naval Magazine Indian Island
Tim Manly	Brinnon Fire Department / East Jefferson County Fire Chief's Association
Robert Wittenberg	East Jefferson Fire and Rescue
Pete Brummel	East Jefferson Fire and Rescue
Brian Tracer	East Jefferson Fire and Rescue
Michael Becker	Washington State Department of Natural Resources, Olympic Region

Name	Organization
Krystle Schnepf	Olympic National Forest
Timothy Callister	U.S. Navy - NAV MAG Indian Island
Josh Peters	Jefferson County
Ty Crowe	Olympic Interagency Fire Management Zone
Jennifer Coe	Washington State Department of Natural Resources
Don Svetich	Quilcene Fire Rescue
Kevin Streett	Jefferson Public Utility District
Dan Toepper	Jefferson Public Utility District
Jeff Bortner	Olympic Interagency Fire Management Zone
Victoria Amato	SWCA Environmental Consultants
Emily Geery	SWCA Environmental Consultants

1.4 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 of American Foresters 2004). SWCA Environmental Consultants (SWCA) released a community survey to the public and received over 800 responses. SWCA hosted booths at the Quilcene Fair and Parade on September 16, 2023, and the Chimacum Farmers' Market on September 17, 2023, to advertise the community survey and gather community input. Both local events drew a large crowd, approximately 300 people at the Quilcene Fair and Parade and approximately 100 people at the Chimacum Farmers' Market, providing the opportunity to engage a range of diverse stakeholders within the community. A summary of the community responses and input is provided in Appendix G. Additionally, SWCA conducted stakeholder interviews with following organizations:

- Jefferson Land Trust
- Rayonier
- Jefferson County Sheriff's Office
- Olympic Interagency Fire Management Zone

SWCA has included quotes from the stakeholder interviews throughout the CWPP.

The draft Plan and project recommendations were made available for public review from May 1, 2024, through May 15, 2024.

Every effort was made to include a broad cross section of the county in the outreach process, and different communication channels, including social media postings, radio interviews, email distributions, and in-person activities, were used to engage as many members of the public as possible. All county residents were welcomed and encouraged to participate in the community events. Moreover, all county residents were provided multiple opportunities to provide input, such as the community survey and Plan document and project recommendations review.

Recommendations for future community engagement and outreach are provided in Chapter 4.

Education and outreach programs targeting the public are a shared priority among various agencies and organizations working on wildfire-related issues.

1.5 PLANNING AREA GEOGRAPHY

The following sections provide context for the remainder of the Plan by describing the baseline conditions throughout the county.

The planning area includes the entirety of Jefferson County as delineated by its geographic and political boundaries (Figure 1.2).

Jefferson County is located within the Olympic Peninsula of northwestern Washington state, reaching from the western shore of the Pacific Ocean to the eastern shore of the Puget Sound. It encompasses an area of 2,185 square miles. In total, 379 square miles are covered by water (Jefferson County Parks and Recreation 2022). Port Townsend is the only incorporated municipality in Jefferson County. Jefferson County is bordered by Clallam, Gray's Harbor, Mason, Kitsap, and Island Counties.

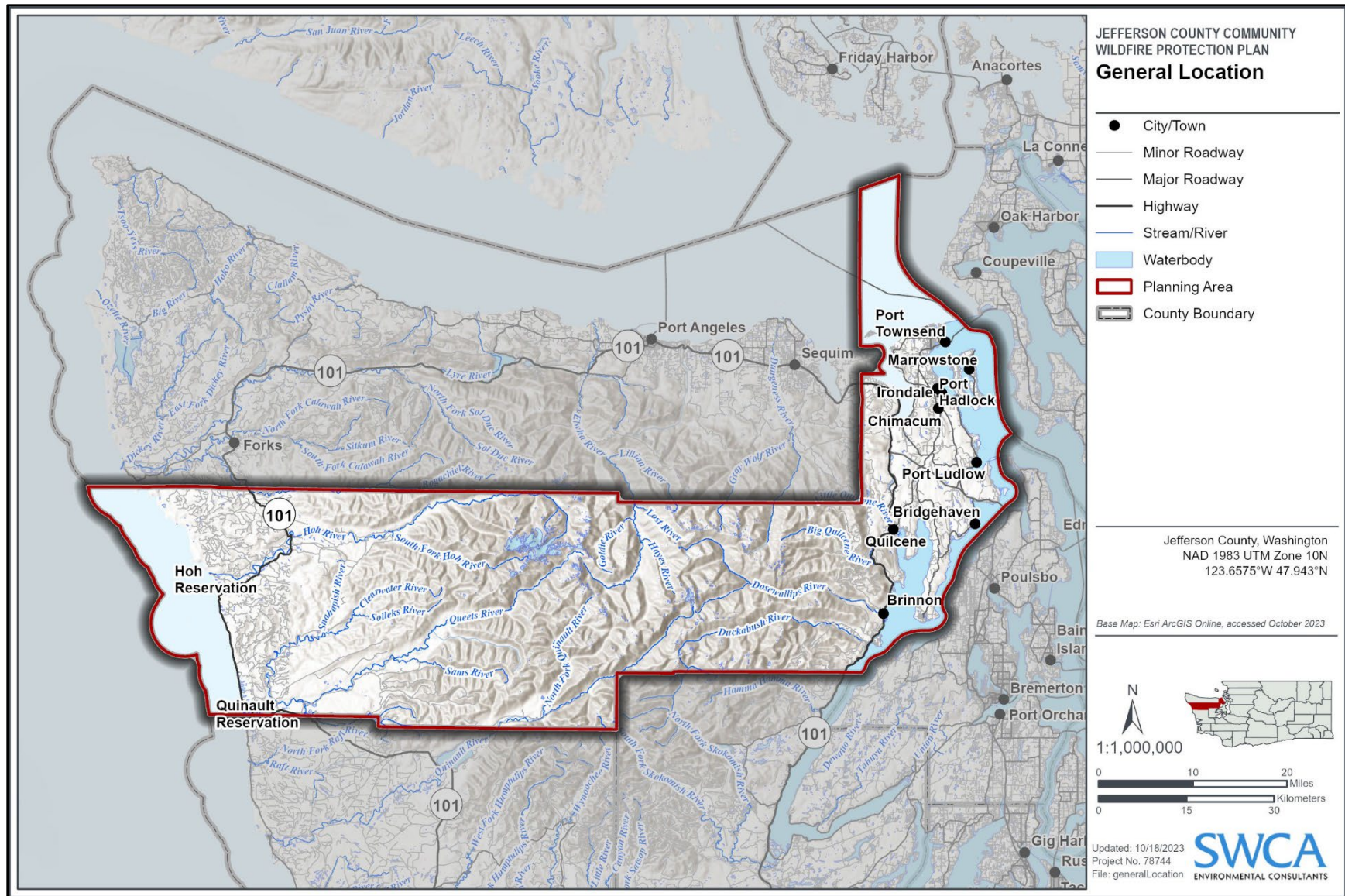


Figure 1.2. Jefferson County planning area.

1.5.1 LAND OWNERSHIP

Jefferson County possesses a relatively diverse range of federal, state, local, private, and other land ownership. National parks account for the largest share at 46.4%, followed by private land at 18.9%, and state-owned land at 17.2%. A large portion of the county is privately owned and managed by timber companies. Most privately held timber land is managed for long-term production with multiple age classes retained and replanting occurring following harvest. National forests cover 14.8% of the total land, with smaller percentages allocated to categories such as Native American reservations, Jefferson Land Trust, Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), National Fish Hatchery, U.S. Fish and Wildlife Service (USFWS), and undetermined ownership, each representing a relatively small portion of the total land area (less than 1%) (Table 1.2; Figure 1.3).

Table 1.2. Land Ownership within Jefferson County

	Acres	Percent
National Park	538,168.5	46.4%
Private	219,320.2	18.9%
State	199,299.5	17.2%
National Forest	171,195.7	14.8%
The Nature Conservancy	16,175.0	1.4%
American Indian Reservation	7,806.2	0.7%
Jefferson Land Trust	4,505.4	0.4%
U.S. Forest Service	941.8	0.1%
Jefferson Land Trust Protected Land	854.3	0.1%
National Park Service	373.6	<0.0%
BLM	74.6	<0.0%
BIA	74.5	<0.0%
National Fish Hatchery	45.0	<0.0%
USFWS	<0.0%	<0.0%

*Undetermined land ownership refers to areas falling on water or other features where ownership may lack a clear designation.

1.5.2 ROADS AND TRANSPORTATION

Few transportation routes transect and connect the entire county. The Olympic Mountains separate the west end of the county from the east, making direct travel impossible (Jefferson County Department of Emergency Management [Jefferson County DEM] 2016). The primary route across the county's expanse is U.S. Highway 101, which stretches for around 100 miles up through Clallam County to the north of Jefferson County (Jefferson County DEM 2016). State highways include State Routes 19, 20, 104, and 116, all of which are in the eastern portion of the county (see Figure 1.3). In addition to the surfaced highways, smaller rural and residential roads traverse the county, with variable road conditions. Some steep grades and gravel road surfaces may impede travel in the event of a wildfire evacuation or emergency response.

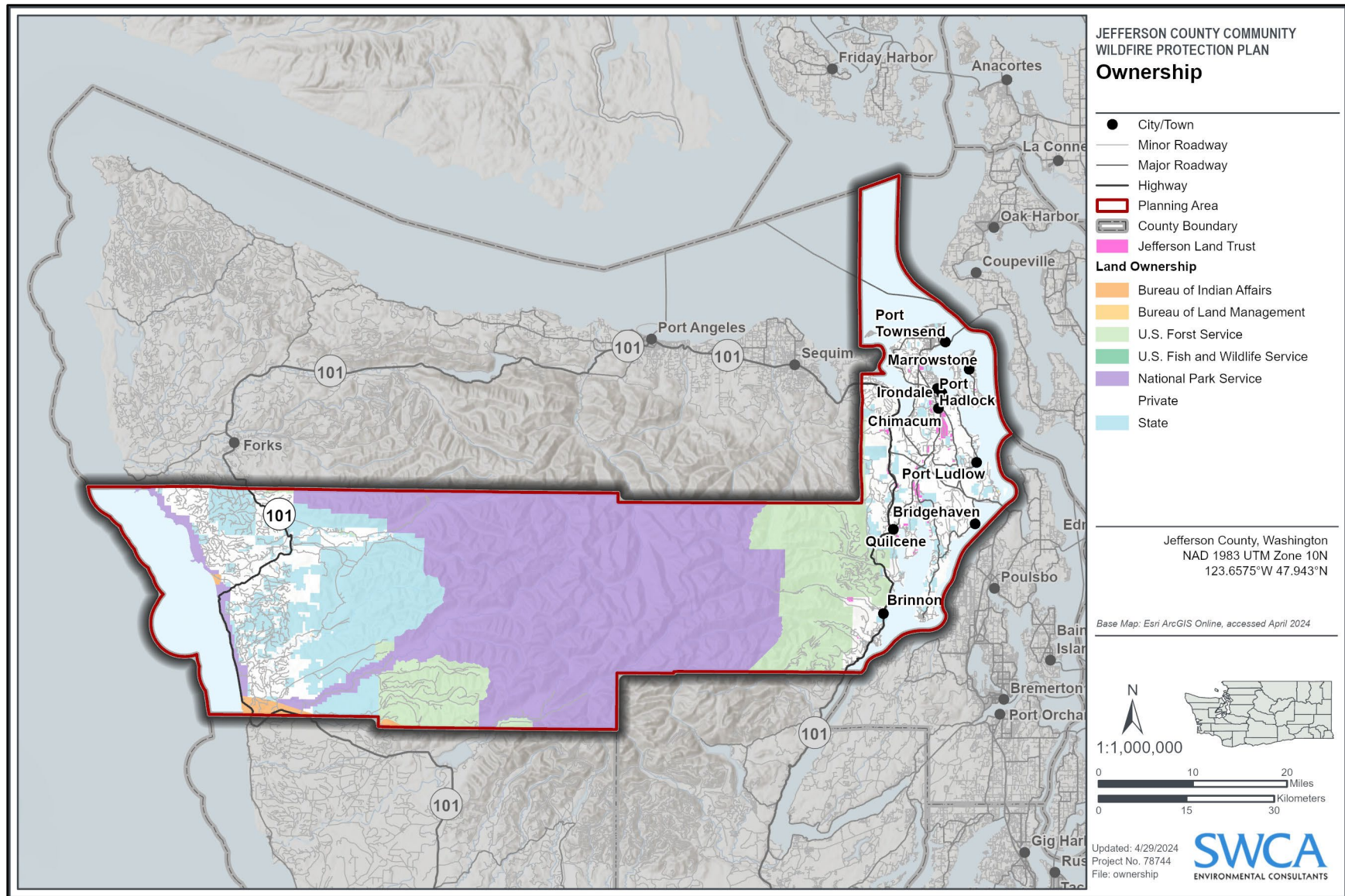


Figure 1.3. Jefferson County land ownership.

1.5.3 TOPOGRAPHY

The county includes three distinct geographical areas. The west end includes a 30-mile coastline across along the Pacific Ocean, the central region includes the Olympic Mountains (including Olympic National Park and Mount Olympus, the county's highest point at 7,965 feet above sea level), and the eastern portion includes the Puget lowlands (Figures 1.4 and 1.5) (Jefferson County DEM 2016; Jefferson County Parks and Recreation 2022). The Puget lowlands include shoreline and rich valleys that lead into the foothills of the central Olympic Mountains region (Jefferson County DEM 2016). The central Olympic Mountains divide the eastern and western portions of the county and contain mountains up to nearly 8,000 feet. The west end includes beaches and rocky coastline surrounded by a mountainous barrier. The valleys of large rivers within this region traverse from the central mountains to the western beaches (Jefferson County DEM 2016). Jefferson County is drained by nine major rivers and four major creeks that flow west into the Pacific Ocean, north into the Strait of Juan de Fuca, and east into Admiralty Inlet and Hood Canal (Jefferson County Parks and Recreation 2022).



Figure 1.4. Mountainous, tree-covered landscape in Jefferson County where topography may contribute to more intense wildfire behavior.



Figure 1.5. Lower-lying landscape in Jefferson County showing the contrast between topographic hazards.

1.5.4 POPULATION

According to the 2022 U.S. Census, the population estimate of Jefferson County was 33,589 persons, an increase of 1.9% over the 2020 census numbers of 32,977 (U.S. Census Bureau 2022a). Over the last few decades, Jefferson County has been one of the fastest growing counties in the state, seeing a population increase of 27.2% between 1990 and 2000 (Jefferson County DEM 2016). In 2022, there were 19,569 households in the county. In 2020, the population density was 18.3 people per square mile (U.S. Census Bureau 2022b). One-third of the total population of the county (approximately 10,388 individuals as of 2020) live in Port Townsend, a 2.3% increase from 2020 (U.S. Census Bureau 2022b). The median resident age is 59.5 years, compared with the statewide median of 38.5 years, and there is a steady increase of older adults within the county (Jefferson County Parks and Recreation 2022).

During the summer months, which coincide with the county's tourist season, the population within western Jefferson County increases from approximately 900 to 10,000 people (Jefferson County DEM 2016). The population of Port Townsend also nearly doubles, and tourism is an increasingly prevalent part of Jefferson County's communities (Jefferson County DEM 2016). In addition, many "unplanned" communities are now becoming permanent year-round housing, such as mobile homes converted to permanent residences (Jefferson County DEM 2016).

1.5.5 SOCIAL VULNERABILITY

The Federal Emergency Management Agency (FEMA) defines social vulnerability as the susceptibility of social groups to the negative impacts of natural hazards (e.g., wildfire), which include disproportionate death, injury, loss, or disruption of livelihood (FEMA 2023). A sole hazard occurrence can bring about

considerably different impacts for distinct individuals, even if the magnitude of the hazard was the same for the entire community. Specific groups of individuals may be more susceptible to natural hazards because of socioeconomic status, physical state, or other factors. For instance, elderly individuals may have more difficulty in quickly evacuating during wildfire emergencies, which may make them more susceptible to entrapment. In other cases, low-income individuals may be less able to harden and improve their homes to reduce structural ignitability and, therefore, can face a higher probability of their homes being damaged or destroyed should a wildfire event occur.

Much of the county, especially the west end, is described as socially vulnerable according to the Center for Disease Control's Social Vulnerability Index, which is based on 16 social factors, such as poverty, unemployment, education, and more. This index is used to identify levels of financial assistance that should be allocated to communities in need through rural development financing (U.S. Department of Agriculture [USDA] 2023). Census data also show that some communities in Jefferson County have high proportions of people aged 65 or older (U.S. Census Bureau 2022b). A map of disadvantaged communities as designated by the Council of Environmental Quality can be found in Figure 1.6.

Federal Designation of the Justice40 Initiative, signed through Executive Order 14008, aims to ensure that 40 percent of the benefits from specific federal investments are directed toward disadvantaged communities facing marginalization, underservice, and pollution burdens. The initiative encompasses various categories of investment, including climate change, clean energy, clean transit, affordable housing, workforce development, pollution reduction, and clean water infrastructure. Federal agencies are undergoing significant transformations to reallocate resources to these communities, addressing decades of underinvestment and environmental hazards. The White House has issued guidance to agencies on identifying covered programs, engaging in stakeholder consultation, and reporting data to fulfill the initiative's goals.

The "partially disadvantaged" area has been identified as such because they are home to federally recognized tribes. The area that has been identified as "disadvantaged", while also home to federally recognized tribes, meets the criteria based on climate change, housing, and legacy pollution. For more information on federal designations through the Justice40 program, please visit:

<https://www.esri.com/arcgis-blog/products/arcgis-living-atlas/local-government/justice40/>

1.5.5.1 Unhoused Populations

With continued economic and social trends exacerbating the level of housing insecurity, urban areas throughout the United States have recently experienced significant increases in unhoused populations. As a result, fire departments are responding to a growing number of incidents involving fires that impact unhoused people and their shelters or encampments. To survive in often harsh environments without adequate protection from the elements, many people living in unsheltered communities utilize fire as a tool for general survival. This includes burning open flames to allow themselves to keep warm and cook food. Fire-safe practices are not always strictly adhered to in these settings, contributing to increased fire risk. Additionally, unhoused individuals are often situated in areas of existing high fire risk, such as densely vegetated riverbanks or vacant and unmaintained buildings. Jurisdictions across the United States face difficulties addressing the houselessness crisis due to legislative and political barriers, causing the issue to stagnate and fire risk to persist among these vulnerable populations. In search for a solution, nonprofit and research organizations have begun examining the behaviors that contribute to fire risk and establishing programs through which unhoused people are provided fire safety gear and proper training to educate them in fire safety and response. These groups are advocating for increased awareness to both those experiencing houselessness and the wider public, with a push for intervention and assistance to those at risk.

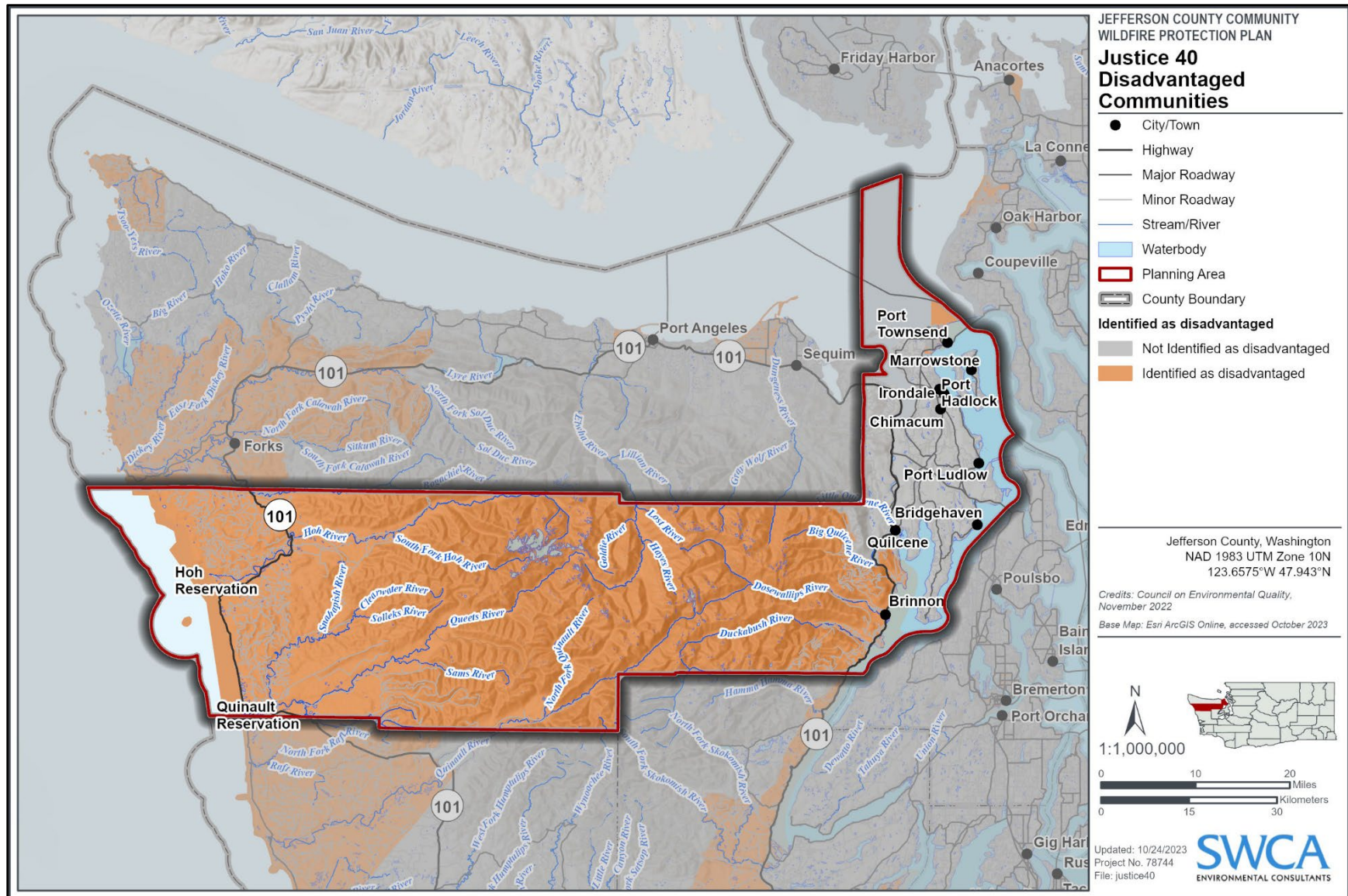


Figure 1.6. Disadvantaged communities in Jefferson County as designated by the Council of Environmental Quality, Esri.

1.5.6 RECREATION

Jefferson County has a variety of outdoor recreational opportunities at the many county, state, and national parks within the county. Jefferson County Parks and Recreation manages 26 parks and campgrounds providing opportunities for camping, hiking, swimming, and other recreation across the diverse landscape of the county (Jefferson County Parks and Recreation 2022). There are 10 state parks in Jefferson County, all of which are situated on the east end of the county within the Puget lowlands and provide opportunities for hiking, biking, horse-riding, swimming boating, fishing, clamming, crabbing, and more (Discover Washington State 2023). The county also includes the heavily frequented Olympic National Park, which is characterized by its exceptional natural diversity, covering 922,651 acres of three distinct ecosystems—glacier-capped mountains, extensive Pacific coastline, and ancient temperate rainforests—that offers visitors a chance to enjoy activities like hiking, whale watching, camping, and stargazing (Discover Washington State 2023). The northwestern part of the county includes the Olympic National Forest, a 6,500-square-mile area that features complex terrain with winding ridges, steep mountains, canyons, and dense forests that visitors can spend their time exploring (National Park Service [NPS] 2008).

Areas of Jefferson County with high recreational opportunity, when paired with the influx of tourists to the county during summer months (Jefferson County DEM), may be at a greater risk for human-caused wildfire ignitions. County, state, and national park organizations may want to consider an increase in wildfire pre-planning to establish evacuation routes for recreationists. These organizations may also consider additional education and outreach programs to teach visitors about wildfire safety and prevention within recreational areas as visitation increases.

“We get a large influx in tourists and transients during the summer months and that’s increased in the last couple years. I’ve seen people camping in places I’ve never seen before, and they aren’t always aware of what the risk can be in the dense forested areas. If a fire starts in the understory, the spread can be rapid.” – Deputy Hoagland

1.5.7 VEGETATION AND LAND COVER

Jefferson County encompasses mountains, rolling hills, lowlands, freshwater and saltwater regions, and coastlands. This mosaic of land classifications leads to variations in elevation, slope aspect, substrate, and microclimates, all influencing the region’s land cover. Among the most commonly occurring land cover types and/or vegetation types are mountains with tree cover and their snowy peaks above tree line, which comprise around 75% of the county’s landmass (Figure 1.7) (Jefferson County DEM 2016).

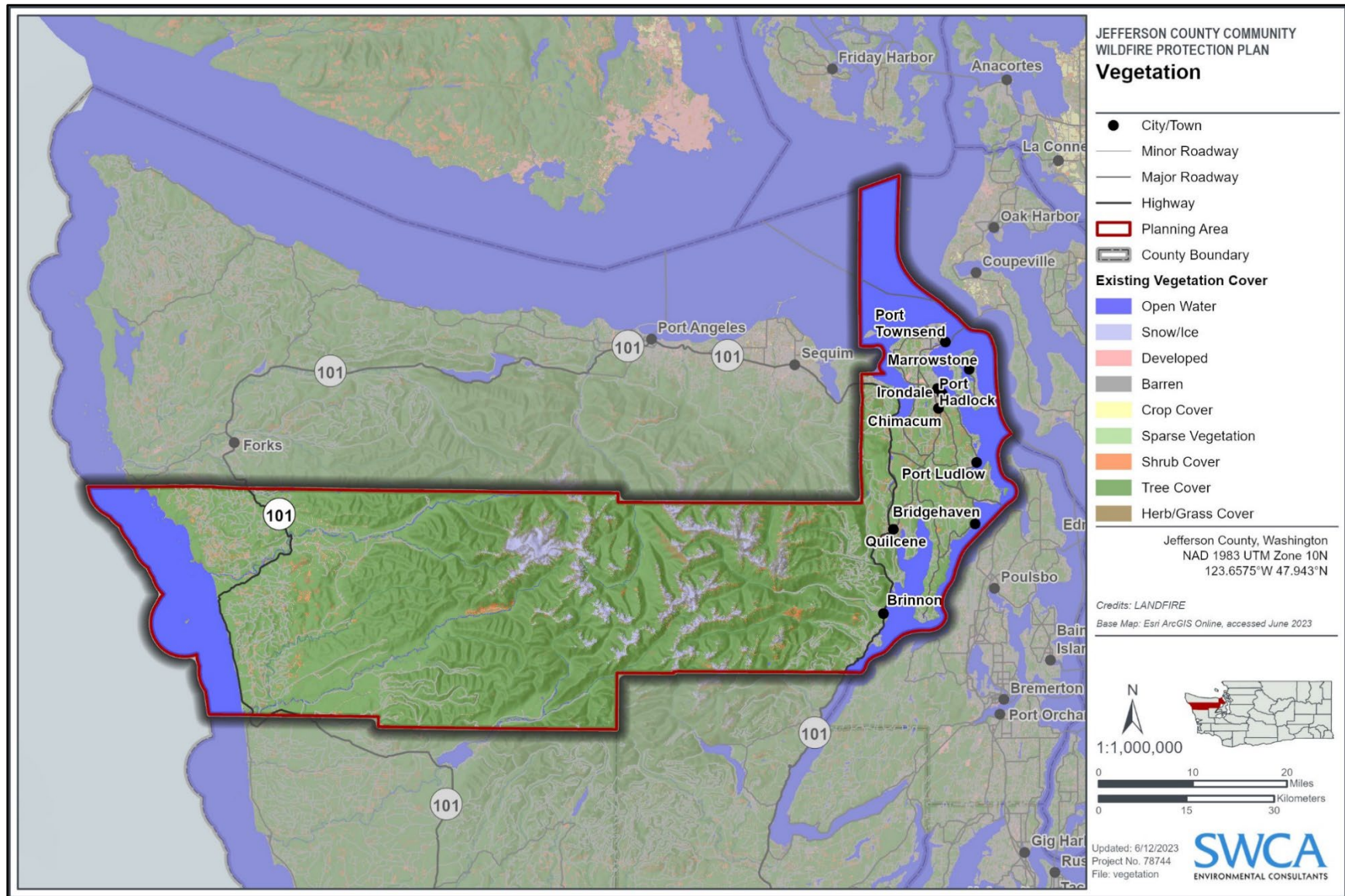


Figure 1.7. Jefferson County existing vegetation cover.

1.5.8 FOREST HEALTH CONSIDERATIONS

1.5.8.1 Diseases and Insects

Pine beetle, blister rust, root disease, and other diseases and insects can cause small- and large-scale tree loss in forests across the county. As trees die or become weakened by disease and insect infestation, fuel loads within the forests increase. This creates more opportunity for fires to ignite and spread. Dead and dying trees catch fire more easily and fallen dead trees can act as ladder fuels that carry fire into the canopy where it can spread and intensify. Douglas-fir beetles have shown an upward trend in recent years, reaching a peak in 2019, followed by a decline in 2021. However, it is worth noting that the 2021 survey may have underestimated the beetle population due to a reduced survey area (Washington State Department of Natural Resources [WA DNR] 2021). As annual temperatures rise due to climate change, as winters become warmer and wetter, and as trees are weakened by other factors such as extended drought, there is the potential for Douglas-fir beetle populations to continue to increase and become more impactful. It is expected that the Douglas-fir beetle's range will shift to higher elevations with rising temperatures making historically unavailable areas accessible for insects (University of Washington Climate Impact Group 2009). Another impactful insect species is the balsam woolly adelgid, an introduced species that feeds on tree sap and can cause tree stress and mortality. The species primarily feeds on subalpine fir, Pacific silver fir, and grand fir (WA DNR 2021).

Several diseases can also impact forest health, including root disease and blister rust. Root disease impacts all present species in the county and is most likely to impact trees already stressed by heat, drought, and insects (U.S. Forest Service [USFS] 2023a). White pine blister rust poses a significant threat to white pine species. The nonnative fungus infects live needles before moving into the branches and trunk. From there, it creates cankers that will kill branches and eventually the whole tree. Mortality rates for infected trees can be as high as 90% (WA DNR 2021).

1.5.8.2 Impact of Climate Change

In recent years, there has been an increase in the number of wildfire events in Washington as well as an increase in the extent and severity of events. The five largest recorded wildfires in the state have occurred in the last 10 years (Washington Geospatial Open Data Portal 2024). 2015 was the warmest recorded year in the state and correlated with the second largest wildfire year in state history (University of Washington Climate Impact Group 2023a, 2023b). Multiple projections indicate that annual area burned by wildfire is anticipated to increase 150% to 1,000% by the end of the century (Jefferson County DEM 2016; Snover et al. 2013). In addition to more intense fire seasons, climate change is anticipated to result in extended fire seasons. Historically, fire season has correlated with the summer months and generally lasts from late June through late September (University of Washington Climate Impact Group 2009). In recent years, fires have occurred further into October, which lengthens the time residents must be concerned about fire events and extends the fire season and burden for response personnel. A 2024 research article titled "Simulated Future Shifts in Wildfire Regimes in Moist Forests of Pacific Northwest" modeled potential shifts in burn probability, fire rotation, and the size and number of fires, especially large fires, under climate change conditions expected with little concerted effort toward reducing carbon emissions (Dye 2024). Their models found that under "business as usual" conditions, the Olympic Peninsula will experience higher burn probability and shorter fire rotations. Additionally, they found that the Olympic region will likely experience an increase in fires greater than 40,000 hectares and an increase in the number of fires per year. A large factor contributing to the increase in size and number of

fires is an anticipated shift in fire seasonality where fire season begins earlier in the spring and may extend further into fall (Dye 2024).

Annual average temperatures have continued to rise in the region and are anticipated to increase further in the coming decades. The Jefferson County Hazard Mitigation Plan (HMP) notes that between 1895 and 2011, the average annual temperature in the county increased 1.3 degrees Fahrenheit and is projected to increase between 4.3 and 5.8 degrees Fahrenheit by the 2050s (Jefferson County DEM 2016). This information is available in the 2016 Jefferson County HMP, which is discussed in further detail in Appendix A. The county is currently working to update the HMP, but this update has not yet been released. All future CWPP updates should align with content in the HMP update. The anticipated temperature rise will result in extended periods of drought, lowered average snowpack, and shifts in precipitation. In 2021, the June heatwave resulted in approximately 84,000 acres of forest desiccation damage in western Washington with a high concentration of recorded damage on the Olympic Peninsula (WA DNR 2021).

As the climate changes, drought will become a more frequent and intense issue for the county. In terms of forest health, more frequent and intense droughts along with warmer average temperatures impact tree health and forest resilience in several ways. Drought periods reduce the amount of water available for trees to utilize and the amount of moisture present in the soil. This can result in weakened tree communities that are susceptible to insect and disease infestation. Most areas of the Olympic Mountains are wetter than the rest of the state and therefore less prone to wildfire. However, with higher average temperatures and more drought-prone summers, the region is becoming more susceptible to fire (Jefferson County DEM 2016). A large component of this is a drier understory than what has historically been present. Long-term drought can also result in large-scale tree mortality that alters forest structure and creates hazardous standing dead tree conditions. As average temperatures rise and droughts persist, species ranges can shift, and regions historically occupied by a certain species may no longer be suitable for the species (University of Washington Climate Impact Group 2009). The Washington State Climate Change Impacts Assessment projects that by 2060, 32% of the state that is currently occupied or appropriate for Douglas-fir will be outside of the species' suitability envelope (University of Washington Climate Impact Group 2009). For Jefferson County, this is anticipated to mostly impact the southern Olympic Mountains.

A result of range shift can mean intrusion of invasive species and alterations to the overall vegetation community of an area. For instance, a forested area may be replaced by grassland as water becomes less available, fires become more frequent and intense, and more fire-susceptible species colonize the area. Most at risk of range shift and loss or vegetation community changes are alpine and subalpine areas that are generally very moist and have very long fire return intervals. Some species, such as subalpine fir and mountain hemlock, are expected to shift to higher elevations as decreased snowpack lengthens the growing season in these areas. Under most climate modeling scenarios used for the USFS analysis, temperate forests are expected to expand (Halofsky et al. 2011). The viability of certain species is reduced under climate change conditions as the availability of resources or consistency of habitat changes. The western redcedar, a culturally and economically significant conifer in the Pacific Northwest, has experienced a decline due to drought and reduced snowpack. Climate change has further exacerbated these impacts as drought conditions become more prevalent in the species habitat (Northwest Climate Adaptations Science Center 2020). Redcedar stands in Jefferson County have been shown to be stressed in their current ranges (Mathys et al. 2014).

With higher temperatures, the evapotranspiration rates of tree species increase, resulting in water being used more quickly. Climate change is also anticipated to disrupt precipitation regimes, shifting timing of precipitation events, and increasing the occurrence of heavy rain (Snover et al. 2013). Sporadic

precipitation creates inconsistent water availability for forest species and can cause erosion issues in post-fire areas where soil is not yet stabilized.

“We are in a state of leaving a climate regime that we’ve had here for about 6,000 years. Everything’s changing and we can’t manage our forests to keep them exactly how they are now. Can we all look ahead together and recognize the way things are changing and manage our forests for these changes in a way that helps maintain the ecological, social, and economic benefits they provide for future generations?” – Jefferson Land Trust

1.5.8.3 Tree Mortality

As discussed above, climate change is anticipated to have a variety of impacts to local weather patterns, average precipitation, snowpack, and drought extent. These combined factors can result in large-scale impacts to forest health including broad tree mortality (National Science Foundation 2022). While tree mortality is a natural process in forest ecosystems, when large regions experience a significant number of tree deaths within a short time period, it can negatively impact forest health and disrupt ecosystem functions. Large-scale tree mortality greatly increases the amount of fuel available for wildfire events and increases the likelihood of catastrophic events.

1.5.8.4 Invasive Species

Nonnative and invasive species can cause degradation and a number of ecological issues, including outcompeting native species, reducing biodiversity and ecological health, and increasing fire vulnerability. Invasive species thrive in disturbed areas and are often transported by vehicles, foot traffic, and escape from gardens. Scotch broom, Canada thistle, Himalayan blackberry, English ivy, English holly, herb Robert, and Japanese knotweed are some of the most impactful species in the county (NPS 2015). Scotch broom in particular increases the potential and intensity of fire. It occurs frequently along roadways and can spread quickly (Jefferson County 2024). Jefferson County and the Noxious Weed Control Board have a number of resources and guides to help community members identify and manage invasive species: <https://jeffersoncountypublichealth.org/1046/Noxious-Weed-Resources>.

1.5.9 WILDLIFE

1.5.9.1 Threatened and Endangered Species

Several state and federally listed threatened and endangered species can be found in Jefferson County, including birds, insects, fish, and plant species (Table 1.3). Treatments on federal land are subject to the National Environmental Policy Act (NEPA) and associated analysis of impacts to these species. Wildfire mitigation treatments in areas that may impact threatened and endangered species require application of certain mitigation measures to prevent degradation to habitat. Please note that the table below is not exhaustive and only includes a selection of species that occur within the area. For a more comprehensive list, please visit the Washington Department of Fish and Wildlife threatened and endangered species page here: <https://wdfw.wa.gov/species-habitats/at-risk/listed>.

Table 1.3. Federally and State-Listed Threatened and Endangered Species that May Occur in Jefferson County

Type	Scientific Name	Common Name	State Status	Federal Status
Birds	<i>Antigone canadensis</i>	Sandhill crane	Endangered	-
Birds	<i>Coccyzus americanus</i>	Yellow-billed cuckoo	Threatened	Threatened
Birds	<i>Brachyramphus marmoratus</i>	Marbled murrelet	Threatened	Threatened
Birds	<i>Fratercula cirrhata</i>	Tufted puffin	Endangered	-
Birds	<i>Strix occidentalis caurina</i>	Northern spotted owl	Threatened	Threatened
Birds	<i>Phoebastria (=Diomedea) albatrus</i>	Short-tailed albatross	Candidate	Endangered
Fish	<i>Salvelinus confluentus</i>	Bull trout	Threatened	-
Fish	<i>Salvelinus malma</i>	Dolly varden	Proposed Similarity of Appearance (Threatened)	-
Insects	<i>Danaus plexippus</i>	Monarch butterfly	-	Candidate
Insects	<i>Euphydryas editha taylori</i>	Taylor's (=Whulge) checkerspot	Endangered	Endangered
Mammals	<i>Balaenoptera musculus</i>	Blue whale	Endangered	Endangered
Mammals	<i>Balaenoptera physalus</i>	Fin whale	Endangered	Endangered
Mammals	<i>Enhydra lutris kenyoni</i>	Sea otter	Threatened	-
Mammals	<i>Eubalaena japonica</i>	North Pacific right whale	Endangered	Endangered
Mammals	<i>Megaptera novaeangliae</i>	Humpback whale	Endangered	Endangered
Mammals	<i>Orcinus orca</i>	Orca Whale	Endangered	Endangered
Mammals	<i>Physeter macrocephalus</i>	Sperm Whale	Endangered	Endangered
Mollusks	<i>Haliotis kamtschatkana</i>	Pinto abalone	Endangered	-
Reptiles	<i>Dermochelys coriacea</i>	Leatherback sea turtle	Endangered	Endangered
Reptiles	<i>Caretta caretta</i>	Loggerhead sea turtle	Endangered	Endangered
Reptiles	<i>Chelonia mydas</i>	Green sea turtle	Threatened	Threatened
Reptiles	<i>Actinemys marmorata</i>	Northwestern pond turtle	Endangered	-
Plants	<i>Pinus albicaulis</i>	Whitebark pine	-	Endangered

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CHAPTER 2 – FIRE ENVIRONMENT

2.1 WILDLAND-URBAN INTERFACE

As of summer 2023, wildland-urban interface (WUI) areas in the state of Washington are determined using the Washington Wildland-Urban Interface (WA-WUI) map for implementing and enforcing building codes across all counties and cities. Chapter 51-55 Washington Administrative Code (WAC) outlines the adoption and amendment of the 2021 edition of the Wildland-Urban Interface Code. The code mandates compliance in construction within the interface or intermix areas and specifies the process for updating or designating new WUI, with only the local jurisdiction's code official having the authority to modify the WA-WUI map (WA DNR 2023a).

In this Plan, the WUI (Figure 2.1) is defined in accordance to Chapter 51-55 WAC as:

- The geographical area where structures and human development meet or intermingle with wildland or vegetative fuels.

Section 302.3.6 of WAC 51-55 outlines the process for WUI area designation. It involves determining structure density, vegetation density, and proximity categories for a given area, and based on these criteria, the site is designated as either intermix or interface, depending on the specified conditions. Compliance with the code, including the Wildland-Urban Interface Code, is then determined accordingly.

The WA DNR is in the process of revising the WA-WUI map, per Senate Bill 6120. This process is expected to be concluded in 2025. Information on the Bill can be found on the Washington State Legislature website: <https://search.leg.wa.gov/search.aspx#document>.

For the purposes of the 2024 CWPP, the WA-WUI layer (Figure 2.1) is considered the best available data and is used in development of the CWPP Composite Risk-Hazard Model. As the DNR WA-WUI map is revised, the Advisory Group will review and adjust the Composite Risk-Hazard Model described in Chapter 3 accordingly.

The WA-WUI map (Figure 2.1) was created by the WA DNR. The purpose of the WA-WUI map is to show where people and property are located relative to wildland vegetation. The WA-WUI map is sometimes inadvertently confused with a wildfire risk map. It is important to note the distinction here. This map was designed as a tool to help municipalities design or update WUI codes or building codes but does not assess wildfire risk or hazard.

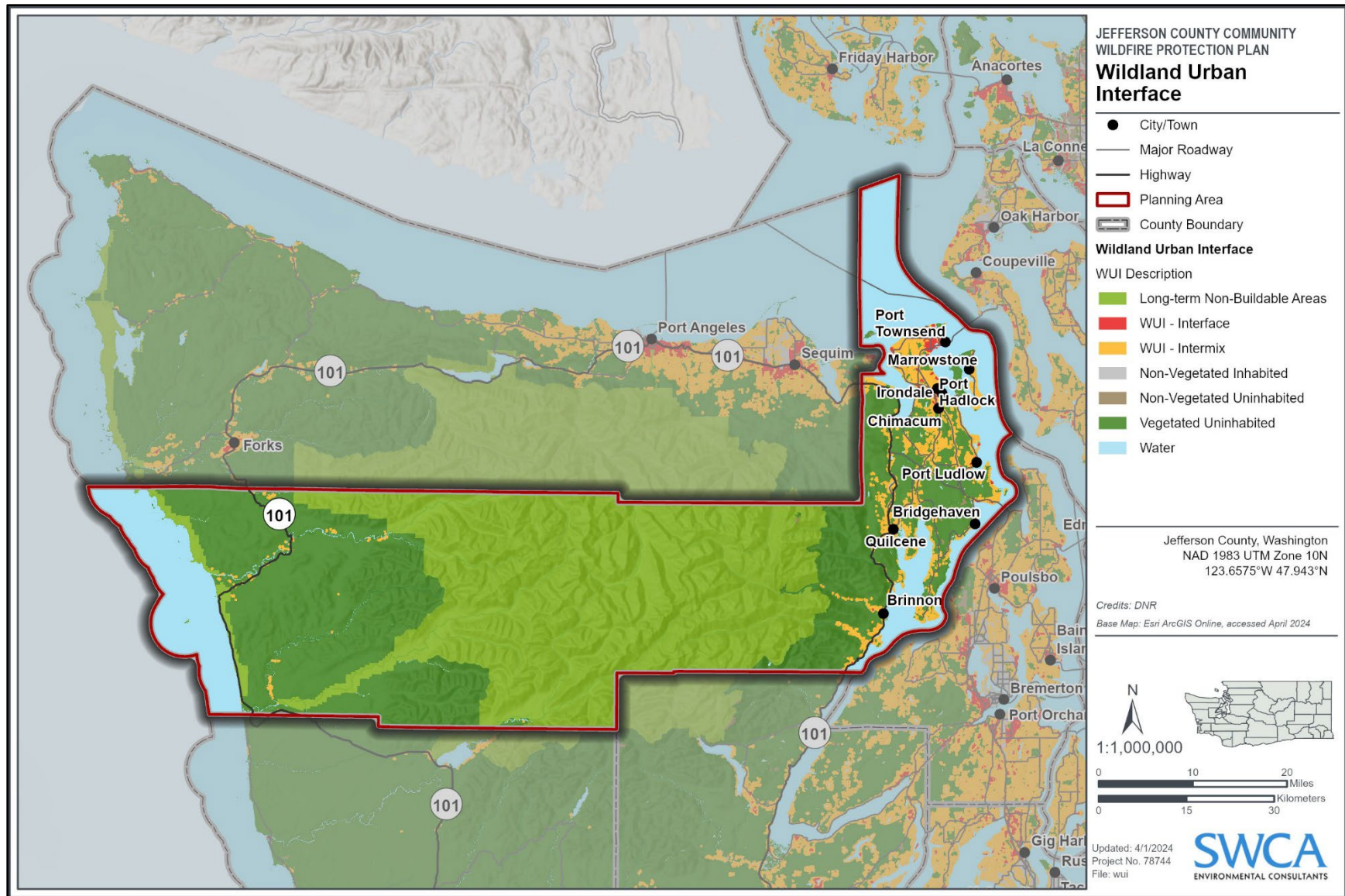


Figure 2.1. WUI in Jefferson County.



Figure 2.2. Example of the WUI Intermix in Port Townsend.



Figure 2.3. Example of the WUI Intermix in Marrowstone Island.

2.1.1 WILDLAND-URBAN INTERFACE LAND USE

Chapter 15.05 of the Jefferson County Code cites the adoption of the 2009 edition of the International Fire Code to direct new construction within the county. The State of Washington adopted the International WUI Code with the 2021 code cycle, influencing development projects in Jefferson County after July 2023 (Washington State Building Code Council 2023). The code aims to enhance safety and wildfire resilience for homes. A four-step process is outlined, involving determining the hazard severity of the parcel, assessing existing defensible space, identifying ignition-resistant construction requirements, and confirming compliance with site plan regulations. The goal is to protect citizens and their homes from wildfires through these new code requirements.

Cities and counties are continuously challenged to accommodate both current and future residents in need of safe and affordable housing. As outlined by the International WUI Code, development in moderate to extreme fire hazard areas is required to be constructed in accordance with a set of guidelines and requirements that aim to prevent wildfire intrusion, protect structures from ignition, and stop structure fires from spreading to wildland fuels, even without fire department intervention. These requirements include the use of fire-resistant materials to minimize fire susceptibility in new structures and implementation of defensible space.

Additional fire code information is described in Appendix A.

Appendix C contains the WUI delineation map for cities and unincorporated areas within Jefferson County as well as a description and a hazard rating for each city and unincorporated area. The WA-WUI map depicts the entire WUI boundary for each city or unincorporated area. The WUI buffer is an area where fuel treatments should be prioritized to provide additional protection to communities from potential wildfire and/or grassland fire spread.

“Wildfires are a big concern for us, and a lot of our practices are intended to reduce the risk of fires on our land just like other community members. Having healthy, diverse forests is essential to what we do.” – Rayonier Representative

2.1.2 FUELS AND TOPOGRAPHY WITHIN THE WILDLAND-URBAN INTERFACE

Jefferson County is characterized by highly varied topography and a wide assortment of vegetative fuel types. Topographically, the county ranges from sea level in its eastern and western portions to 7,969 feet at the summit of Mount Olympus, with hills, valleys, and sprawling ridges throughout. The highest proportion of land cover in the county is timber fuel, which presents a heightened risk due to its wildfire behavior. Portions of the highly contoured and forested expanses of the county interface with human development, posing a substantial wildfire threat. Development and expansion of the WUI and contemporary fire suppression practices have both increased the likelihood of human ignitions and led to increased fuel accumulation, respectively. In addition, historic fire incidents have shown that fire risk is elevated in areas where human ignitions are more probable.

Figure 2.4 shows fuels within Jefferson County. For further details on the fuel conditions for each model input, please see Table 3.1.

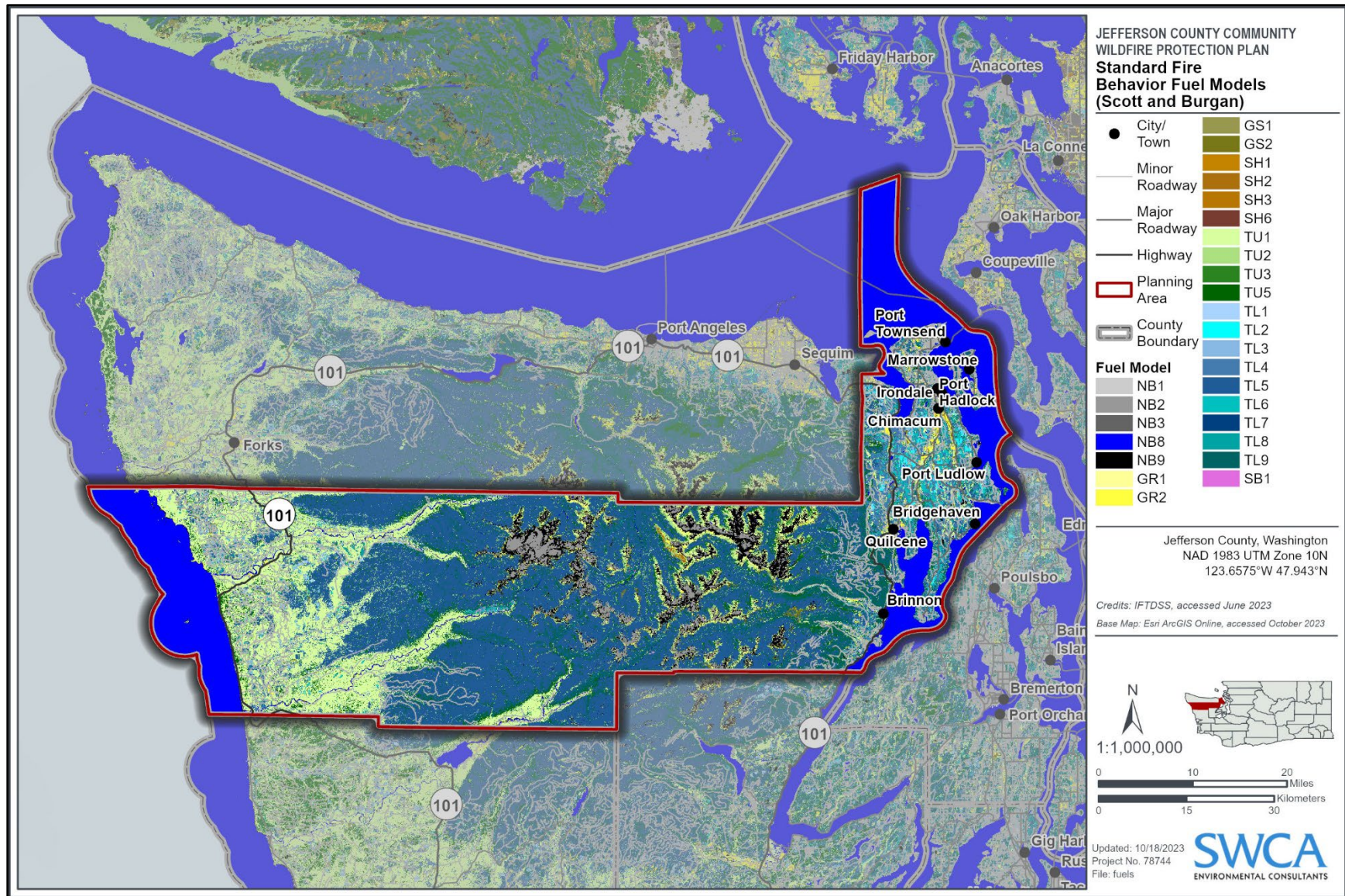


Figure 2.4. Fuels across Jefferson County.

2.2 FIRE REGIMES

Fires are characterized by their intensity, the frequency at which they occur, the season in which they occur, their spatial pattern or extent, and their type. Combined, these attributes describe the fire regime. While fire regimes for distinct ecosystem types are detailed below, Figure 2.5 provides an overview of the mean fire return intervals across Jefferson County's diverse landscape. The prevailing mean fire return interval observed across this terrain ranges from 100 to 300 years. A variety of fire return intervals can be found across the county ranging from 50 years to over 1,000 years (Fryer and Luensmann 2012; LANDFIRE 2020). Long return intervals result in fire events that are often stand replacing as fuels gradually increase.

2.2.1 SITKA SPRUCE

Sitka spruce communities are generally located in areas with relatively high annual precipitation. In the county, they are commonly found in the western coastal region, which experiences the highest precipitation totals. Sitka communities are often intermixed with western hemlock and redcedar and a forest floor consisting of mosses and ferns (Acker and Kertis 2004). Due to the high amount of precipitation, this community experiences very little fire and has a fire return interval of 150 to over 350 years (USDA 2012a). Most fires experienced by Sitka communities spread from adjacent areas with drier conditions. Sitka spruce is not well adapted to fire and has thin bark and shallow roots. Wildfire events are generally stand replacing (Acker and Kertis 2004). Windthrow events are more common as the portion of the county most often occupied by Sitka spruce experiences the highest occurrence of severe storms. This can result in fuel loading within Sitka communities, especially during extended drought periods. However, due to the moist climate inhabited by Sitka communities, most slash and windfall trees are not available as active fuel due to rapid decay rates on the forest floor (Griffith 1992).



Sitka spruce.

Source: Bressette (2014a)

2.2.2 DOUGLAS-FIR-WESTERN HEMLOCK



Douglas-fir (left) and western hemlock (right).

Sources: Powell (2002); Van Pelt (2007)

Pacific madrone can also be found in dry fir communities where soil is well drained. Madrone is an early successional species with a high light requirement that is often outcompeted by fir species on less disturbed sites. Madrone often colonizes first following disturbance such as fire (Reeves 2007). The fire return interval for dry western hemlock community is 50 to 150 years (USDA 2012a, 2012b). This community experiences mostly mixed-severity fire events. As the fire return interval lengthens, reaching over 250 years, stand-replacement fires become more common. Douglas-fir communities are fairly fire dependent to clear understories and return soil nutrients.

Wet-mesic Douglas-fir-hemlock communities are common across the county and occur on the north, south, and west aspects of Mount Olympus. Wet-mesic communities receive more precipitation than dry communities and are found in cool, moist microsites (Kertis et al. 2004). The fire return interval for this community is between 300 and 1,000 years (USDA 2012c). Severity of fire in wet hemlock communities generally ranges from mixed to stand replacing with stand replacement being more common in wet communities compared with dry communities (Kertis et al. 2004). This is primarily due to the longer fire return interval for wet hemlock. Hemlock and Douglas-fir dominate this community with some redcedar intermixed and a forest floor consisting of a variety of shrub species such as Devil's club, huckleberry, rhododendron, and swordfern (Kertis et al. 2004).

Douglas-fir and western hemlock are common in multiple communities across the county including wet and dry-mesic habitats. Dry-mesic fir-hemlock communities are most prominent in the eastern portion of the county that experiences a rain shadow (Kertis et al. 2004). The terrain of this area is often low montane and has well-drained soil. Other species common in dry fir-hemlock communities are redcedar, white pine, lodgepole pine, and grand fir. The understory is often primarily shrubs.



Pacific madrone.

Source: Washington State University (2023)

2.2.3 WESTERN REDCEDAR

Western redcedar is a common species within the county but is most frequently found on the west side of Mount Olympus in old-growth coastal rainforests. Redcedars are one the largest and oldest growing species of tree in the region, growing to ages of over 1,000 years old, reaching heights of over 200 feet with trunk diameters of over 8 feet (Tesky 1992). The species is often found in forest communities containing Sitka spruce, western hemlock, Douglas-fir, and silver fir. Redcedar often forms codominant relationships with firs and hemlocks (USDA 2012b, 2012c). The species has been heavily harvested and is a valuable resource for roofing, siding, poles and posts, and other varying products (Tesky 1992).

The county contains some of the largest living redcedars including the Duncan Cedar, which is the second largest known redcedar in the world. Redcedars have a low to moderate fire resistance due to their thin bark, shallow roots, and tendency to be accompanied by dense understories with flammable foliage. Large specimens, however, can be expected to survive fire events as long as they are not fully girdled by a burn (Tesky 1992).

The fire return interval for western redcedar varies based on its associate species, topography, and water proximity. Generally, fire return intervals range from 50 to 350 years; in riparian areas, the mean return interval increases to 200 years. Fires in redcedar communities are most often moderate to severe burns due to the large amount of understory fuel (Tesky 1992). The species regenerates naturally effectively but can be limited if soil is severely burned and if ungulate herbivory is high.



Western redcedar.

Source: Bressette (2014b)

2.2.4 SILVER FIR-MOUNTAIN HEMLOCK

Silver fir is a common tree species and is often found in association with mountain hemlock throughout Jefferson County. Fir-hemlock communities are common; they are found extensively in the montane portions of the county at elevations above 1,500 feet (Cope 1992). Both species are also occasionally found in pure stands. Mountain hemlock tends to occupy higher elevations while the two begin to intermix at lower altitudes with less freezing and more consistent water (Cope 1992). Silver fir and mountain hemlock are also associated with Douglas-fir-hemlock communities and the two are often found intermixed or bordering one another. This vegetation community can be found at both mid- and high elevations and can grow in almost all soil types



Silver fir (left) and western hemlock (right).

Sources: Bressette (2014c); McDougal (1991)

in the area (Acker and Kertis 2004). Communities are reliant on cool moist conditions and most often found where high snowpack occurs. Fir-hemlock communities have a low fire return interval that averages between 200 and 600 years with intervals over 1,000 years also possible (USDA 2012d). Silver fir is fire avoiding and sensitive to impacts of wildfire. The species has thin bark and shallow roots that are often killed by fire. Fire events in fir-hemlock communities are most often stand-replacing crown fires (Acker and Kertis 2004; USDA 2012d).

2.2.5 SUBALPINE FIR

Subalpine fir is found at high elevations in Jefferson County, often on the eastern slope of the Olympic Mountains. The species is adapted to very cold winters and warm, dry summers but can also occur along streams and in other areas with higher available moisture (Kopper and Acker 2004). Subalpine fir tends to grow in thick stands with associated species including hemlock, lodgepole pine, Douglas-fir, and Englemann spruce (Uchytel 1991). The forest floor of this community generally consists of shrubs, grasses, and sedges. The median fire return interval for subalpine fir communities is 150 years (Kopper and Acker 2004). Fire events are often stand replacing as fuel accumulation is generally high. Additionally, the species is poorly adapted to high-intensity fires. Following wildfire events, lodgepole pine can overtake fir in recovery and limit opportunity for establishment (Uchytel 1991).



Subalpine fir.

Source: Bressette (2014d)

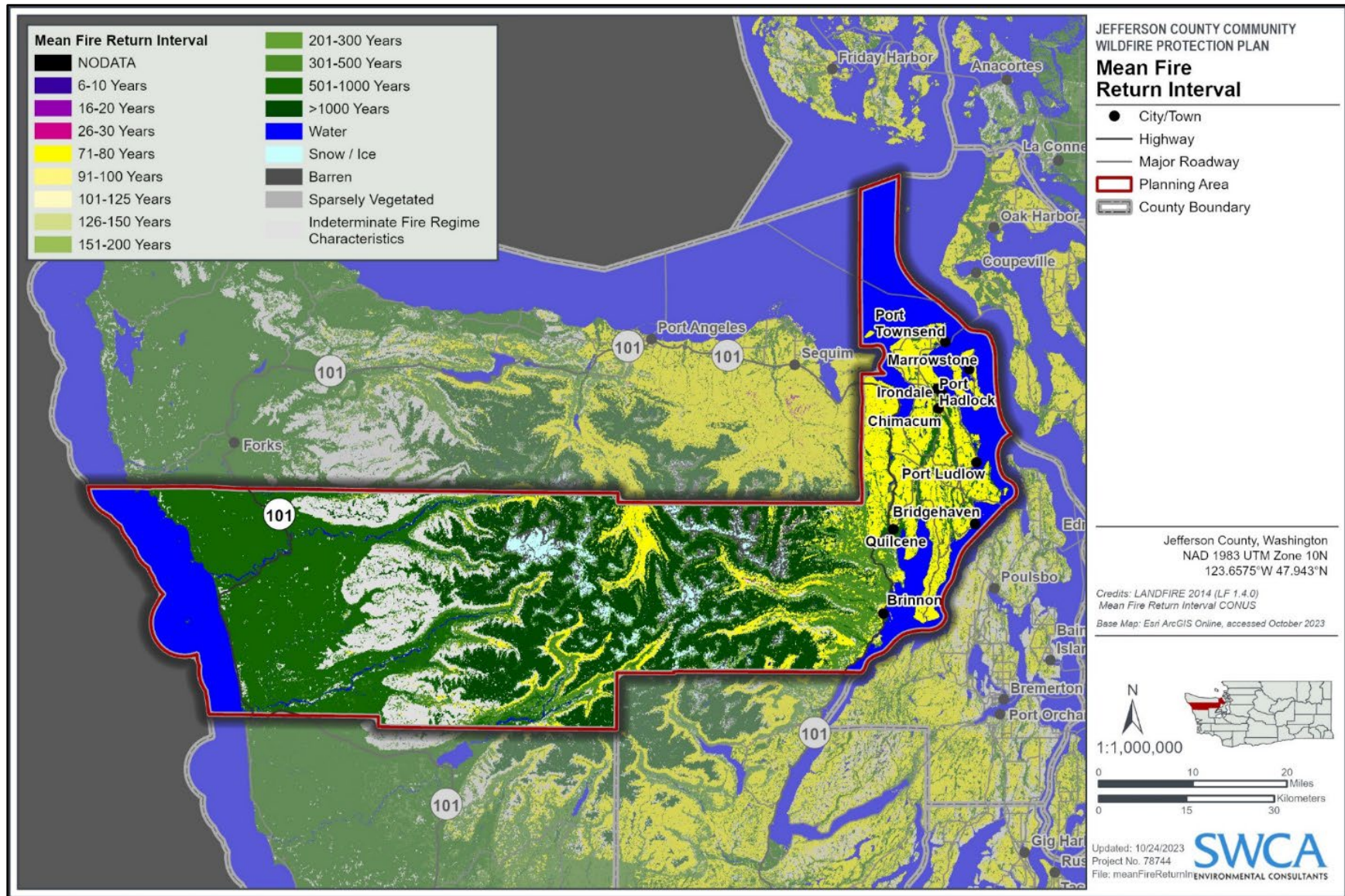


Figure 2.5. Mean fire return intervals across Jefferson County.

2.3 CLIMATE AND WEATHER PATTERNS

The climate of the county is heavily influenced by its topography and coastal proximity. The western portion of the county is dominated by temperate rainforest and receives a majority of the peninsula's precipitation. Precipitation is highly variable and dependent on elevation, coastal proximity, and location on the peninsula. The north-central portion of the county, near Mount Olympus, averages 260 inches of rainfall annually. Toward the coast, annual precipitation decreases along a gradient to 103 inches annually for coastal areas. The eastern portion of the county receives the lowest annual precipitation with averages along the Puget Sound coast as low as 20 inches annually. This large precipitation range is heavily attributed to the rain shadow effect that the Olympic Mountains has on the region where storms moving eastward deposit a majority of their precipitation on the mountain range, creating drier conditions on the eastern front range.

Precipitation is heaviest in winter months from November through March when totals average 14 inches per month (National Weather Service 2023a, 2023b). One-day maximum precipitation regularly falls between 4 and 8 inches on the west side of the county during the rainy season, while the eastern portion generally experiences maximums between 1.5 and 4 inches (Western Regional Climate Center 2023a, 2023b, 2023c). Summer and early fall months receive the lowest precipitation, with average monthly totals ranging from 1 to 4 inches. Snow can also be expected during late fall, winter, and early spring months with snowfall totals ranging from a 0.5 to 3 inches per month in lower-elevation regions. The mountainous regions receive considerably more snow than the rest of the county, with Hurricane Ridge averaging 30 to 35 feet annually.

The annual average temperature ranges from 37 to 63 degrees Fahrenheit, with lower temperature extremes dropping to 0 degrees in winter months and highs rising to over 100 degrees in summer months. Winter temperatures can range from 0 to 70 degrees with an average temperature of 38 degrees. Spring temperatures range from 12 to 90 degrees with an average temperature of 48 degrees. The temperature range for summer months is 30 to 102 degrees with an average temperature of 61.7 degrees. Fall temperatures can range from 5 to 99 degrees with an average temperature of 50 degrees.

Similar to precipitation, temperature varies greatly depending on altitude, coastal proximity, and location relative to Mount Olympus. The western coastal portion of the county is generally a temperate rainforest climate and is often foggy and cool. The eastern portion of the county is much drier but with similar temperature variation. Within the lowlands exists a small region called the Olympic Rain Shadow, which receives significantly drier and sunnier weather than its surroundings. It encompasses the towns of Sequim, Port Angeles, and Port Townsend, as well as much of the San Juan Islands.

Storm cells most often impact the county from the southwest and move northeast. Storms can often be accompanied by high winds, with the most severe storm and wind events generally occurring in October through February. Winds are generally strongest from the west and north, and drainages that are oriented east-west can channel wind events creating focused air currents. Severe wind events can cause damage to facilities and trees. Two such events occurred in 1921 and 1962. The event in 1921, termed the "great Olympic blowdown", saw coastal wind speeds reach over 100 miles per hour and 40% of trees were blown down on the southwest side of the Olympic Mountains. The 1962 event saw winds peaking at 160 miles per hour with similarly catastrophic windfall results in the forests (Read 2015).

Monthly climate normals (30-year averages) for the county are graphed by weather stations below (Figures 2.6, 2.7, and 2.8). Monthly temperature and precipitation data for the county is limited, especially for the western portion of the county. Average monthly temperatures for the Quilcene area are included in

Figure 2.6, average monthly precipitation for the Chimacum area is included in Figure 2.7, and temperature and precipitation averages for the entire Olympic Peninsula are included in Figure 2.8. The Olympic Peninsula area figure includes data from across the region, including outside of the county, and is not representative of specific location records. Differences in average temperature and precipitation occur across the county and should be noted when considering local conditions.

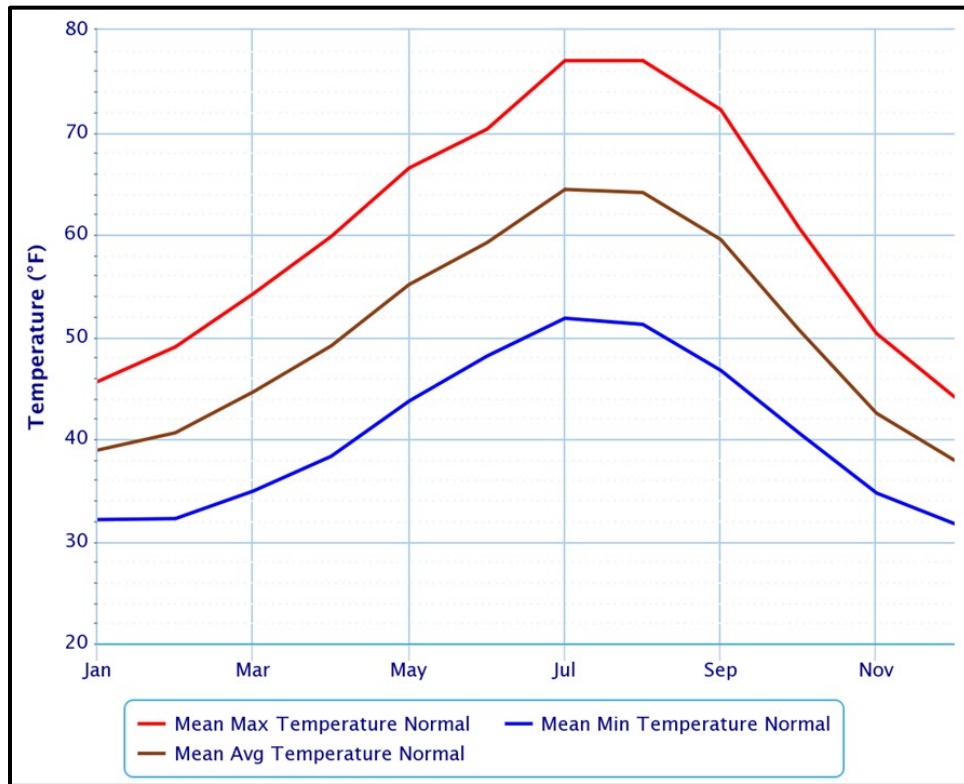


Figure 2.6. Mean average temperature in Quilcene.

Source: National Weather Service (2023a)

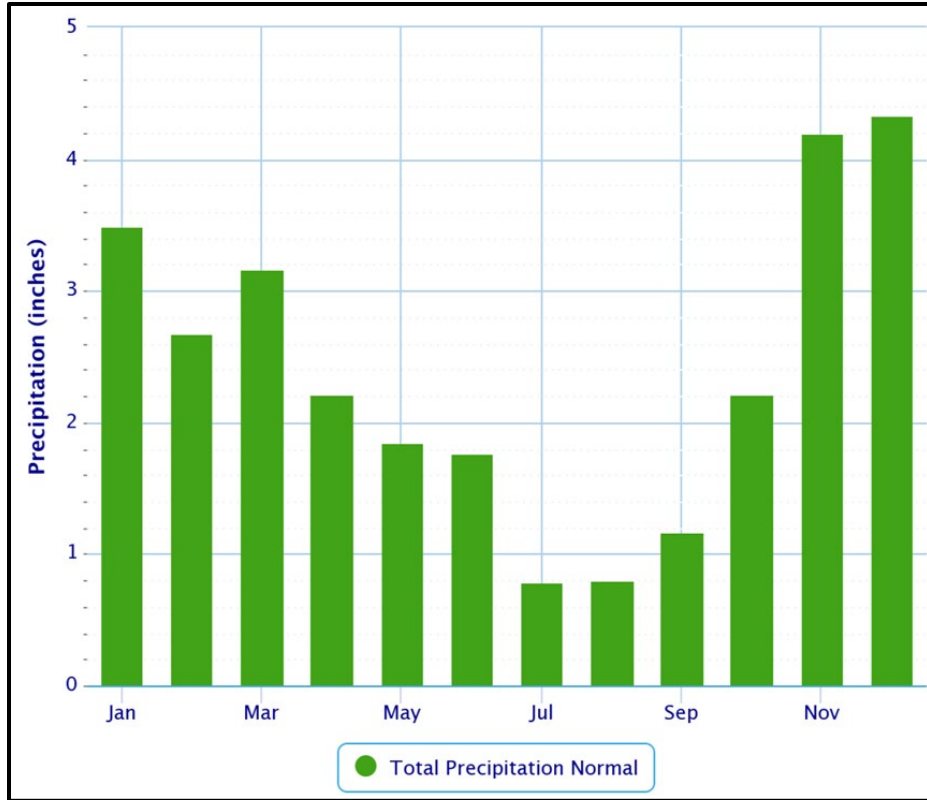


Figure 2.7. Average total precipitation in Chimacum.

Source: National Weather Service (2023b)

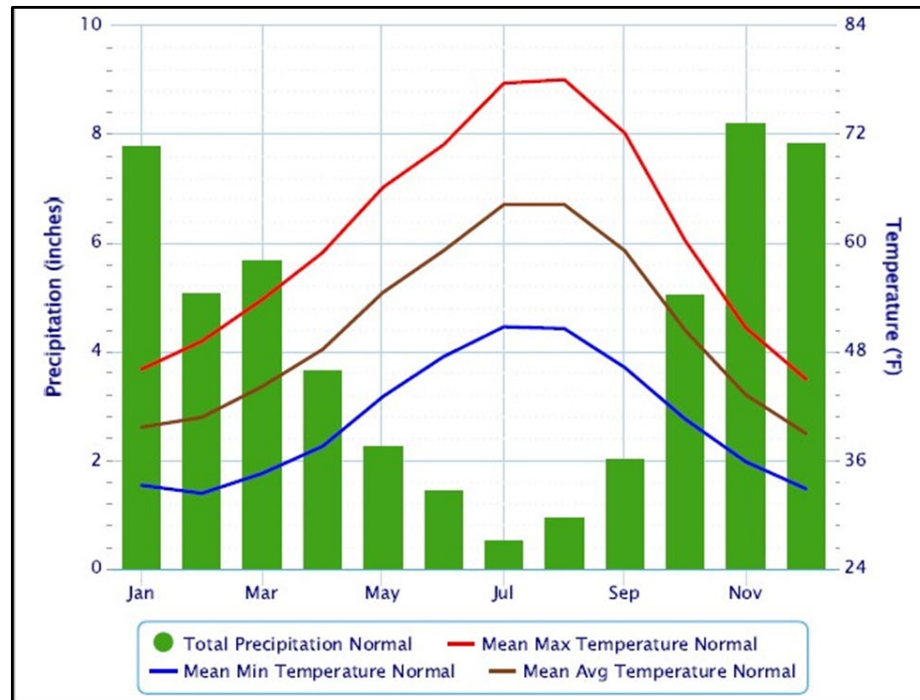


Figure 2.8. Average total precipitation and mean average temperature in the Olympic Peninsula.

Source: National Weather Service (2023c)

2.4 FIRE HISTORY

Fire is a naturally occurring aspect of Washington's landscape and is essential to the health of many ecosystems in the state. Forest communities across the county range from fire adapted to fire avoidant depending on geography, elevation, and local climate. Fires that occur at natural intervals play a crucial role in clearing dead fall and understory debris, returning nutrients to the soil, and maintaining tree and canopy spacing. Prior to colonial presence on the peninsula, most fires were intentionally set to maintain the prairies throughout the lowland landscape (Wray and Anderson 2003). Others were naturally occurring and varied in intensity and size (Jefferson County DEM 2016). Following Europeans landing in the area, several large fires occurred due to logging and road building (NPS 2005). The average fire return interval is generally 100 to 150 years; however, this varies across ecosystem types and geographic location (see Figure 2.5). The east side of the county experiences more frequent fires due to its drier climate.

Historical evidence such as fire scars indicates that large fires burned much of the north, east, and south sides of the peninsula over 300 years ago and many valleys and watersheds were burned in large fires about 250 years ago (Jefferson County DEM 2016). Although there may be limited documented accounts regarding the influence native tribes had on fire occurrence, indigenous peoples selectively burned areas to improve wildlife habitat and access, maintain certain vegetation, and harvest root crops. Some suggest that the prairies near the western coast are a result of these management practices (NPS 2005).

The early 1900s saw a large occurrence of fires, including the Forest Fires of 1902; the Dosewallips and Duckabush Fires of 1918, which burned over 7,000 acres combined; and the Green Mountain, Discovery Bay, and Snow Creek Fires, which burned 9,600, 5,000, and 3,800 acres, respectively (Jefferson County DEM 2016). In the last 20 years, fires have become more frequent in the county, particularly in the northeastern portion, where drier conditions can create ideal fire conditions. These include the Griff, Heatwave Complex, and Hopper Fires.

Fire occurrences have also increased due to increased population growth in the county and more people living within the WUI as communities expand into forested areas. Jefferson County averages 5 to 10 acres of wildland fires every year (Jefferson County DEM 2016). Figures 2.8 through 2.10 illustrate historic fire perimeters, cause of ignition, and density of past events. Throughout the county, west- and north-facing slopes are less likely to experience severe wildfire conditions due to higher precipitation and cooler temperatures. In recent years, this has become less reliable, however, because climate change-induced drought has created drier conditions across all aspects. The fire season in the county generally spans from the end of June through the end of September. In recent years, the season has extended further into October as dry, warm conditions linger.

"Compared to my time working on the peninsula in the late 90's and early 2000's, wildfire has increased in all metrics. It used to be if we had a fire over 2 acres, it was a big deal. Some years we wouldn't have any fires in the park or National Forest." – Joseph Crowe, USFS

2.4.1 RECENT FIRE OCCURRENCE

This section was developed using fire history data from WA DNR and the National Interagency Fire Center (NIFC) website (<https://data-nifc.opendata.arcgis.com/datasets/nifc::wildland-fire-incident-locations/about>). The Advisory Group acknowledged that fire reporting, especially for small ignitions (that grow to less than 1 acre), is notoriously limited throughout the county and nationally, and therefore, fire history data may not fully represent the actual numbers of fires that occur on an annual basis.

A depiction of Jefferson County's wildfire history (1900–2022) shows historic fires occurring across all geographies of the county. A majority of fires in the county have occurred in the eastern portion, which corresponds with drier conditions and higher human populations. Most recent large fires have occurred within Olympic National Park (Figures 2.9–2.11). The county averages 5 to 10 acres of wildland fire annually (Jefferson County DEM 2016).

Historically, large wildfires have been fairly rare in the county but have followed an oscillating cycle. Small fires less than 0.25 acre are the primary events across all time periods. Although the number of events has not significantly increased in the last few decades, the number of large fires has increased. The period of 2010 through 2019 included the largest number of acres burned per year compared with other periods and saw the largest number of fires over 1,000 acres aside from the period of 1900 through 1999. The current decade, beginning in 2020, has seen a decline in the number and size of fire events compared with the previous decade.

Increases in the number and size of wildfires can primarily be attributed to drier forest conditions; however, an increase in residents living in the WUI has also fostered conditions for more frequent and intense WUI fires. Hidden illegal meth labs have also been a contributing factor that has sparked fires in the WUI (Jefferson County DEM 2016). Human ignitions are the leading cause of fire in the county and include fireworks, cigarettes, outdoor burning, and heat sparks from equipment and vehicles. Debris fires have the highest loss per incident compared with every other ignition type. Many fire events have unknown ignition sources, while natural causes, such as lightning, also play a significant role in ignitions, particularly in the western portion of the county.

The progressing effects of climate change are a primary driver of increased ignitions and large fires. Less consistent precipitation and snowpack, combined with increased evapotranspiration rates, leave forests more vulnerable to all ignitions sources. Loss of forest coverage is one factor that contributes to drier conditions. Dense, mature, temperate forests maintain cooler, moist atmospheric climates through evaporation and condensation cycles. The effects of this cycle are reduced or disrupted as forests are lost through urban development and logging.

Logging companies in the county are active in improving their practices to reduce ignitions on their owned or leased land by strategically planning harvests, reducing the amount of slash left on-site, and maintaining response equipment and personnel.

At the beginning of the 1900s, there was an influx of large fires resulting from settler development and logging. Throughout the mid-1900s, there were significantly fewer fires, until the end of the century when the Hoh Fire burned around 1,050 acres in 1978. In the last decade, the eastern portion of the county has seen a significant increase in fires due largely to human population growth and drier conditions in the rain shadow region.

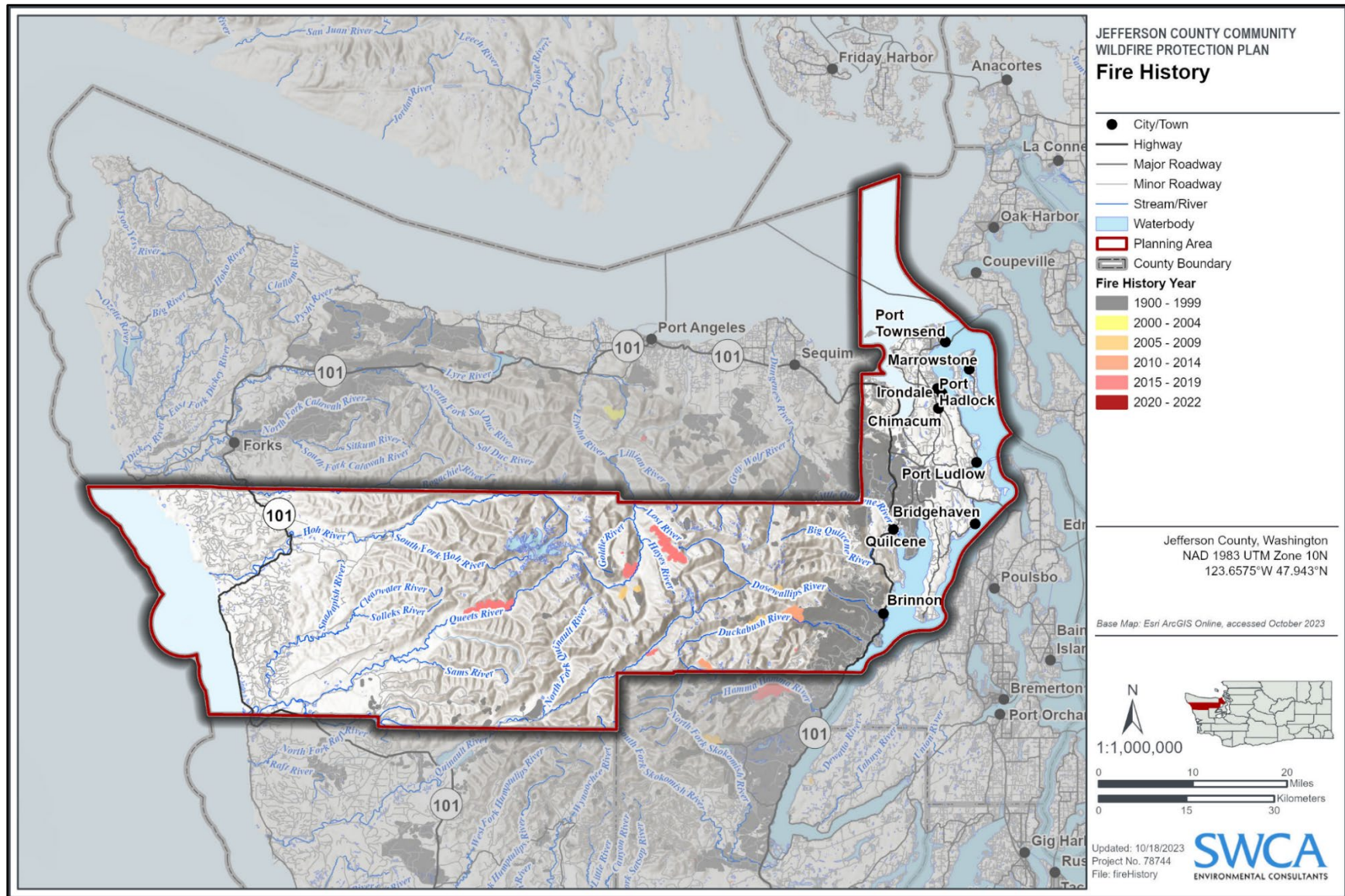


Figure 2.9. Historic fire perimeters for Jefferson County from 1900 through 2022.

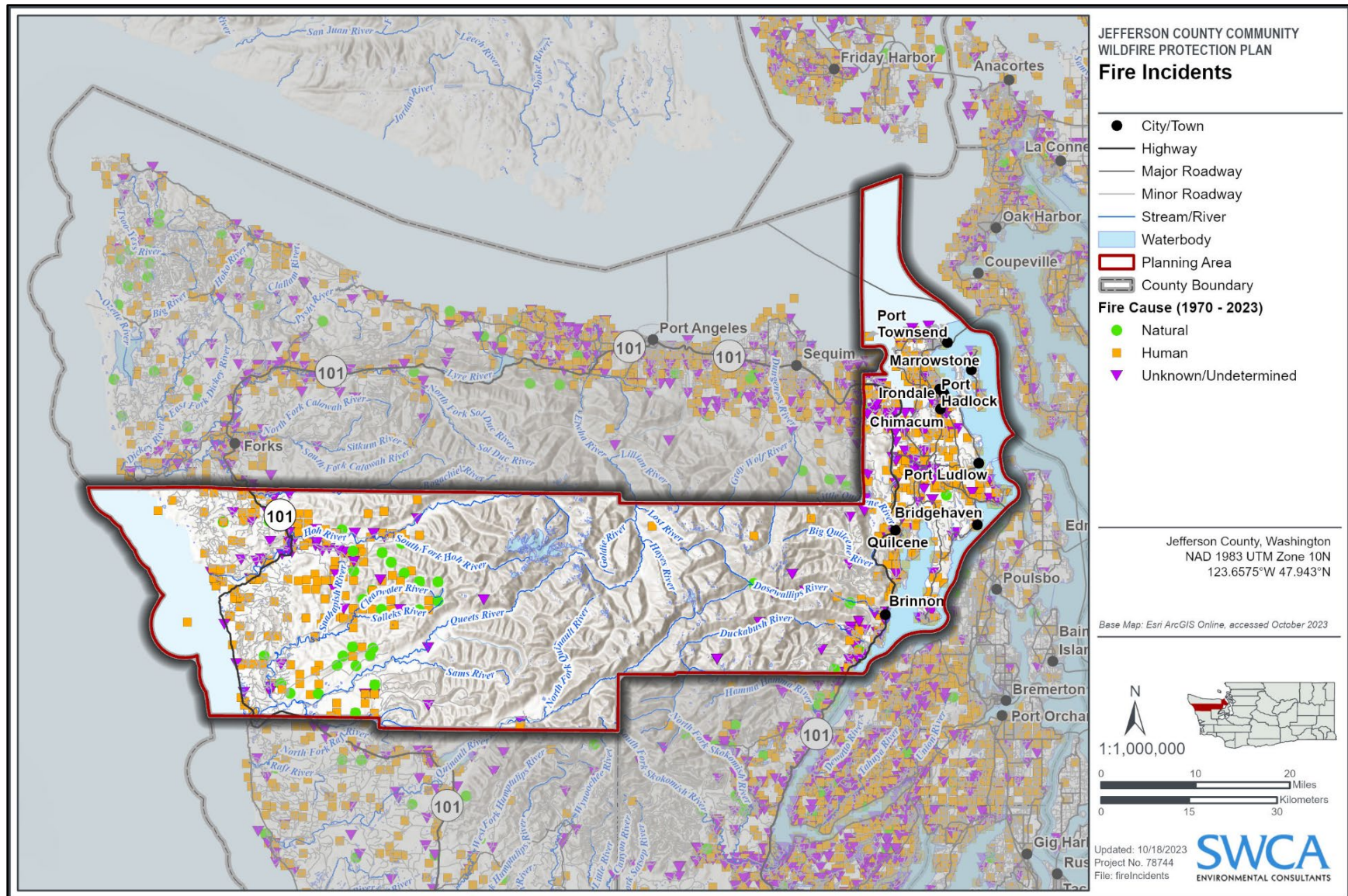


Figure 2.10. Fire incidents for Jefferson County from 1970 through 2023.

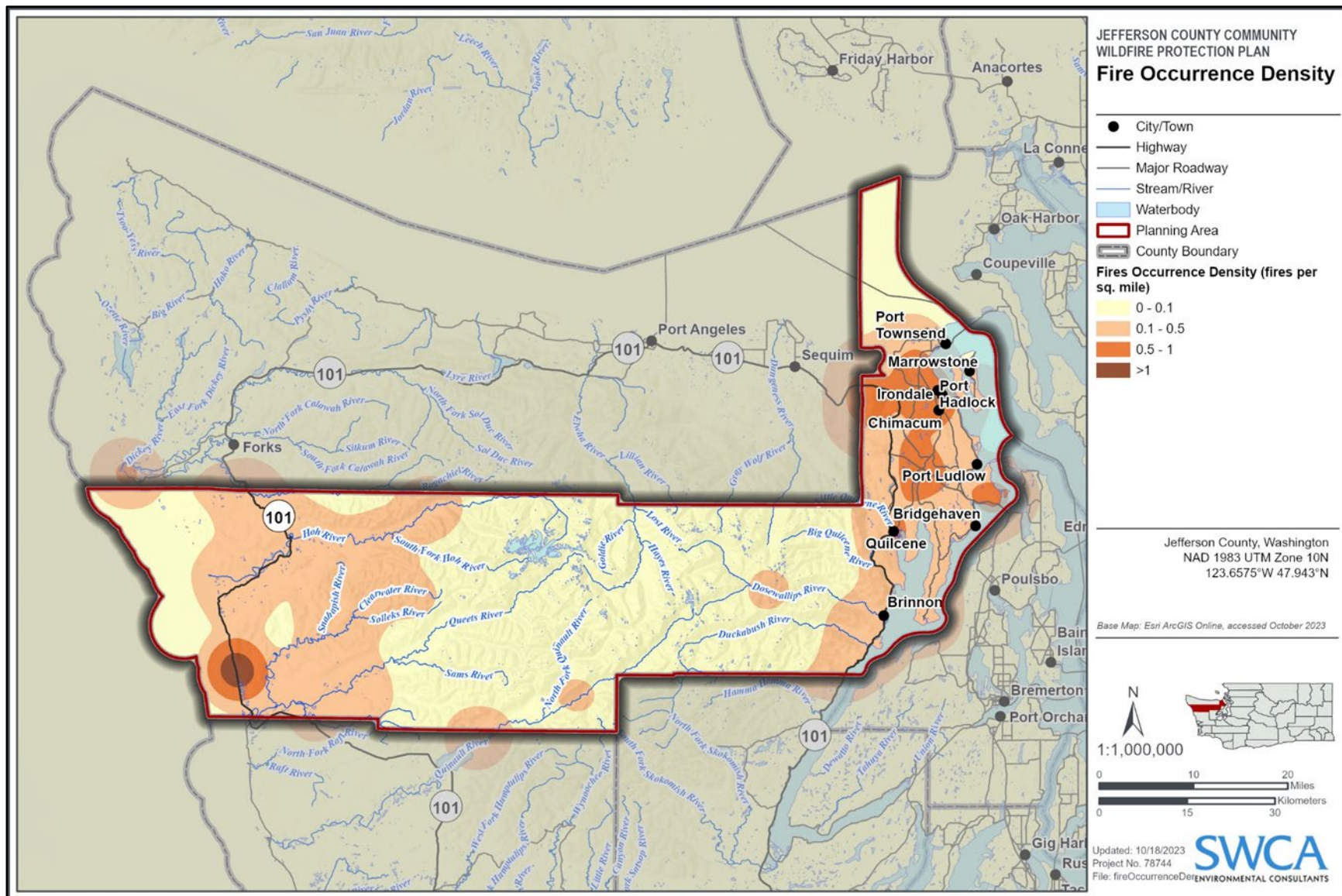


Figure 2.11. Fire occurrence density map illustrating fires per square mile.

In the last 10 years, multiple large fires have impacted the county within the boundaries of Olympic National Park. The 2015 Paradise Fire burned 2,798 acres (Figure 2.12), the 2016 Hayes Two Fire burned 2,389 acres, the 2016 Godkin Fire burned over 560 acres, and other smaller fires occurred during this time. Notably, the 2015 and 2016 fire years followed an abnormally dry and warm year in 2015.

In August 2023, a series of lightning strikes caused multiple fires to start just southeast of Mount Olympus. The Delabarre Fire was the largest of the naturally caused events, and the total area burned from these fires was 4,795 acres. Wildfires continue to grow in the number and size of events within the county and there is a high probability of future events (Figures 2.13–2.17). Reoccurring dry conditions and wildland encroachment have resulted in a regular brush fire season that has seen continued rapid responses from local fire departments that have limited the impact of these events.



Figure 2.12. Paradise Fire of 2015 burning in Queets Valley.

Source: NPS 2023.

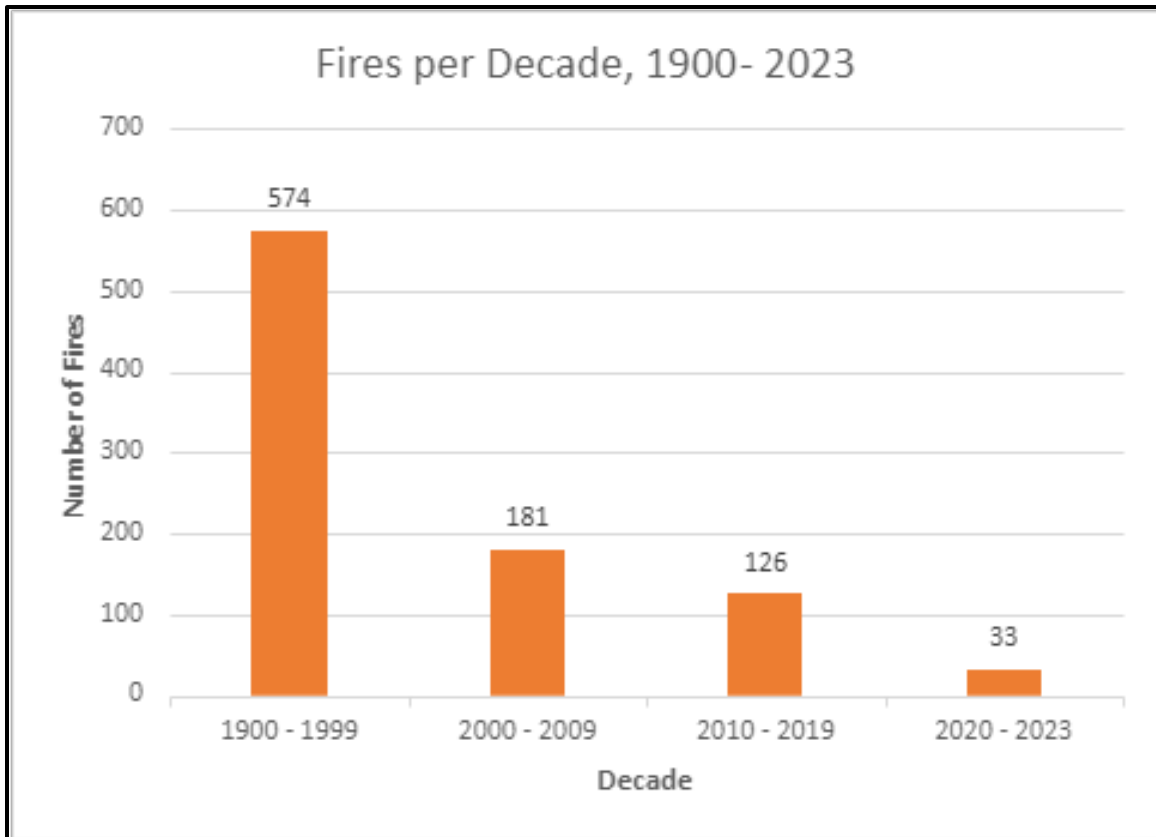


Figure 2.13. Decadal wildfire frequency in Jefferson County from 1900 through 2023.

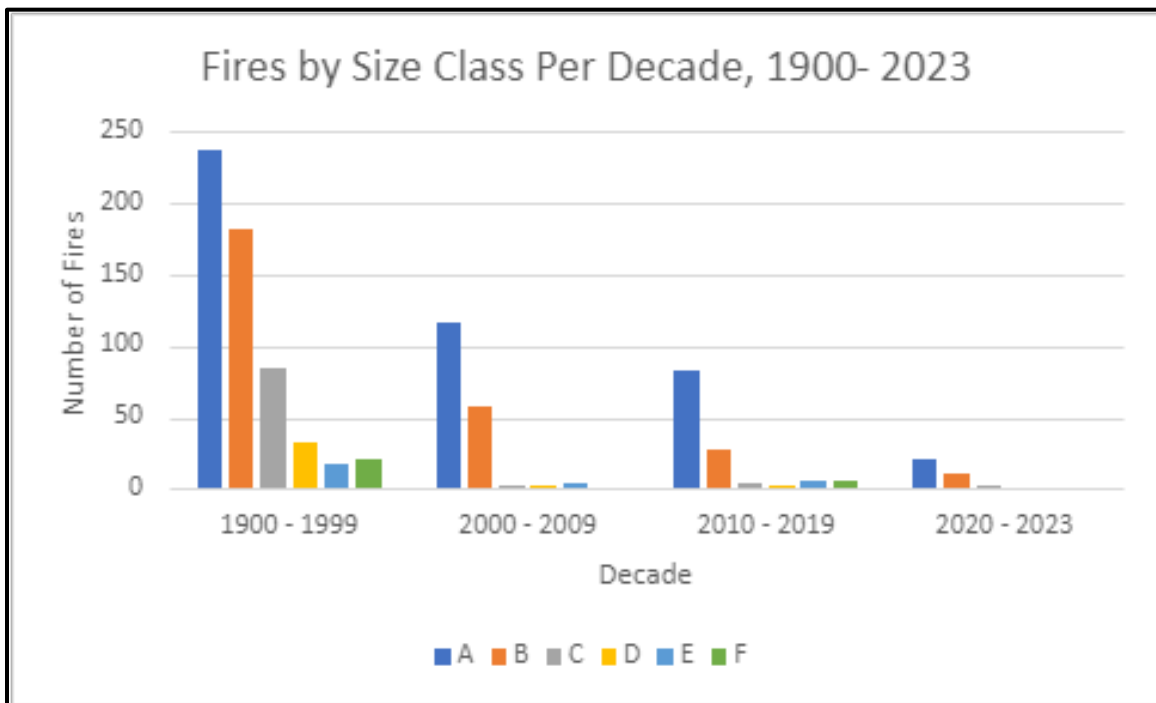


Figure 2.14. Jefferson County fire size statistics per decade from 1900 through 2023.

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.

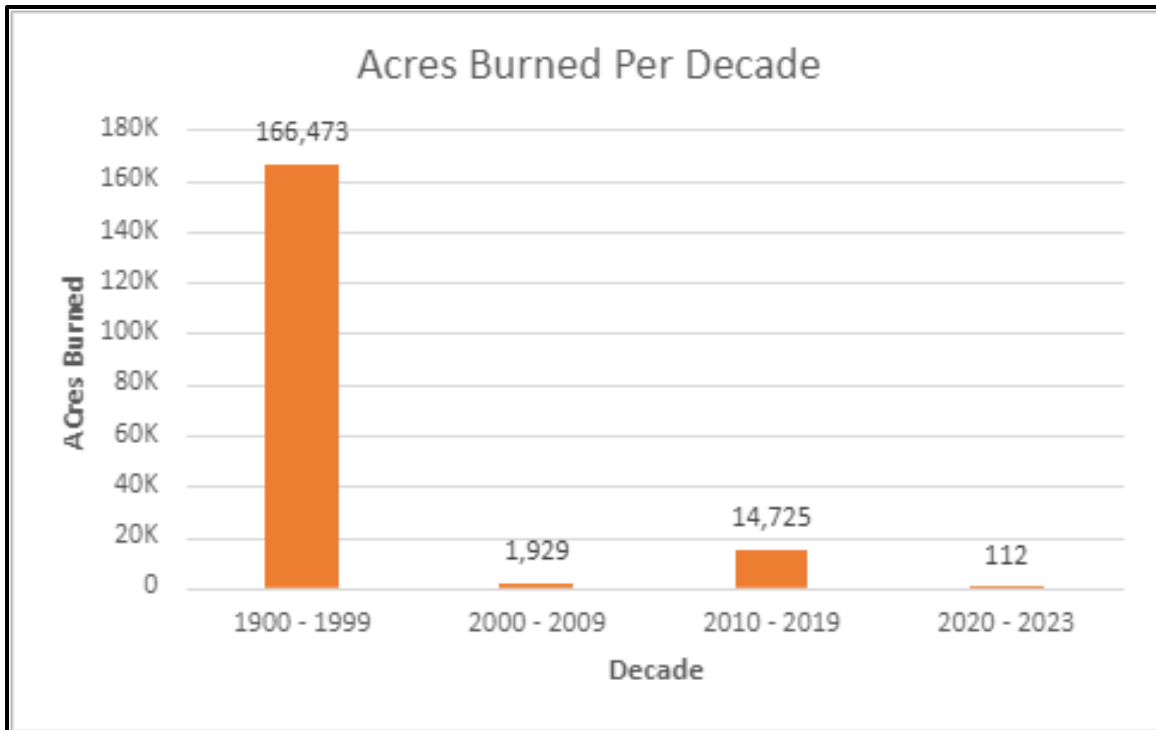


Figure 2.15. Jefferson County acres burned per decade from 1900 through 2023.

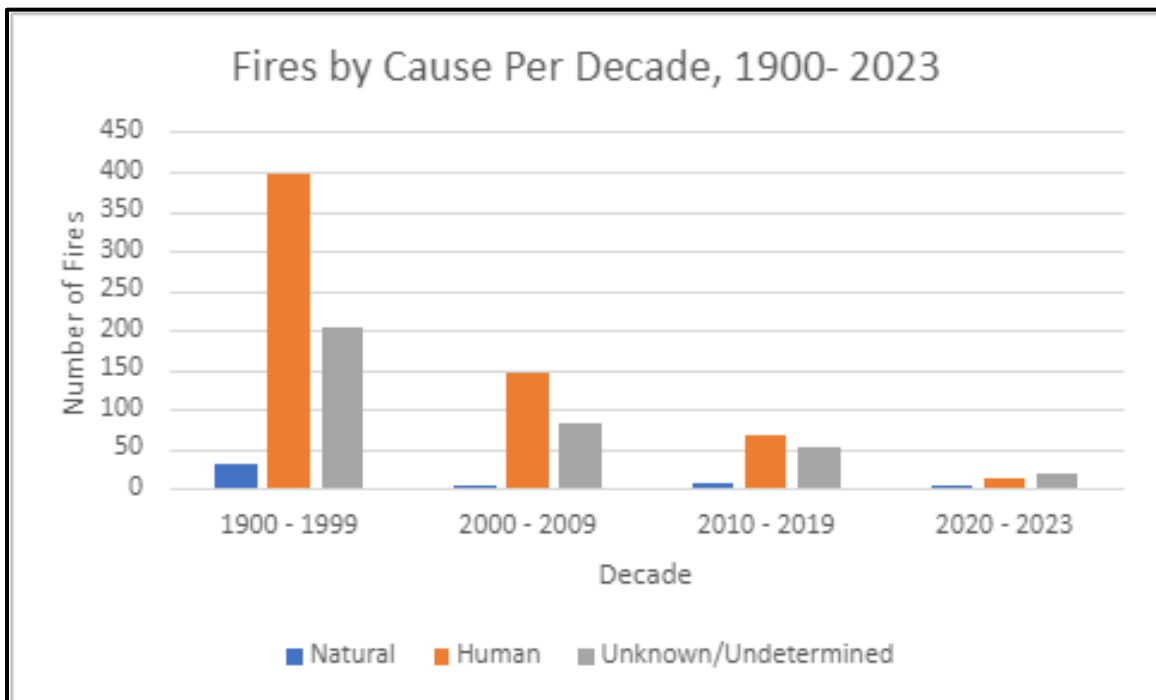


Figure 2.16. Jefferson County fire causes from 1920 through 2023.

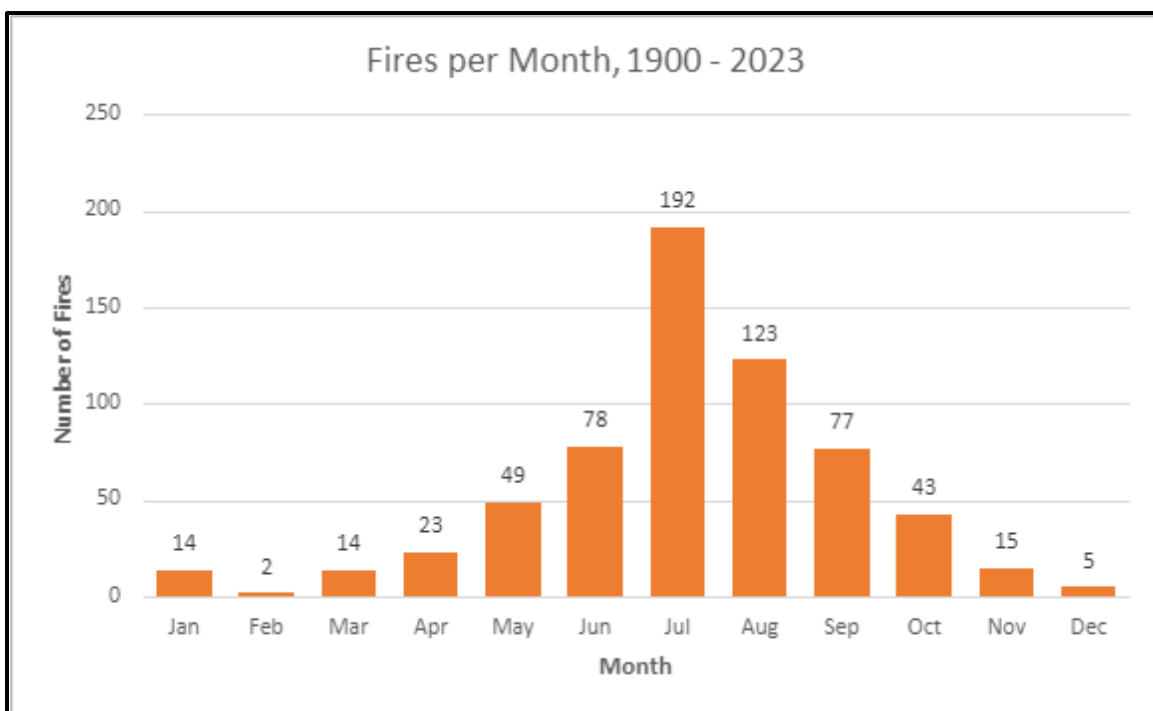


Figure 2.17. Jefferson County monthly fire frequency from 1900 through 2023.

2.5 FIRE RESPONSE

The Northwest Interagency Coordination Center in Portland, Oregon, serves as the central hub for coordinating resources, logistics, aviation support, and predictive services related to wildland fire management and suppression in the Northwest Region, encompassing Oregon and Washington. It collaborates with various state and federal agencies, such as the BLM, USFS, Oregon Department of Forestry, USFWS, BIA, WA DNR, and NPS, to ensure effective wildfire response and management (Northwest Interagency Coordination Center 2023). Jefferson County has an overall fire defense plan (Olympic Region Fire Defense Board 2021) with a stepwise process that local agencies use to summon additional resources for fire response. This process was used for the recent Beaver Valley Fire and Lake Sutherland Fire and is described in Figure 2.18.

2.5.1 LOCAL RESPONSE

2.5.1.1 Jefferson County Fire Response

Jefferson County fire response consists of seven local fire protection districts composed of four fire departments (Figure 2.19).

Information regarding fire department and fire protection district equipment and personnel is available in Appendix C.

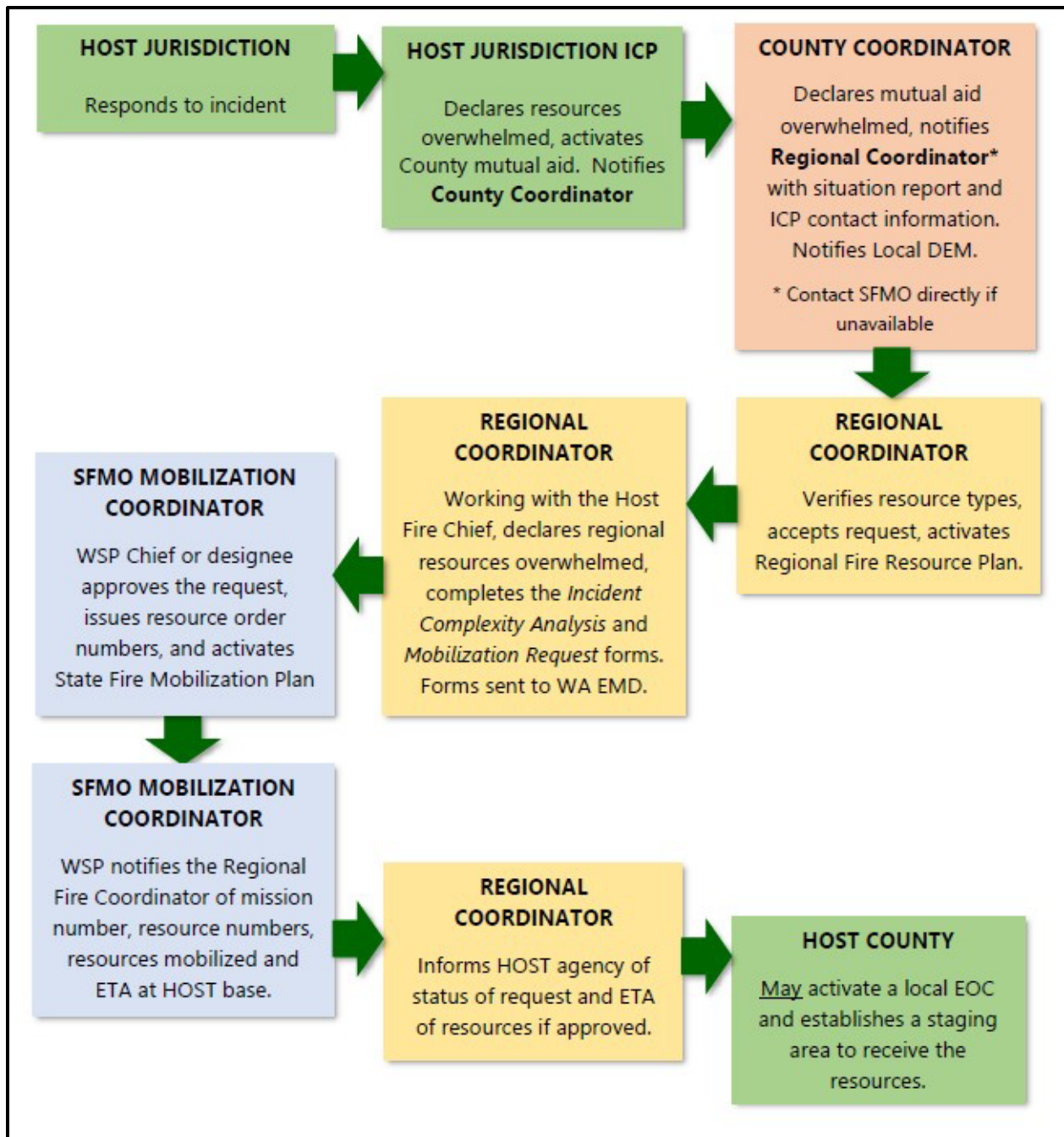


Figure 2.18. Mobilization flowchart for the region.

Source: Olympic Region Fire Defense Board (2021).

Acronym definitions: ICP- Incident Command Post, SFMO - State Fire Marshal's Office, WA EMD - Washington State Emergency Management Division, WSP - Washington State Police, ETA - Estimate Time of Arrival, EOC - Emergency Operations Center.

Local agencies use this state mobilization process to summon additional resources in cases where circumstances require it. For example, this process was employed during the Beaver Valley and Lake Sutherland fires.

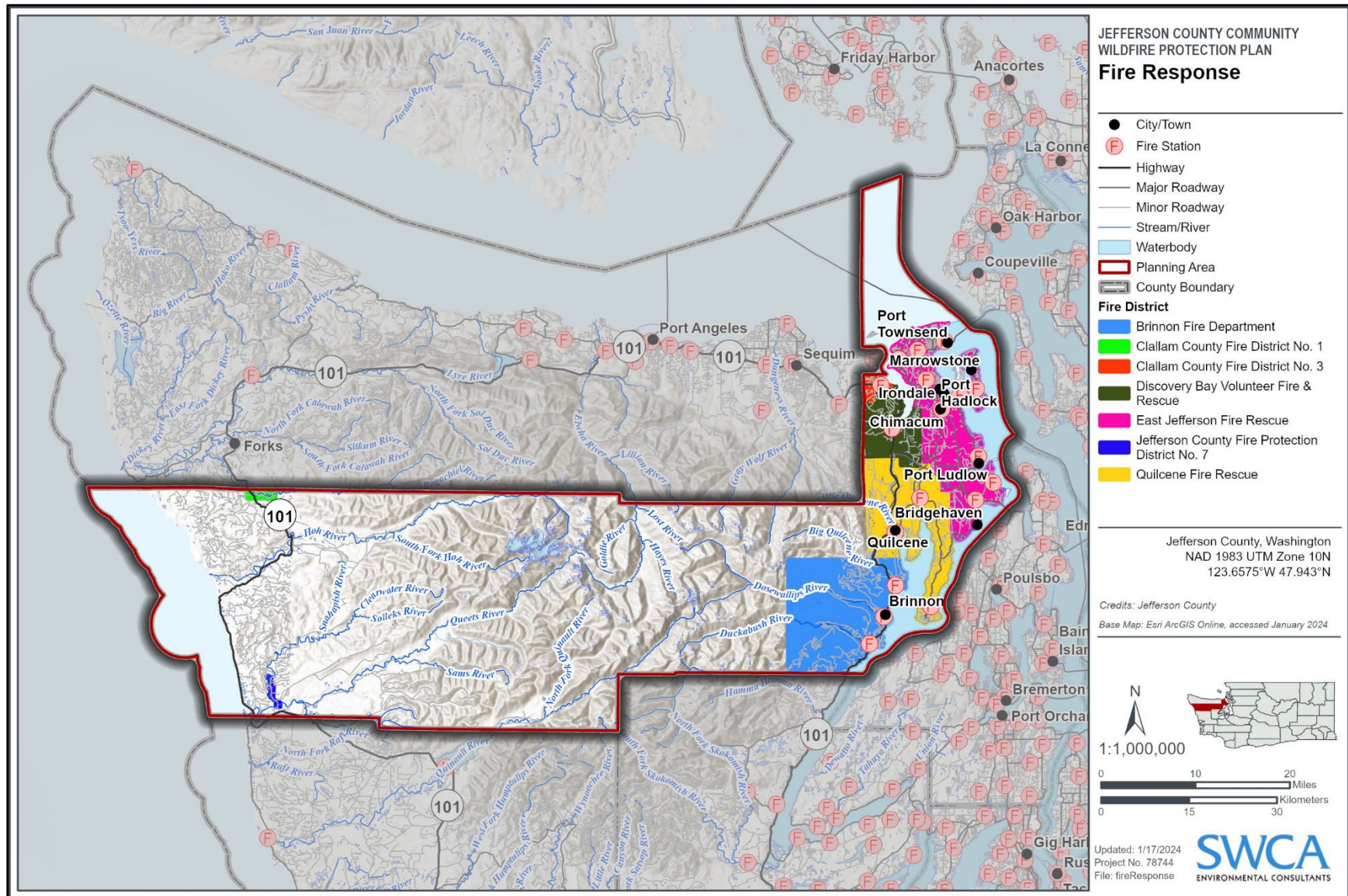


Figure 2.19. Fire response zones and fire station locations.

Note: some stations are not staffed 24 hours per day.

2.5.1.2 Fire Departments and Fire Protection Districts

Please note that efforts were made to communicate with all fire departments and districts, but information about resources was not always available.

East Jefferson Fire Rescue

East Jefferson Fire Rescue is an “all hazards response” department whose mission is to “protect life and property while providing compassionate service that meets the needs of our varied community through prevention, education and emergency response” (East Jefferson Fire Rescue 2022). Also known as Jefferson County Fire District No. 1, this district is the largest fire and emergency medical services provider in Jefferson County. The district was established in 1872 within the incorporated city of Port Townsend, and now includes the unincorporated communities of Cape George, Chimacum, Irondale, Kala Point, Marrowstone Island, Port Hadlock, Paradise Bay, Shine, Bridgehaven, Mats Mats, Swansonville, Beaver Valley, South Point and Port Ludlow, Washington (East Jefferson Fire Rescue 2023).

The district supports emergencies that include motor vehicle accidents, commercial structure fires, emergency medical response including advanced life support and basic life support response, fire suppression, marine services, fire investigation and inspection, urban interface/wildland fires, and hazardous materials spills (East Jefferson Fire Rescue 2022).

Quilcene Fire Rescue

The Quilcene Fire Rescue Department is a special purpose district that was founded in 1954 and has since operated as a municipal corporation. The district is dedicated to protecting the 88 square miles surrounding Quilcene and Coyle within the Olympic Peninsula. The district’s goal is to provide “fire prevention services, fire suppression services, emergency medical services, and the protection of life and property within its legal boundaries” (Quilcene Fire Rescue 2023).

The district is recognized by the State of Washington as Jefferson County Fire Protection District No. 2 under Title 52 Revised Code of Washington, has the authority to levy special taxes, and is governed by a three-member Board of Fire Commissioners (Quilcene Fire Rescue 2023). This Board of Fire Commissioners governs the operations of the district by determining levels of service, funding, goals, and strategic planning. In addition, they also establish policies, employ personnel, and represent the district to the public. The district is comprised of full-time staff and volunteers that support firefighting and emergency medical response capabilities.

Brinnon Fire Department

The Brinnon Fire Rescue Department (Jefferson County Fire Department No. 4) is a community-based organization founded in 1959 that employs both full-time fire staff and a dedicated team of volunteers to offer 24/7 support for the surrounding communities (Brinnon Fire Rescue 2023). The department protects approximately 132 square miles in the county, which contains the Olympic National Forest, U.S. Forest lands and lands managed by WA DNR, and the town of Brinnon between Olympia and Port Angeles (Jefferson County DEM 2018). The department encourages volunteers to apply to support the many stations within the district as the population surrounding Brinnon and the district’s covered area increases (Jefferson County DEM 2018).

Discovery Bay Volunteer Fire and Rescue

Discovery Bay Volunteer Fire and Rescue is “committed to training to the highest of standards so that we are always prepared to best serve our community in emergency response situations” (Discovery Bay Volunteer Fire and Rescue 2023). The department was founded in 1969 and serves Discovery Bay, Eaglemount, Crocker Lake, and surrounding areas of the Jefferson County Fire District No. 5.

The department is dedicated to fire suppression, emergency medical treatment, automobile accident response, wildland fire suppression, safety education, and residential fire inspection for 500 full-time residents and 500 temporary residents (Jefferson County DEM 2018). The department staffs a volunteer fire chief, lieutenant, firefighters, emergency medical technicians, engineers, and scene support to serve the 75 square miles within the district (Discovery Bay Volunteer Fire and Rescue 2023).

Clallam County Fire District No. 1

Clallam County Fire District No. 1 (CCFPD1) is headquartered in Forks, Washington, and serves the city of Forks and the unincorporated communities surrounding the town. A portion of the district is in the western part of Jefferson County, surrounding the northernmost portion of U.S. Highway 101. CCFPD1 is an all-hazards fire department that responds to wildfire, structure fires, hazardous materials incidents, motor vehicle collisions, and freshwater emergencies (via a swift water rescue team). The fire district also has formal mutual aid agreements with neighboring districts and responds to 200 to 1,500 calls each year (CCFPD1 2023). The department has one fire station in Forks and a second station in Beaver, Washington. Staff include 18 volunteer firefighters, 13 volunteer swift water rescue technicians, and eight recruits serving 6,453 residents (CCFPD1 2023).

Clallam County Fire District No. 3

Clallam County Fire District No. 3 (CCFPD3) is “dedicated to excellence in serving, educating, and protecting our community through emergency medical services, fire suppression, and public education” (CCFPD3 2024). The district serves 142 square miles along a 24-mile stretch of U.S. Highway 101, just east of the Clallam County line into what was formerly a portion of Jefferson County Fire District 5. The district serves a wide variety of lands, including USFS and NPS lands in the area, farms, residential communities and housing developments, and industrial/commercial districts. The fire district also has mutual aid agreements with nearby districts, including the Clallam County Fire District No. 2.

“Adding a fire station near the Hoh reservation would greatly improve response on that side of the county. Having more centralized response in the western part of the county would help a lot.” – Deputy Hoagland

2.5.1.3 Private Landowner Response

A large portion of the county is privately owned and managed, including land held by timber companies. Many of these companies have response resources intended to address fires on operational lands. Rayonier owns multiple water tenders that it strategically positions on lands being actively harvested and has indicated willingness to coordinate the use of this equipment during wildfire events. In discussions with a representative from Rayonier, it was also noted that contractors have a variety of heavy equipment that may be useful during a fire (personal communication, Kate McLean, Rayonier, 2023).

2.5.2 STATE RESPONSE

2.5.2.1 Washington State Department of Natural Resources

Wildfire management in the state of Washington falls under the responsibility of the WA DNR. The WA DNR wildfire fighting force has access to over 1,300 trained employees ready to combat fires when necessary. This workforce comprises over 800 permanent employees and 550 seasonal employees. WA DNR's firefighting resources include approximately 120 wildland fire engines, nine helicopters, and six single-engine air tankers, all of which are contracted and available for WA DNR's firefighting efforts (WA DNR 2023b). They combat fires across more than 13 million acres of private and state-owned forest lands. WA DNR sets fire protection and safety equipment standards to support local fire districts in responding to wildfires. Additionally, they collaborate with local fire departments as well as the National Weather Service to provide fire weather forecasts and precaution levels. WA DNR employs various resources, including hand crews, engines, dozers, water tenders, helicopters, and planes, to extinguish wildfires and also engage with external entities to provide equipment and services for fire suppression (WA DNR 2023c).

Management responsibilities for the state of Washington are divided amongst six upland regional offices; Jefferson County falls within the Olympic District. The Olympic District comprises diverse landscapes, including Pacific Ocean beaches and rainforest valleys. The district encompasses 371,000 acres of state forest, agriculture, urban, and conservation lands, including the Olympic Experimental State Forest. In these lands, WA DNR focuses on sustainable timber harvesting practices that consider the needs of wildlife. The district's staff also manage forest practices, oversee wildfire prevention, and lead firefighting efforts on both state and private forest lands in the region (WA DNR 2023d).

The primary office for WA DNR is located in Forks, which provides foundational resources for wildland fire response in the western portion of the county. In addition, WA DNR has smaller offices in Chimacum and Port Angeles. The Chimacum station is seasonally staffed from May to September and includes one engine, and the Port Angeles station has a limited full-time staff that is supplemented during fire season. The Port Angeles station has two engines at its disposal. In the event of a large fire incident, dispatch is coordinated with other regional offices such as the Forks station to provide additional response resources (personal communications, WA DNR Olympic Region Office March 2024).

The WA DNR provides live updates on wildfires for the Olympic region and other areas throughout the State on their website: <https://www.dnr.wa.gov/Wildfires>

2.5.3 FEDERAL RESPONSE

2.5.3.1 Bureau of Indian Affairs

The BIA plays a critical role in providing wildland fire response on tribal lands through supporting local agency development, supplying equipment, and providing interagency coordination. The Division of Wildland Fire Management remains and sponsors personnel to meet interagency standards and qualifications. Additionally, the agency has seven interagency hotshot crews for firefighting. The BIA maintains a fleet of over 240 wildland fire engines and 12 aircraft to effectively respond to wildland fire and various all-risk situations across Native American communities nationally (BIA 2023).

Hoh Indian Tribe

Located 28 miles south of Forks in Jefferson County, the Hoh Indian Reservation is situated approximately 1 mile east from the mouth of the Hoh River to Ruby Beach. The tribe has acquired over 700 acres of new land, located east and adjacent to their original reservation along Lower Hoh Road and U.S. Highway 101. The Hoh Tribe currently consists of 30 homes, accommodating 120 residents, and in total there are 270 tribal members. The original reservation and western parts of the new trust lands are at low elevations near the Hoh River and the Pacific Ocean, though there are plans to relocate to an 80-acre parcel known as the Hoh Highlands, with approximately 45.3 acres south of Highway 101 (Hoh Indian Tribe 2022). Due to the looming threat of a tsunami, the entire community is in the process of relocating to higher ground within the next 6 to 7 years.

The Hoh Indian Tribe does not have a fire station, leading them to depend on neighboring communities for fire response services. Unfortunately, communication with the nearest emergency response is inadequate due to their remote location. Fire incident response takes a minimum of 45 minutes to reach the Hoh Tribe's reservation, magnifying the tribe's risk to wildfire impact under conditions conducive to rapid fire spread (e.g., high wind, drought, extreme heat). Recently, they experienced a fire incident where they had to allow the structure to burn due to these communication challenges and insufficient local suppression resources to fight the fire. The severity of a wildfire for the Hoh Tribe depends on existing conditions and the availability of fire resources at the time of the incident (Hoh Indian Tribe 2022). A recently constructed fire station will now serve the Hoh Highlands, providing additional fire response capacity to meet the needs of the community.

The community is extremely isolated with only one way in and out of the existing location, however, upon relocating to the new community site, ingress and egress should be improved. The new site also includes an existing facility for housing fire and other emergency management equipment and apparatus to improve the self-sufficiency of the tribe and allow for more immediate fire suppression.

Quinault Indian Tribe

The Quinault Indian Nation (QIN) comprises the Quinault and Queets Tribes, along with descendants of five other coastal tribes. Guided by bylaws dating back to 1922 and a constitution from 1975, the QIN places great importance on self-governance and the management of their own affairs. The Quinault Indian Reservation features rich forests, water bodies, and Pacific coastline. The Reservation supports both cultural preservation and economic growth, hosting socioeconomic values such as the Quinault Pride Seafood and the Quinault Beach Resort. With a strategic plan emphasizing unity and resilience, the QIN remains determined to overcome challenges and build a promising future (QIN 2023a).

Emergency fire response within the reservation faces challenges due to the tribe's limited size, potential access issues, and roadways often affected by water inundation or other natural impacts. The QIN is exploring the possibility of establishing additional tribal fire departments to address these issues as they anticipate future growth (QIN n.d.). In compliance with the Disaster Mitigation Act of 2000, the QIN is actively updating its 2017 HMP to enhance resilience throughout its territory (QIN 2023b). The tribe is also planning to relocate to a higher elevation.

2.5.3.2 U.S. Forest Service

Olympic National Forest

The Olympic National Forest is located in the northwestern part of Washington State on the Olympic Peninsula, a distinct geographic region surrounded by saltwater on three sides. U.S. Highway 101 runs along the west coast, the Strait of Juan de Fuca to the north, and Hood Canal and Puget Sound to the east. This 6,500-square-mile area features complex terrain with winding ridges, steep mountains, canyons, and dense forests (USFS 2024).

The wildfire response strategy in the Olympic National Forest emphasizes cost-effectiveness and alignment with land and resource management goals. An "Escaped Fire Situation Analysis" is conducted for wildfires that exceed established limits, weighing suppression costs against potential resource impacts. Priorities for protection include life and property, soil productivity, endangered species habitat, fish and wildlife habitat, timber investments, and air quality. For moderate to high-intensity wildfires, the strategy is control and contain, with an emphasis on minimizing visual and environmental impacts. Fuels management and prescribed fire are employed to meet management objectives and reduce fire hazards, with a focus on air quality maintenance. Resource Advisors provide guidance on reducing equipment-related impacts and rehabilitating affected areas (USFS 2024).

2.5.3.3 National Park Service

Olympic National Park

Located in the center of the Washington State's Olympic Peninsula, Olympic National Park is characterized by its exceptional natural diversity, covering 922,651 acres of three distinct ecosystems, including glacier-capped mountains, extensive Pacific coastline, and ancient temperate rainforests (NPS 2008). The park's extensive river systems are home to numerous native freshwater fish species and Pacific salmon, including the federally threatened bull trout. The park also provides habitat for over 1,100 native plant species, 300 bird species, 70 mammal species, and 24 endemic species found only within the park. Numerous federally listed species can also be found within the park. With boundaries spanning rugged, mountainous terrain into the Pacific Ocean, Olympic National Park is home to coastal environments, intertidal areas, valleys, and mountain peaks (NPS 2008).

The management goals and strategies for the park have been defined in the Olympic National Park General Management Plan. The plan outlines a 15- to 20-year vision focused on preserving natural and cultural resources and enhancing visitor experiences. Among the numerous key elements touched on within the plan is fire management (NPS 2008). The park's fire management approach aims to restore and maintain natural fire patterns while making necessary modifications for compliance with regulations, protection of wildlife and cultural resources, and human safety. Land managers within the park aim to use advanced technology and ongoing monitoring to enhance their fire management program, with a focus on reducing hazardous fuels near structures and cultural sites (NPS 2008).

2.5.3.4 U.S. Fish and Wildlife Service

The USFWS has three primary areas of focus regarding fire management strategies, including fuels management, wildfire management, and wildfire prevention. The USFWS aims to carry out fire management and land improvements in a safe and cost-effective manner to benefit both people and the landscapes. This will be achieved through the prioritization of fuel management programs such as

prescribed burns, fuel treatment projects, maintaining previous projects, leveraging funding, and promoting safety and security (USFWS 2023a).

Washington Maritime National Wildlife Refuge Complex

Washington Maritime National Wildlife Refuge Complex is an administrative grouping of multiple National Wildlife Refuges in the State of Washington. Two refuges, the Quillayute Needles Wildlife Refuge and Protection Island, are located in Jefferson County. Quillayute Needles Wildlife Refuge is a remote and rugged area that is home to a diverse range of seabirds, including tufted puffins, common murres, and black oystercatchers. In addition to its bird populations, the refuge provides critical habitat for marine mammals like sea otters, harbor seals, and California sea lions (USFWS 2023b). Protection Island National Wildlife Refuge also houses seabirds and marine mammals, including nesting bald eagles, tufted puffins, glaucous-winged gulls, and northern elephant seals. The island serves as a critical breeding site for these species and has recovered from past damage, now thriving with wildlife (USFWS 2023b).

Wildfire response for these coastal refuges is tailored to the unique challenges of their island settings (USFWS 2007). Given the remoteness and inaccessibility of the islands, initial attack actions may be limited. As a result, strategies such as monitoring from a distance or on-site, as well as confinement, may be employed. Suppression tactics and the use of certain equipment are carefully approved to minimize damage to the natural habitats and resources of the refuges, with consultation involving Resource Advisors and Agency Administrators. All fire response actions within the refuges consider factors like firefighter and public safety, resource management objectives, weather, fuel conditions, and the potential cost of these actions. The Olympic National Park has entered into an agreement with Quillayute Needles Wildlife Refuge, offering wildfire suppression assistance on refuge lands when resources permit (USFWS 2007).

2.5.4 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 resources to respond to an incident as quickly as possible regardless of jurisdiction. Such agreements may also describe how reimbursement will be conducted; state resources responding to wildfires on federal land may have their associated costs reimbursed by the responsible federal agency, and the reverse is true for federal resources suppressing a wildfire on state land.

In Washington state, mutual aid agreements are highly encouraged by the legislature to ensure public safety, health, and the protection of people's lives and property. There are two types of mutual aid agreements: Emergency Proclamation Mutual Aid, activated during a state of emergency declared by the governor, and Local Agency Mutual Aid, used in the absence of such a proclamation. Both agreements involve tribes and have cost recovery provisions (Washington State Department of Transportation [WSDOT] 2023).

Mutual aid facilitates the mobilization of various resources, including fire services, transportation, and emergency management, across the state. The Washington state fire services mobilization plan outlines the framework for large-scale resource mobilization and grants the chief of the Washington state patrol the authority to implement this plan. The chief can activate fire resources under specific conditions, such as when the local mutual aid network is exhausted; there's a threat to life, property, or natural resources; local resources are insufficient; and the fire has significant statewide or even international implications (Washington State Fire Marshal's Office 2023).

Jefferson County has multiple mutual aid agreements in place to ensure a robust response is on hand in any situation, and East Jefferson Fire Response has agreements with Kitsap and Clallam Counties and Quilcene Fire Rescue. Quilcene Fire Rescue maintains agreements with Kitsap and Clallam Counties, as well as a forest land agreement with WA DNR. The Brinnon Fire Department has mutual aid agreements with Mason, Kitsap, and Clallam Counties. Fire response in the region is coordinated through the Northwest Interagency Coordination Center which monitors fire activity and dispatches response resources across the state. The center is responsible for allocating federal hotshot crew and aviation resources to fires on federal and state lands in Jefferson County. Additionally, WA DNR maintains a regional dispatch for the Olympic Peninsula based out of Forks. WA DNR is responsible for wildfire mitigation efforts and incident response on state- and privately owned lands. Many timber companies additionally maintain some degree of response resources for addressing incidents on their land. Generally, these companies are willing to provide these resources to neighboring lands if it will aid in a strategic response, especially if the fire has spread from their privately owned lands.

2.5.5 EMERGENCY NOTIFICATIONS AND EVACUATION

The safe and efficient evacuation from wildfire involves several factors, including:

- **Public Alert and Warning:** Jefferson County DEM (2023) has implemented a countywide notification system in cooperation with its municipalities. The Jefferson County Emergency Notification System allows residents to register phone numbers and emails to receive alerts. This allows county and municipal emergency agencies to rapidly communicate information regarding severe weather and disasters, evacuation notices, road closures, and any other relevant emergency information (Jefferson County DEM 2023). Because a portion of the local population lacks access to cell phones, the county is exploring alternative communication methods, such as ham radio, to ensure effective outreach and information dissemination. Other pathways for informing the community during an emergency are the local radio stations, WSDOT email alerts, social media, etc. (Jefferson County DEM 2023).
- **Public Awareness:** Through public outreach and education, agencies should encourage the community to sign up for emergency notifications, know their emergency evacuation zone, and plan for emergencies.

2.5.5.1 Evacuation Resources

The Jefferson County comprehensive plan discusses the importance of evaluation of existing subdivisions for evacuation routes and future planning needs, particularly in wildfire-prone areas, and emphasizes collaboration with the Jefferson County DEM to prioritize roadway improvements. Additionally, the plan calls for evaluations of how new developments may impact emergency response (Jefferson County 2023a).

Housed within the annexes of the Jefferson County – City of Port Townsend All Hazard Mitigation Plan is the Jefferson County Evacuation Plan, outlining the scope and purpose of evacuation procedures within the County. The plan defines the authorities, emphasizing that an evacuation order serves as a formal notice for their protection. Law enforcement and incident command agencies are responsible for implementing and coordinating evacuation, with a focus on minimizing risk, protecting lives, and communicating warnings effectively. The plan also addresses various evacuation levels, warning methods, destination points, transportation considerations, and re-entry planning levels. Additionally,

it emphasizes the importance of assisting vulnerable populations and ensuring the safety of emergency responders during evacuation (Jefferson County DEM 2016).

The Jefferson County DEM website provides information and resources related to evacuation and emergency response in the Jefferson County area of Washington. The website outlines the department's primary objectives, such as public education, coordination, field operations, and activation of the Emergency Operations Center during emergencies (Jefferson County 2023a). Included on the website is a Wildland-Interface Fire Evacuation Plan pamphlet, providing essential homeowner guidelines for mitigative actions and evacuation preparedness for wildfire incidents (Jefferson County 2023a).

The Jefferson County DEM website can be accessed here: <https://www.co.jefferson.wa.us/950/Dept-of-Emergency-Management>

While the fire department plays a vital role in managing and responding to fires, it is not the role of the fire chief nor other fire department staff to personally guide neighborhood evacuations. Residents are encouraged to stay informed on local evacuation protocols, practicing individual preparedness and timely response in the event of an evacuation. These actions significantly contribute to community safety.

For more information, see Appendix K, Evacuation Recommendations. Jefferson County worked with Ladris to run simulations of wildfire evacuation scenarios to plan for emergency management and promote community awareness.

2.5.5.2 Emergency Notification

The Jefferson County DEM webpage hosts a tab dedicated to emergency alerts and warnings for disasters or other incidents requiring public notification. Through this website, residents are encouraged to stay informed and prepared for emergency conditions through various resources. Requiring no sign-up and broadcasting alerts through a variety of channels, the Emergency Alert System (EAS) serves as a national warning system that provides alerts for local weather emergencies. Residents are encouraged to sign up to receive emergency alerts via text, voice message, and email from the Jefferson County DEM, which can be done on the "Alerts & Warnings" tab of the Jefferson County DEM webpage. Local radio stations like KPTZ 91.9 FM, KROH 91.1 FM, and KIRO 97.3 FM play a vital role in communication efforts and can be useful tools for residents responding to emergency events. Additionally, WSDOT offers specialized email alerts on traffic conditions, mountain pass reports, and construction updates by region to keep residents informed about transportation-related emergencies.

Please visit the following webpage to sign up for Jefferson County Emergency Alerts and learn more about alerts within the county: <https://www.co.jefferson.wa.us/1066/Alerts-Warnings>

2.5.5.3 Animals and Livestock

In the event of a wildfire, it is important that residents, fire responders, and Jefferson County DEM have a plan for evacuation of pets and livestock. While creating evacuation plans, residents should take into consideration the time needed to load livestock into stock vehicles and evacuate during a wildfire incident. A local livestock animal team composed of volunteers assists with livestock evacuation in the areas, conducting simulated exercises to ensure proper execution and animal safety in the event of a disaster (personal communication, Fire Chief Tim Manly, 2023).

There is also a need to pre-identify where animals can be taken for large animal shelter. Similarly, locations where small animals such as dogs and cats are picked up in the fire area should be pre-identified, as well as the lead agencies coordinating this work.

Washington State Department of Natural Resources Emergency Preparedness: Pets

The WA DNR's guidance for pet owners in disaster preparedness is designed to protect the lives of pets and enhance the safety of disaster response efforts. Before a disaster has taken place, WA DNR recommends that homeowners carry out the following actions (WA DNR 2023e):

- Ensure your pets have proper identification (microchip if possible).
- Identify safe places to take your pets, such as pet-friendly hotels or the homes of friends or relatives outside the area.
- Create a pet emergency kit with food, water, medications, and veterinary records.
- Make plans with a trusted person to evacuate your pets or set them up with necessary supplies if you are not home during a disaster.
- Identify safe locations within your house for your pets in case of an emergency is advised.

During disasters pet owners are advised to evacuate with their animals whenever possible to ensure their well-being. It is crucial to check for wild animals around your property as disasters can disorient them, potentially causing them to seek refuge nearby. Additionally, the WA DNR recommends separating animals as one distraught pet's behavior during disasters can cause usually relaxed pets to become agitated (WA DNR 2023e).

After a disaster, the WA DNR recommends keeping pets close and secured when evacuating, as they may become anxious. Upon returning home, it is recommended that pet owners help their pets adjust to a normal routine, preparing for potential behavioral issues stemming from the stress of the disaster and consulting a veterinarian if the issue persists (WA DNR 2023e).

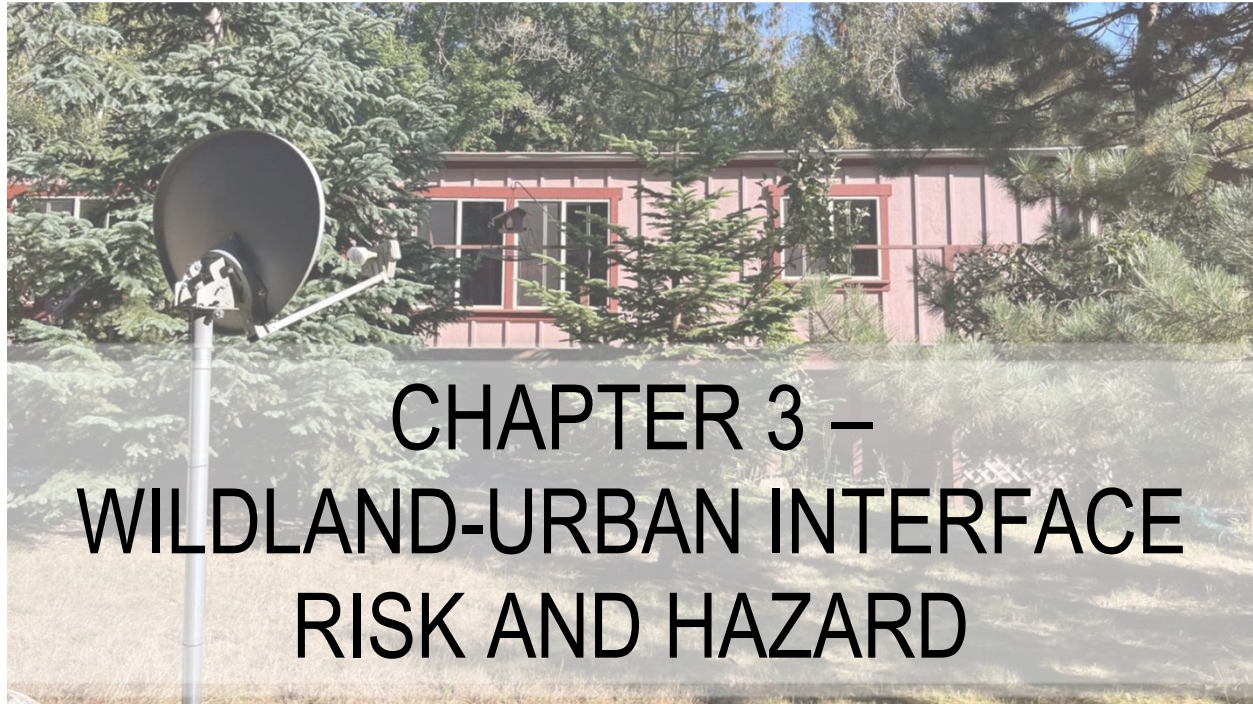
2.5.6 WATER AVAILABILITY AND SUPPLY

In Jefferson County, water availability and supply for wildfire management are primarily managed through a combination of public and private water distribution systems. These water systems have emergency plans and procedures in place for responding to emergencies and are coordinated with broader emergency response plans (Jefferson County DEM 2016). The goals and policies related to water resources within the Jefferson County comprehensive plan aim to ensure a sustainable and safe water supply while protecting the quality and quantity of surface, ground, and marine water resources (Jefferson County DEM 2018). Jefferson County Public Utility District follows Jefferson County Ordinance No. 134, which dictates the location and placement of fire hydrants. Additionally, they ensure that fire hydrant installations and flow requirements adhere to the specifications and standards outlined in the same ordinance's current revision. This approach ensures that fire hydrants are strategically located and meet the necessary standards to support firefighting efforts effectively within the jurisdiction (Jefferson County Public Utility District 2023). The majority of communities within Jefferson County are equipped with fire hydrants that meet county codes (personal communication, Fire Chief Tim Manly, 2023). Examples of additional water supply sources in Jefferson County include boating docks along with water from the ocean and nearby ponds.

Increasing human demand for groundwater, particularly during severe droughts, can lead to declining groundwater levels in certain areas, affecting water availability and the health of vegetation. The past practice of straightening rivers and streams has caused channels to incise and function as a drainage ditches, thereby reducing the groundwater in some areas. Groundwater levels may be enhanced by

implementing restoration actions to restore the “large wood cycle” and by re-introducing beavers where feasible, especially on public lands (Collins et al. 2012). Under extreme drought conditions, drained and desiccated peat or muck soils could become flammable. Once ignited, such fires are often very difficult to extinguish (Watts and Kobziar 2013).

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Disclaimer

The purpose of the risk assessment process described herein is solely to provide a community and landscape-level overview of general wildfire risks within County as of the date hereof, and to provide a potential resource for community pre-fire planning. This risk assessment process is premised on various assumptions and models which include and are based upon data, software tools, and other information provided by third parties (collectively, “Third-Party Information and Tools”). SWCA, Incorporated, doing business as SWCA Environmental Consultants (“SWCA”) relied on various Third-Party Information and Tools in the preparation of this plan, and SWCA shall have no liability to any party in connection with this plan including, without limitation, as a result of incomplete or inaccurate Third-Party Information and Tools used in the preparation hereof. SWCA hereby expressly disclaims any responsibility for the accuracy or reliability of the Third-Party Information and Tools relied upon by SWCA in preparing this plan. SWCA shall have no liability for any damage, loss (including loss of life), injury, property damage, or other damages whatsoever arising from or in connection with the risk assessment products contained herein, including any person’s use or reliance on the information contained in those risk assessment products. Any reproduction or dissemination of the risk assessment products or any portion hereof shall include the entirety of this plan disclaimer.

3.1 PURPOSE

CWPPs utilize wildfire risk and hazard analysis in order to guide wildfire mitigation efforts in the WUI and vulnerable landscapes. Although many definitions exist for hazard and risk, for the purpose of this document these definitions follow those used by the firefighting community:

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).

Fire Hazard is defined as the potential fire behavior or fire intensity in an area, given the type(s) of fuel present – including both the natural and built environment – and their combustibility (NWCG 1998).

The Jefferson County CWPP utilizes two separate methodologies for determining risk and hazard: field assessments that consider structural ignitability at a community scale (Section 3.2) and desktop modeling that integrates fire behavior analysis at a broader landscape scale based on wildland fuels (Section 3.3). The field assessments (see Appendix C), using NFPA Structure Ignition Form 1144, evaluate structural hazards on a community scale through direct observation by trained personnel, resulting in an overall community risk rating. In contrast, the desktop analysis results in a Composite Risk-Hazard Model which illustrates potential wildfire behavior in wildland fuels on a countywide scale using established fire behavior models and GIS tools, relying on national data sources like LANDFIRE. These two methods inform development of the CWPP at differing scales, but are separate from each other.

Using these methods, land 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 inform them about methods for reducing the damaging impacts 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.

The Jefferson County – City of Port Townsend All Hazard Mitigation Plan recognizes wildfire occurrence as an annual threat, exacerbated by heavy fuel loads, highly susceptible topography, and critical weather conditions (Jefferson County DEM 2016).

3.2 FIELD ASSESSMENTS

Field assessments were conducted using the NFPA Wildland Fire Risk and Hazard Severity Form 1144 (see Appendix C). The NFPA standard focuses on individual structure hazards and requires a spatial approach to assessing and mitigating wildfire hazards around existing structures.

The purpose of the field assessments and subsequent ratings is to identify fire hazards and risks at a community scale and prioritize areas requiring mitigation and more detailed planning. Each community was rated based on conditions within the community and immediately surrounding structures, including access, vegetation (fuels), defensible space, topography, roof and building characteristics, available fire protection, and placement of utilities. Each score was given a corresponding rating of low, moderate, high, or extreme, as described in Appendix C.

It is important to note that the WA-WUI map does not contribute to the field assessment process or community ratings described in Appendix C in any way. The WA-WUI map was developed at a state scale using different assessment parameters.

Field assessments for Jefferson County were conducted in September 2023. The full community-at-risk hazard ratings from the field assessments are provided in Appendix C.

3.3 COMPOSITE RISK-HAZARD MODEL INPUTS

3.3.1 FIRE BEHAVIOR MODELING APPROACH

The wildfire 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.

There are three primary modes of fire spread: surface fire spread (e.g., grasses and shrubs), crown fire (e.g., ladder fuels), and spotting (embers) (Figure 3.1). Surface fire spread occurs at ground level, crown fire spreads through the upper forest canopy, and spotting involves the transportation of embers ahead of the main fire.

For this plan, an analysis 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 Desktop Spatial Analyst tools. Data used in the Composite Risk-Hazard Model is largely obtained from LANDFIRE.

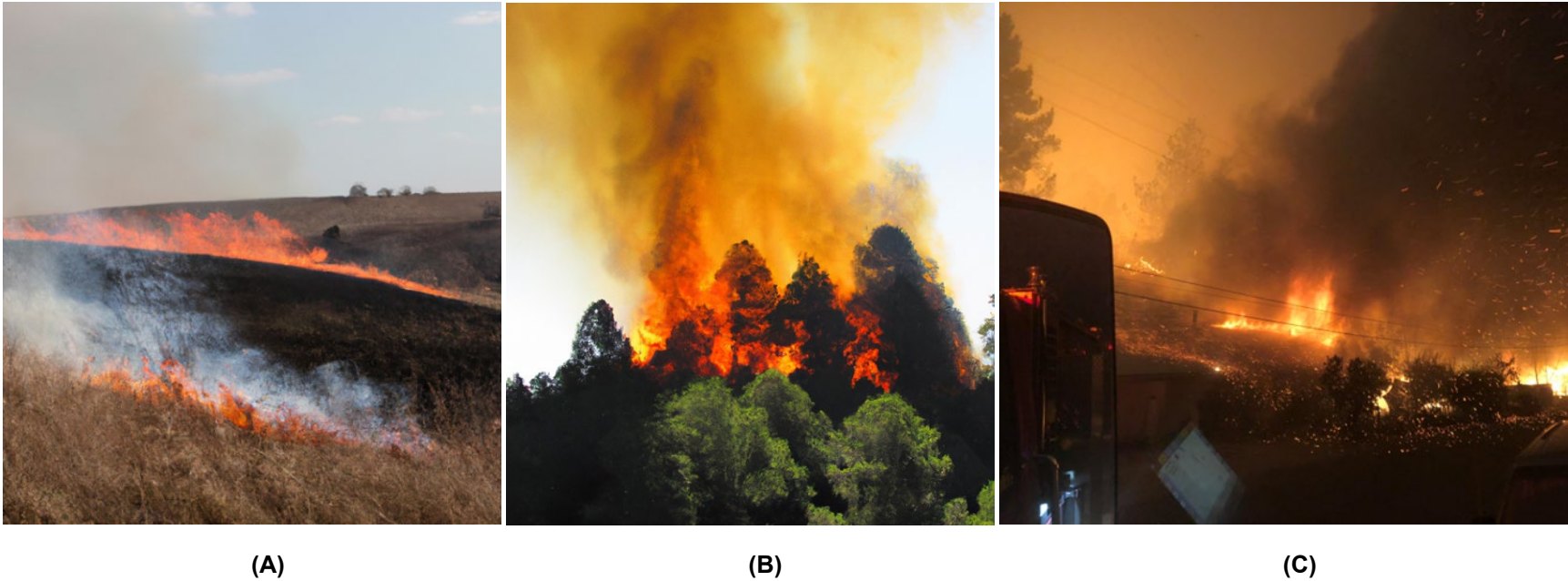


Figure 3.1. Three primary modes of wildfire spread: 1) fire spread along the surface (e.g., grasses, shrubs) (Image A), 2) fire spread through the tree canopy (e.g., ladder fuels) (Image B), and 3) spotting (embers) (Image C).

Images A and B were developed internally with the assistance of artificial intelligence.

Image C source: <https://www.nist.gov/feature-stories/piecing-together-timeline-californias-deadliest-wildfire>

3.3.2 FIRE BEHAVIOR MODELING PLATFORMS

3.3.2.1 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 U.S. Department of the Interior. More information can be obtained from <http://www.landfire.gov>.

3.3.2.2 FARSITE

FARSITE is a computer model based on Rothermel's spread equations (Rothermel 1983). 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. Information on fire behavior models can be obtained from <http://www.fire.org>.

3.3.2.3 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 Plan to predict fire behavior across the landscape under extreme (97% worst case) weather scenarios.

3.3.3 FIRE BEHAVIOR MODEL INPUTS

3.3.3.1 Fuels

The fuels in Jefferson County 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 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

Table 3.1 provides a description of each fuel type included in Jefferson County.

Figure B.1 in Appendix B illustrates the fuels classification throughout the county.

It is important to note that due to limitations of the fuel model classification system, areas that are under active timber management may be classified as non-burnable, which does not accurately reflect fire behavior known to occur in these fuel types. As a result, fire behavior modeling in these areas may underpredict the potential fire behavior parameters—flame length and rate of spread. The Advisory Group is aware of this limitation but accepts that these are the best available data at the time of writing. The Advisory Group has included recalibration of fuel models as a project for the next revision of the CWPP.

Table 3.1. Fuel Model Classification for the Jefferson County 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).
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).
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.	SH6: Dense shrubs, little to no herb fuels. Fuel bed depth about 2 feet. Spread rate high (20–50 chains/hour); flame length high (8–12 feet).
4.	Grass or shrubs mixed with litter from forest canopy (Timber-Understory)
i.	TU1: 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: Moderate litter load with shrub component. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
iii.	TU3: Moderate litter load with grass and shrub components. Spread rate high (20–50 chains/hour); flame length moderate (4–8 feet).
iv.	TU5: High load conifer litter with shrub understory. Spread rate moderate (5–20 chains/hour); flame length moderate (4–8 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 foot); fine fuel load (0.5 ton/acre).
iv.	TL4: Moderate load. Spread rate very slow (0–2 chains/hour); flame length low (1–4 foot).
v.	TL5: High load conifer litter. Spread rate slow (2–5 chains/hour); flame length low (1–4 foot).
vi.	TL6: Moderate load. Spread rate moderate (5–20 chains/hour); flame length low (1–4 foot).
vii.	TL7: Heavy load. Spread rate slow (2–5 chains/hour); flame length low (1–4 foot).
viii.	TL8: Long needle litter; long needle fuel. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).
ix.	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 wildfire under any condition (Non-burnable)

- i. **NB1:** Urban or suburban development; insufficient wildland fuel to carry wildfire.
- ii. **NB2:** Snow/ice.
- iii. **NB3:** Agricultural field, maintained in non-burnable condition.
- iv. **NB8:** Open water.
- v. **NB9:** Bare ground.

7. Activity fuel (slash) or debris from wind damage (blowdown) (Slash-Blowdown)

- i. **SB1:** Fine fuel load is 10 to 20 tons/acre, weighted toward fuels 1 to 3 inches diameter class, depth is less than 1 foot. Spread rate moderate (5–20 chains/hour); flame length low (1–4 feet).

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

3.3.3.2 Topography

Topography plays a vital role in shaping fire behavior as it encompasses several key factors.

The steepness of slopes significantly influences how a fire progresses, as steeper slopes can accelerate the spread of flames due to increased fuel availability and the potential for fire to travel uphill more rapidly.

The aspect, which refers to the direction a slope faces, also impacts fire behavior by influencing the amount of sunlight received and the moisture levels in the vegetation. Variations in elevation contribute to variations in temperature, which in turn affect fuel moisture content and atmospheric stability, further influencing fire behavior.

Additionally, landscape features such as canyons, ridges, and valleys can channel winds, potentially affecting fuels and intensifying fire behavior by directing flames and increasing the rate of fire spread. Understanding and considering these topographic factors are crucial for assessing fire risk, predicting fire behavior, and implementing effective wildfire management strategies.

Assets close to steep slopes and dense fuel loads have the highest risk of loss.

3.3.3.3 Weather

Of the three fire behavior components, weather is the most likely to fluctuate. As downslope winds from the Olympic Mountains and rising temperatures dry fuels in the spring and summer, conditions can deteriorate rapidly, creating an environment that is susceptible to wildfire. 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 high winds, 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, property, and the environment.

One of the critical inputs for FlamMap is the fuel moisture files. The initial run of the Composite Risk-Hazard Model utilized the IFTDSS Auto 97th modeling parameters, which integrate historic fire weather data from nearby remote automated weather (RAW) stations.

3.3.4 FIRE BEHAVIOR MODEL OUTPUTS

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

3.3.4.1 Flame Length

Figure B.2 in Appendix B illustrates the flame length classifications for Jefferson County. Flame lengths are determined by fuels, weather, and topography. Flame length is a particularly important component of the Risk-Hazard Model 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 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 county range from 0 to more than 25 feet. The highest flame lengths are associated with the timber fuels found in the higher elevations of the county.

It is important to note that due to limitations of the fuel model classification system, areas that are under active timber management may be classified as non-burnable, which does not accurately reflect fire behavior known to occur in these fuel types. As a result, fire behavior modeling in these areas may underpredict the potential fire behavior parameters—flame length and rate of spread. The Advisory Group is aware of this limitation but accepts that these are the best available data at the time of writing. The Advisory Group has included recalibration of fuel models as a project for the next revision of the CWPP.

3.3.4.2 Suppression Difficulty Index

Figure B.3 in Appendix B shows the level of difficulty in performing fire control work on the landscape. The index considers topography, fuels, expected fire behavior under severe fire weather conditions, firefighter line production rates in various fuel types, and accessibility (distance from roads/trails).

3.3.4.3 Slope and Rate of Spread

Figure B.4 in Appendix B illustrates the rate of spread classifications for the county.

The rate of spread, or the speed with which fire moves away from the point of origin, is influenced by the slope. Fire moves at a faster rate uphill than downhill, thus the steeper the slope the faster the rate of spread. Additionally, steep slopes bring the fuels above the fire closer to a growing fire, making them more susceptible to ignition. Another issue with steep slopes is the possibility of burning debris rolling down the hill and igniting fuel below the main fire. This is illustrated in Figure 3.2.

The rates of spread in the area range from 0 up to greater than 150 chains/hour (one chain is approximately 66 feet and is a common measure in wildland firefighting). Low rates of spread are associated with timber-dominated areas, while moderate and high rates of spread are associated with grass and shrub fuels and riparian vegetation.

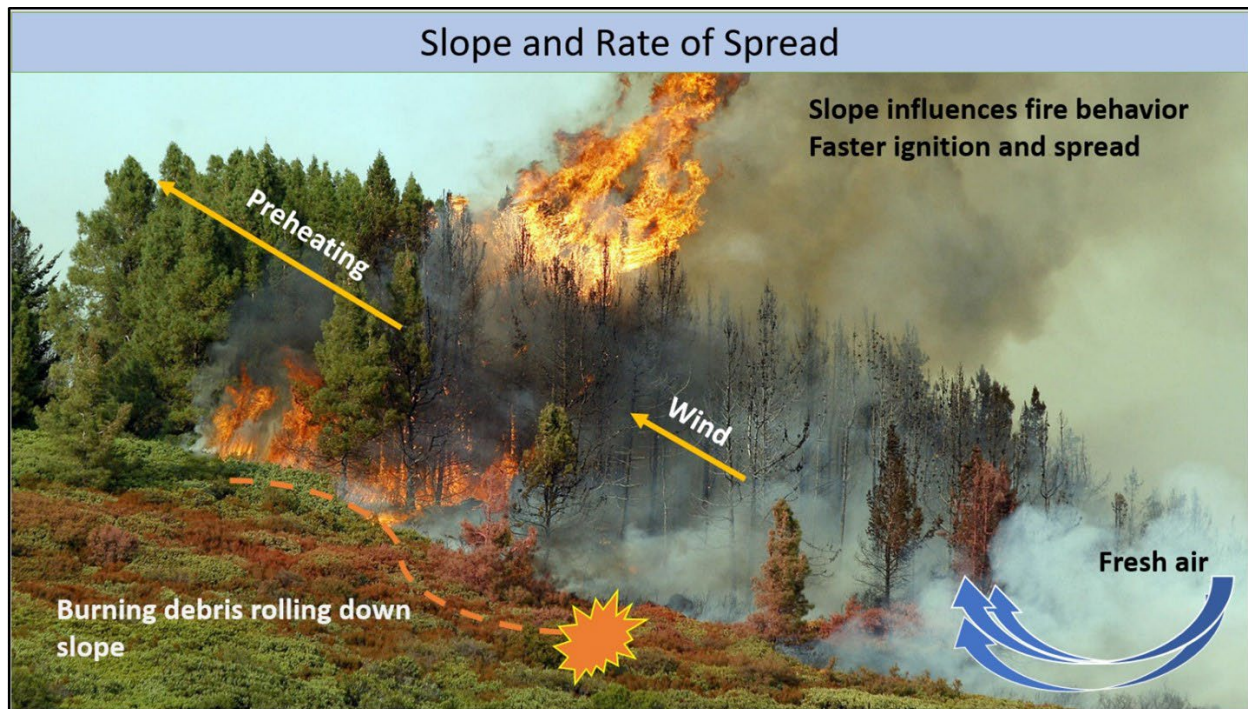


Figure 3.2. Demonstration of the effect of topography and wind patterns on fire behavior.

3.3.4.4 Crown Fire Potential

Figure B.5 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-dominated fuels).

3.3.4.5 Burn Probability

Figure B.6 in Appendix B shows the likelihood of a given location on the landscape burning. Burn probabilities consider the size and frequencies of fires that occur on a given landscape as well as the rate of spread and weather conditions.

3.3.4.6 Composite Risk-Hazard Modeling Process

Our Composite Risk-Hazard Model uses various inputs, which can be categorized into wildfire hazards and potential loss of valued assets. These inputs contribute to a raster data layer that assesses risk through weighting and summation. Hazard data sets consist of historical weather data, topography, vegetation, and fuel regimes. Threat data sets encompass ember exposure zones, burn probability, and fire history. Lastly, the values category includes data for the WUI, critical infrastructure, and natural, cultural, and socioeconomic assets.

Surface fires burn on the ground (in grasses, shrubs, small trees, etc.) and are more receptive to control through suppression efforts.

Crown fires spread through the canopy of trees and are extremely difficult to control.

Removing ladder fuels and reducing fuel loads before a fire ignites is the best way to lower the risk of crown fires.

SWCA utilized the IFTDSS application to generate a landscape file for the county, incorporating various LANDFIRE data sets (fuels, slope, elevation, and aspect) into a single layer (Figure 3.3). Advisory Group input was used to refine the fuels model, resulting in customized fire behavior outputs. Subsequently, in Esri ArcGIS Pro, SWCA combined the fire history, fire station, WUI, suppression difficulty, and highly valued resource and asset (HVRAs) data sets. Finally, to assess risk, a weighted sum raster process was conducted in ArcGIS Pro, assigning weights based on significance and Advisory Group input. All 10 inputs were given equal weight due to their potential impact to wildfire risk.

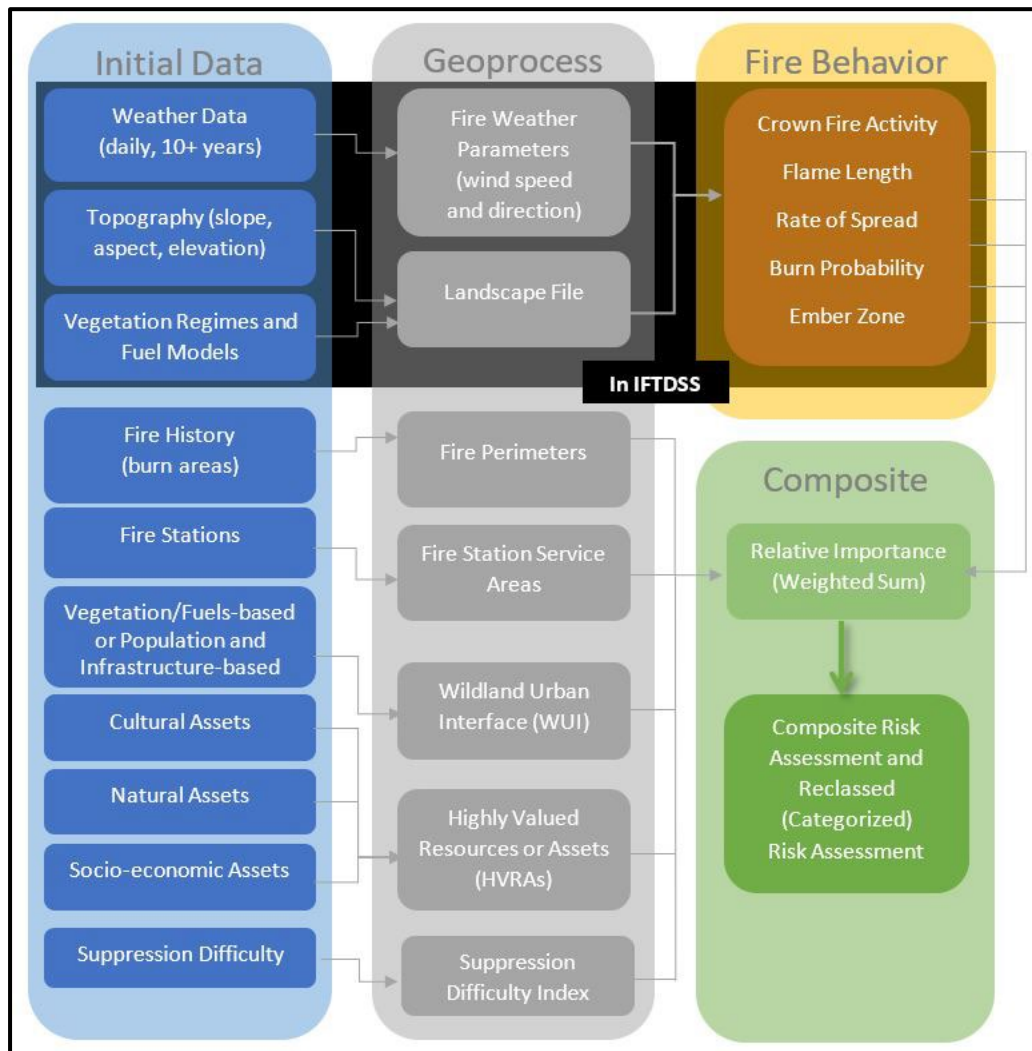


Figure 3.3. Composite Risk-Hazard Model breakdown.

The distance from the nearest fire station(s) to the community typically determines fire response times, and the level of suppression difficulty impacts effectiveness and feasibility of suppression efforts. The WUI and HVRAs designate areas that constitute life, property, and critical infrastructure. Lastly, fire occurrence, ember exposure, burn probability, and fire behavior characteristics (crown fire activity, flame length, and rate of spread) determine where a fire is likely to occur and the type, intensity, and speed at which the fire will spread.

It is important to note that information gathered during the field assessments is not used in the Composite Risk-Hazard Model. Only data gathered through the desktop analysis process is included.

3.4 COMPOSITE RISK-HAZARD MODEL RESULTS

Figure 3.4 illustrates the individual data sets and the relative weights assigned within the modeling framework. Table 3.2 shows the same data sets and weights but includes the data source. These include fire behavior parameters, HVRAs, WA-WUI, fire history, suppression difficulty index, burn probability, and distance from fire stations. Approximately 50 percent of the weight accounts for wildfire hazards and 50 percent accounts for resources and assets at risk, using HVRA and the WUI communities' data layers to indicate the location of community values exposed to wildfire. Without the inclusion of these resources and asset layers, the modeling approach would only yield wildfire hazard, not risk. Figure 3.5 is the Composite Risk-Hazard Model for Jefferson County and classifies the county into low, moderate, high, and extreme risk categories.

Overall, the Composite Risk-Hazard Model (see Figure 3.5) shows high and extreme risk areas along the eastern portion of the county, with extreme risk areas particularly concentrated along the Puget lowlands on the eastern coast in the communities of Port Townsend, Irondale, Port Hadlock, Chimacum, and Quilcene. Due to the resolution of the data used in the modeling process, the Composite Risk-Hazard Model is not designed to be used to determine risk to individual parcels.

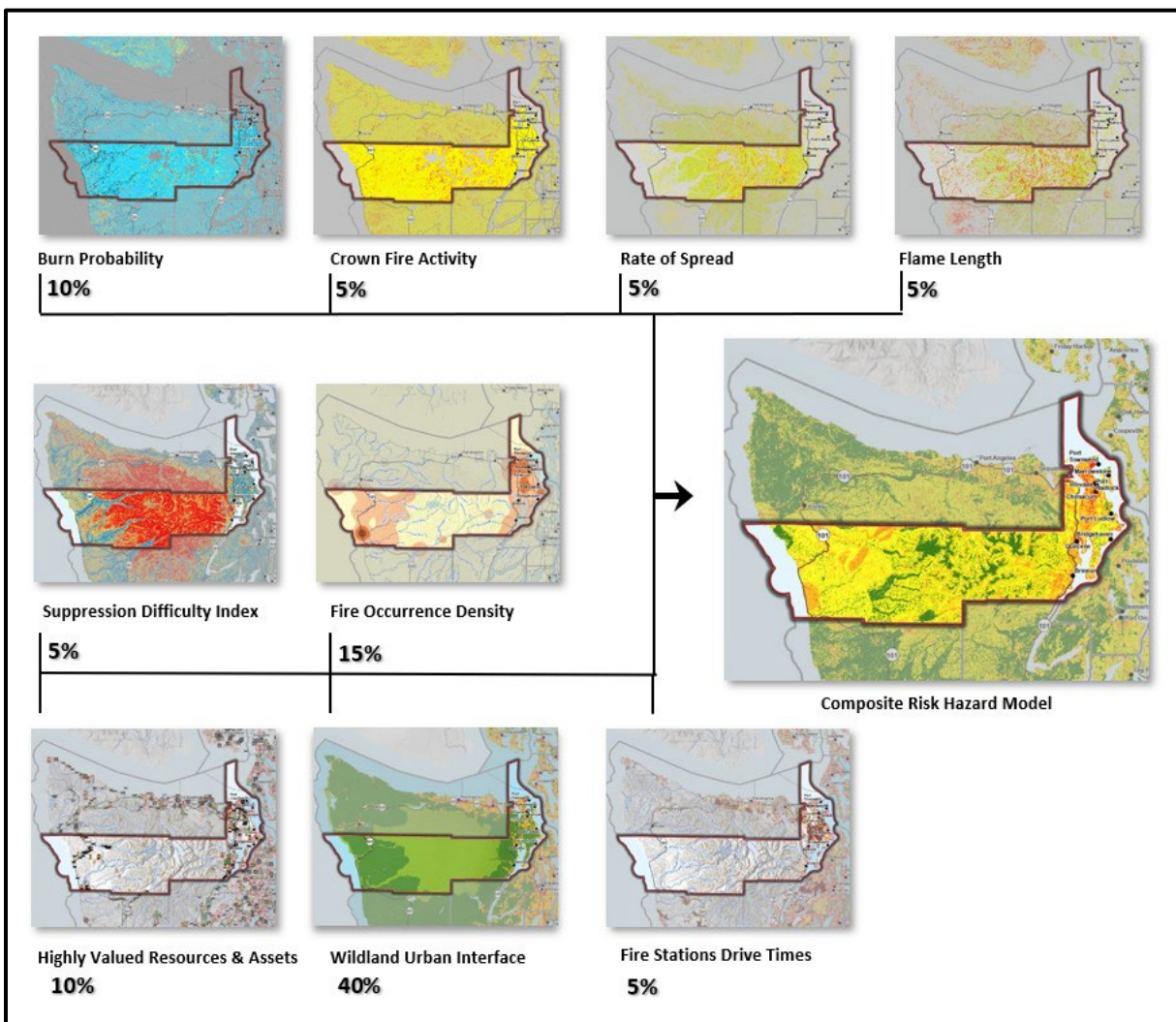


Figure 3.4. Composite Risk-Hazard Model overlay process.

Table 3.2. Composite Risk-Hazard Model Inputs, Sources, and Weights

Inputs	Source	Weight
WUI	WA DNR	40%
HVRAs	Jefferson County GIS and IFTDSS	10%
Burn probability	IFTDSS, LANDFIRE	10%
Flame length	IFTDSS, LANDFIRE	5%
Rate of spread	IFTDSS, LANDFIRE	5%
Crown fire activity	IFTDSS, LANDFIRE	5%
Fire station drive time*	Fire station data from fire protection districts/fire departments	5%
Suppression difficulty index	NIFC	5%
Fire occurrence density	IFTDSS, LANDFIRE, and SWCA	5%

Note: IFTDSS and LANDFIRE are federal databases for fire planning.

*Distance from fire stations was partitioned in 5-minute (rated 0), 10-minute (rated 1), 15-minute (rated 2), and >15-minute (rated 3) drive time intervals. SWCA used the Esri tool—generate service areas—and configured the analysis for access for emergency vehicles.

Washington Department of Natural Resources (WA DNR) Revising WA-WUI Layer

The WA DNR is in the process of revising the WA-WUI map, per Senate Bill 6120. This process is expected to be concluded in 2025. Information on the Bill can be found on the Washington State Legislature website: <https://search.leg.wa.gov/search.aspx#document>.

During the development of the Composite Risk-Hazard Model, stakeholders in the Advisory Group identified some limitations with the WA-WUI map developed by WA DNR. These limitations are being adjudicated through the SB 6120 process. However, at the time of development of the CWPP, the Advisory Group determined that the WA-WUI map is the best available data to inform the CWPP and therefore the current WA-WUI classification should continue to be used in this iteration of the plan. Upon conclusion of the SB 6120 process, and release of a revised WA-WUI map by WA DNR, the Advisory Group will evaluate the current Composite Risk-Hazard Model and will revise the model as needed.

It is important to note that the classification of WUI for any community is a complex process comprising many spatially derived data sets, each with inherent imperfections. However, the Advisory Group is unified in seeing the value of the current WA-WUI map as a tool for education and communication for this iteration of the CWPP planning process.

The CWPP is a live document and all data layers used in the development of the plan will be continually evaluated and updated as new and improved data becomes available.

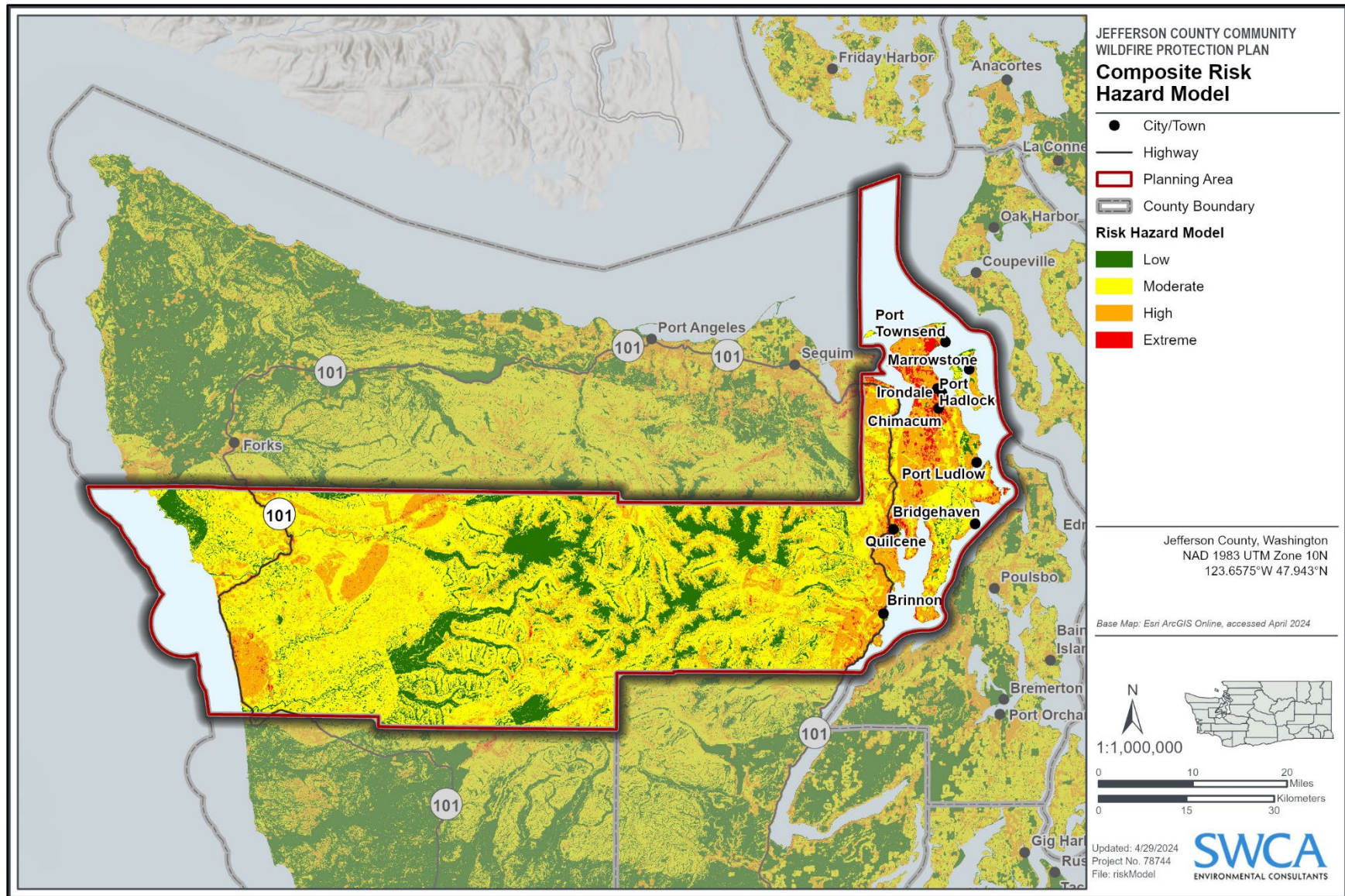


Figure 3.5. Composite Risk-Hazard Model for Jefferson County.

3.5 COMMUNITY VALUES

Earlier compilation of the critical infrastructure in the county, coupled with the community assessments, public outreach, and Advisory Group input, has helped in the development of a list of community values that may be exposed to wildfire. These data are also supplemented with HVRA data, which is a data set that is being gathered nationwide and available through the IFTDSS.

In addition to critical infrastructure, other community values exposed to wildfire can include natural, social, and cultural resources. It is important to note that although an identification of values potentially exposed to fire 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.

3.5.1 NATURAL VALUES

Jefferson County contains a wide variety of natural resources, including rare habitats and listed species (see Table 1.3 in Chapter 1); parks and open spaces owned by city, state, federal, and private entities; waterways; and other important natural areas and resources (Figure B.8 in Appendix B). A majority of the county is publicly owned, with 75% of land falling under the jurisdiction of the NPS, Washington State Parks, Department of Fish and Wildlife, WA DNR, and other public entities (Jefferson County Parks and Recreation 2022). Public outreach throughout the county has emphasized the importance of protecting natural/ecological values to the general public (Figure 3.6). The county manages a combined 1,151 acres of parks and open space. Examples of natural values and places identified by the public, Advisory Group, and previous planning efforts include the following:

- Local and regional parks
 - Indian Island County Park and Trail
 - Gibbs Lake County Park
 - Cape George Trailhead
 - Irondale Community Park
 - Chimacum County Park
 - H.J. Carroll County Park and Trail
 - Oak Bay County Park
 - Broad Spit County Park
- Jefferson Land Trust protected properties:
 - Chimacum Creek watershed
 - Chimacum Ridge Community Forest
 - Illahee Preserve
 - Quimper wildlife corridor
 - Duckabush Riparian Forest and Duckabush Oxbow and Wetland Preserve
 - Dabob Bay and Tarboo Valley
- Tamanowas Rock Sanctuary
- Outdoor recreation areas
 - Scenic viewsheds
 - Trail systems
 - Scenic rural areas
- Watershed Resource Inventory Areas
 - Quilcene – Snow Watershed
 - Skokomish – Dosewallips Watershed
 - Sol Duc – Hoh Watershed
 - Queets – Quinault Watershed
- Elwha-Dungeness Watershed
- NPS lands
 - Olympic National Park
- USFS lands
 - Buckhorn Wilderness
 - The Brothers Wilderness
 - Colonel Bob Wilderness
- Washington State Parks Lands
 - Anderson Lake State Park
 - Kinney Point State Park
 - Fort Flagler State Park
 - Fort Worden Historical State Park
 - Fort Townsend Historical State Park
 - Dosewallips State Park
 - Triton Cave State Park
 - Pleasant Harbor State Park
 - Triton Cove State Park
 - Mystery Bay State Park
- Washington Department of Fish and Wildlife–managed lands:
 - Chimacum Wildlife Area
 - Discovery Bay wildlife Area
 - Tarboo Wildlife Area
 - North Olympic Wildlife Area
 - Duckabush Wildlife Area
- Wildlife critical habitats
 - Bull trout
 - Chinook salmon
 - Steelhead

- Island marble butterfly
- Killer whale
- Marbled murrelet
- Northern spotted owl
- Taylor's checkerspot



Figure 3.6. Example of scenic viewsheds present within Jefferson County.

3.5.2 SOCIOECONOMIC VALUES

Socioeconomic values include population, recreation, infrastructure, commercial, and economic resources and the built environment (Figure B.9 in Appendix B). Large portions of communities in the county are located within the WUI. Examples include the following:

- Communications infrastructure (e.g., cell phone and radio towers)
- Tourism values (e.g., restaurants, recreational facilities)
- Schools
- Public safety infrastructure
- Highways
- Municipal infrastructure
- Industrial infrastructure
- Water treatment plants
- Commercial timber lands (Figure 3.7)
- Churches
- Care homes, senior housing, day care, and other group homes
- Water storage
- Recreation sites (e.g., golf courses, trails, parks)
- Agricultural land and food systems (local farms, fish and shellfish habitat)



Figure 3.7. Example of a socioeconomic value: timber industry lands. Wildfire impact could result in the loss of valuable timber resources and disrupt the supply chain.

Source: Rayonier (2023)

3.5.3 CULTURAL VALUES

Many historical landmarks are scattered throughout the county (Figure B.10 in Appendix B). Cultural values include buildings, sites, and districts that are part of the National Register of Historic Places, tribal lands, and other structures and places identified by the public and Advisory Group. Examples of cultural values that have been identified by the Advisory Group and the public in the planning area are the following:

- Čičmehán Trail
- Port Townsend Historic District
- Chimacum Dairy and Finnriver Orchard
- Duckabush River Bridge
- Fort Flagler
- Fort Worden
- Point Wilson Lighthouse
- Kuhn Spit Archeological Site
- Jefferson County Courthouse
- Enchanted Valley Chalet (Figure 3.8)
- Tamanowas Rock Sanctuary



Figure 3.8. An example of a cultural value, the National Register of Historic Places—listed Enchanted Valley Chalet.

Source: National Register of Historic Places (2023)



CHAPTER 4 – MITIGATION STRATEGIES

The Plan recommendations have been structured around the three main goals of the Cohesive Strategy: restoring and maintaining landscapes, fire-adapted communities, and wildfire response. Many of the recommendations listed can be implemented at the homeowner or community level. Projects requiring large-scale support can be further prioritized based on the Composite Risk-Hazard Assessment.

Recommendations in this chapter have also been aligned with the strategies in the 2016 Jefferson County – City of Port Townsend All Hazard Mitigation Plan (Jefferson County DEM 2016) wherever possible.

4.1 GOAL 1: RESTORE AND MAINTAIN LANDSCAPES

Efforts to restore and maintain landscapes should focus on vegetation management and hazardous fuel reduction.



Jefferson County is largely composed of public lands managed by federal and state agencies including the USFS, NPS, Washington State Parks, and other entities that actively manage fuels and forest health. Figure 4.1 shows fuels treatments that are proposed, planned, or in progress in and around the county. Olympic National Park maintains a policy of managing fires for forest health and ecological benefit when the fire poses no direct threat to life or property (NPS 2005). The park also recently updated its fire management plan with an environmental assessment completed in 2019. The environmental assessment evaluated impacts and benefits of manual and mechanical fuels treatments across the park allowing future treatments to be prioritized in areas with high wildfire hazard, where values are at risk, and where sequential treatment or cross-boundary treatments would be beneficial to landscape-scale forest health (SWCA 2019). Olympic National Forest operates under the guidance of a similar fire management policy that directs how wildfires will be managed based on proximity to resources and fire intensity. The USFS also maintains a webpage that gives details on proposed and active projects in the forest (USDA 2023). Currently, no specific projects are proposed on national forest or national park lands; however, in discussions with forest managers for the two federal agencies, priority treatment areas have been

identified and both agencies are working to map priority treatment areas (USDA 2023). Areas identified as critical treatments have included roadways, especially park entrances where dense canopy cover poses an evacuation hazard, and national forest land adjacent to Lords Lake, a reservoir with water supply infrastructure and a valuable recreation site (USDA 2023).

4.1.1 RECOMMENDATIONS FOR HAZARDOUS FUEL MODIFICATION

As described in Section 2.2, the County is comprised of vegetative fuels that historically and naturally would burn every 50 years to over 1,000 years (Fryer and Luensmann 2012; LANDFIRE 2020). For wildfire frequency, these are considered as long return intervals that result in fire events that are often very intense because fuels establish over long periods,

wildfires can consume entire forest stands. While these are natural processes that have occurred for millennia, development in the WUI has increased exposure of values to this intense fire behavior.

Research has shown how fuel treatments in the WUI can change fire behavior to support suppression activities and protect homes (Evans et al. 2015). Fuels can be modified with a strategic approach to reduce the threat high-intensity wildfires pose to lives, property, and other values. Recommendations focus on reducing fire intensity and fire spread rates proximate to structures, consistent with Firewise and International Fire Code standards. Further into open space areas, treatments tend to emphasize forest health and increasing resiliency to catastrophic wildfire and other disturbances.

Recommended projects focus on fuels management on and adjacent to roadways, near WUI communities, and improving opportunities for private landowner actions. Projects are also identified to streamline future treatments by standardizing techniques, ensuring other county planning documents integrate mitigation, and introducing unique and community focused programs and incentives to land management. For broader recommendations, such as fuel modification in high-hazard areas, recommendations are provided which detail required steps for implementing the defined project. Implementation timelines are dependent upon available funding sources, agency and personnel capacity, and NEPA and State Environmental Policy Act (SEPA) requirements for treatments pursued on public lands.

Treatments on state-owned lands will require SEPA compliance as well as any treatment that receives state funding to complete. Projects implemented on national forest and national park lands will require coordination with forest or park representatives to complete NEPA requirements and submit documentation as the lead agency. Coordination with these agencies should also include discussion on existing documents and assessments that may be tiered to or adopted for new projects which may reduce time to meet federal compliance requirements.

Through the planning process the Advisory Group identified high-risk wildland areas and communities at risk of wildfire. Areas of concern include portions of the county with a high concentration of HVRAs and WUI communities with high potential exposure to wildfire. Other priority areas are those with active management activities that could be built on to increase landscape-scale resilience. Land managers should consider prioritizing these areas to protect life, property, and resources. Treatment types will be site specific but should address a need to slow fire spread or mitigate potential extreme fire behavior

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.

parameters, such as high flame lengths or fireline intensity. Wildfire does not stop at jurisdictional boundaries, and therefore, it is crucial that projects are implemented across borders with coordination at all jurisdictional levels. While residents within these areas of concern should prioritize fuel treatments in the home ignition zone (HIZ), it is advisable to reduce fuels beyond the HIZ for properties within the WUI.

See Appendix E for home hardening strategies to reduce the ignitability of your home and build greater resilience to wildfire impacts.

“This plan can help the Land Trust, County, DNR, and other forest managers by identifying priority risk areas, defining a path forward and opportunities to fund projects - and to work together in priority areas.” – Jefferson Land Trust

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 fuel modification 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.

The treatment list is by no means exhaustive and serves to provide a baseline of recommended projects for the future management of Jefferson County. Many projects may be eligible for grant funds available from federal and/or state sources. For a list of funding sources, please refer to Appendix D.

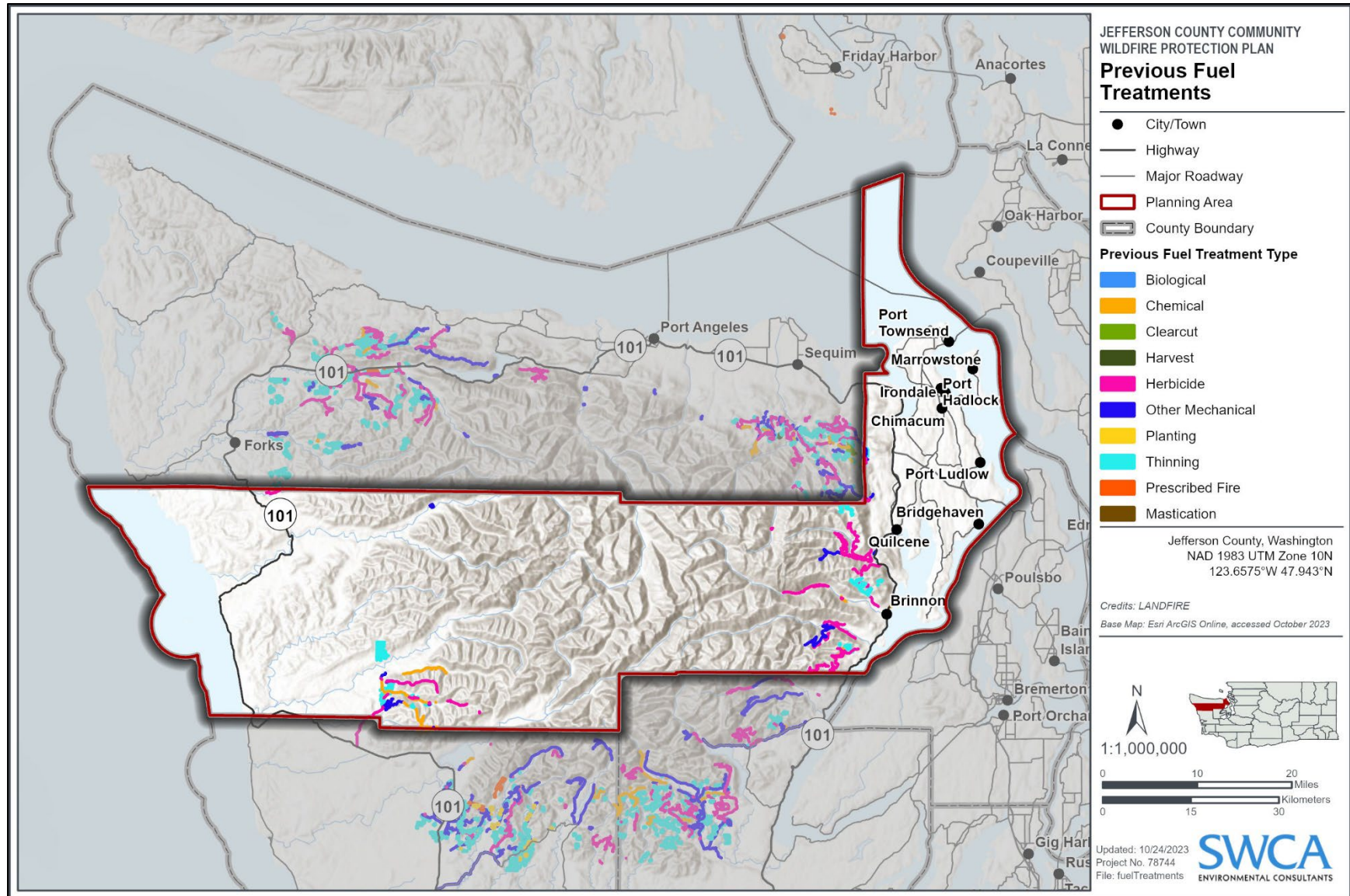


Figure 4.1. Existing fuel treatments across all jurisdictions.

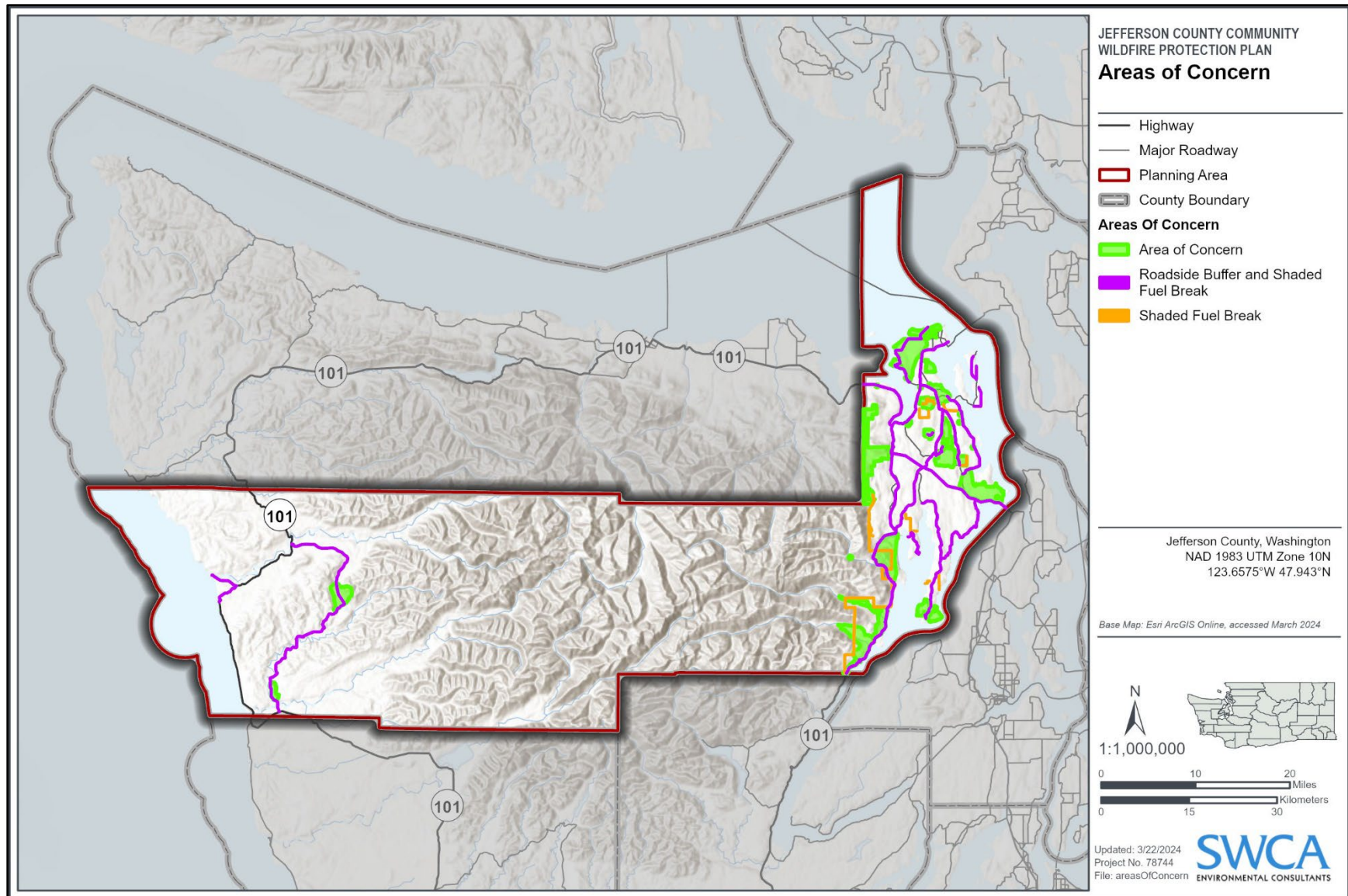


Figure 4.2. Areas of concern developed during the CWPP planning process within Jefferson County.

Table 4.1. Areas of Concern Recommendations

Name	Ownership	Notes	Type
Anderson Lake State Park Area of Concern	State	Area of concern (AOC) fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit.	Area of Concern
Anderson Lake State Park Shaded Fuel Break North	State	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
Anderson Lake State Park Shaded Fuel Break South	State	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
Beausite Lake Area of Concern	State	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit.	Area of Concern
Beausite Lake Road Roadside Buffer	State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Beaver Valley Area of Concern	State	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit.	Area of Concern
Beaver Valley Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Beaver Valley Shaded Fuel Break	State	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
Cape George Area of Concern	Private/State	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation.	Area of Concern
Cape George Roadside Buffer	Private/State/County	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Center Area of Concern	Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation.	Area of Concern

Name	Ownership	Notes	Type
Center Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Chimacum Shaded Fuel Break	Private	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
Chimacum Ridge Community Forest Area of Concern	Private/State/County	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit.	Area of Concern
Clearwater Area of Concern	Private/State	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation.	Area of Concern
Coyle Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Dosewallips Area of Concern	Private/State/Federal	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
Duckabush Area of Concern	Private/State/Federal	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
East Coyle Area of Concern	Private/State	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
East Marrowstone Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
East Quilcene Shaded Fuel Break	State	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
Egg And I Connector Road Roadside buffer	Private	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Private lands so will require potential financial support	Roadside Buffer and Shaded Fuel Break

Name	Ownership	Notes	Type
Federal–State cross-boundary fuel modification	Federal/State	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Area of Concern
Flagler Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Fort Townsend Historical State Park Area of Concern	State	Fuel modification AOC	Area of Concern
Hoh 101 Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Hoh Mainline Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Hoh Reservation Access Road Roadside Buffer	Tribal	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Hwy 101 Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Hwy 104 Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Lindsay Hill Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Little Quilcene and Quilcene River Drainages	Private/State	Shaded fuel break/roadside buffer along FS28. Protect the Little Quilcene and Quilcene river drainages	Shaded Fuel Break
Lords Lake Area of Concern	State/Federal/Private	Shaded fuel break/low-intensity understory fuels reduction. Cut and hand-pile brush and smaller trees, then low-intensity burn, followed by continued maintenance burns on a 5- to 10-year cycle	Area of Concern
Oak Bay Road Roadside Buffer	Private/State	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break

Name	Ownership	Notes	Type
Olympic Corrections Center Area of Concern	State/Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
Port Ludlow Area of Concern	State/Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
Port Townsend Area of Concern	State/Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
Quilcene Area of Concern	State/Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
Rhody Road Roadside Buffer	State/Private	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Robbins Road Roadside Buffer	State/Private	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Schwartz Road Roadside Buffer	State/Private	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Tabook Beach Shaded Fuel Break	State/Private	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
Thorndyke Road Roadside Buffer	State/Private	Modify fuel along roadway to reduce potential fire intensity in event of evacuation. Buffer width will depend upon land ownership and site conditions.	Roadside Buffer and Shaded Fuel Break
Triton Area of Concern	State/Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern
U.S. Naval Reservation Shaded Fuel Break	Federal/State/Private	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break

Name	Ownership	Notes	Type
USFS Boundary Fuel Break	Federal	Shaded fuel break. Buffer width will depend on site-specific conditions, but treatments should reduce ladder fuels and raise canopy base height.	Shaded Fuel Break
West Coyle Area of Concern	State/Private	AOC fuel modification with a focus to reducing hazardous fuel load and fuel continuity. Actions should be directed by existing land management planning and compliance. Seek opportunities for multiple resource benefit. HIZ fuel mitigation. Federal lands interface requires cross-boundary collaboration.	Area of Concern

4.1.1.1 Ongoing, Planned, and Proposed Fuels Treatments

State, federal, and private landowners have been active in managing forested lands and attention to the need and benefit of these actions has been steadily increasing across the county.

National Park Service

The NPS conducts targeted fuels reductions and thinning to protect properties, reduce fuel continuity, and limit ladder fuels. The agency has a target of treating up to 200 acres of forest per year to maintain fuel loads (NPS 2005). In discussions with NPS personnel, the Hoh rainforest park entrance was identified as a hazard risk due to narrow, single-entrance roads and dense fuels loads (personal communication, Joseph Crowe, USFS, 2023). Work in this area will require cooperation between the national park and bordering landowners.

U.S. Forest Service

In early 2023, the Hood Canal Ranger District, part of Olympic National Forest, contracted a local silviculture specialist to complete thinning and hazardous fuels removal on 182 acres of land within the ranger district. This project is anticipated to be completed by the end of February 2024. Approximately 28% of the fuels reduction work was completed as of November 2023 (USFS 2023b).

Jefferson County

Jefferson County has been active in managing the forested lands it owns and, in 2020, established a pilot forest management program. The program is intended to identify and prioritize action on County-held lands to reduce fuel loads. In 2019, a forestry study was completed that assessed all parks and other land held by Jefferson County and recommended priority actions with mapped project boundaries (Jefferson County 2019). The forestry program targeted a total of 312 acres of treated land. Completed projects have included treatments near Gibbs Lake County Park and Camp Beausite (2020), Chimacum County Park Complex (2020), Trailhead Park (2021), Larry Scott Trail (2021), and Cape George (2021) (Jefferson County 2020).

Jefferson Land Trust

Jefferson Land Trust owns and manages a variety of primarily forested lands with the mission of permanently protecting their conservation values, such as fish and wildlife habitat, water quality, and productive timberland. They also hold conservation easements on primarily forested land owned and managed by other private landowners, which are designed to also permanently protect the conservation values of those lands, including resilient and healthy forests. The organization has been active in managing forested areas for project specific objectives such as climate resilience, timber production, bird habitat improvement, and stand diversity and succession. These actions also improve the fire resilience of the properties (Jefferson County Trust 2010). As concern about forest health has risen, more private forest owners have grown interested in proactively managing their lands. The Northwest Natural Resource Group, a nonprofit group dedicated to strengthening ecological and economic value of northwest forests, partnered with the Jefferson Land Trust to host a hands-on forest health strategies workshop where private forest owners can learn about forest management science and techniques to implement on their land (Northwest Natural Resource Group 2021). Communities that have been active in managing the forests adjacent to them include Queets, the Hoh Indian Reservation, Leland, Dabob and Camp Discovery, Beaver Valley and Port Ludlow, and Gardiner.

Washington State Department of Natural Resources

The Western Washington Financial Assistance Program, administered by the WA DNR Service Forestry Program, aims to enhance forest resiliency, and minimize the risk of catastrophic fires. The program supports projects such as thinning dense tree stands, creating firebreaks, removing invasive species, pruning, slash disposal, tree planting, and prescribed burning. The program provides financial assistance for up to half of the actual incurred costs for projects such as thinning dense stands, creating firebreaks, removing invasive species, and more. However, it excludes activities like the removal of select trees due to mortality, post-timber harvest activities, and landscaping. Eligibility is determined by WA DNR field staff, following the landowner's completion of the application process. The application process involves an initial property visit by the field staff, submission of a Request for Financial Assistance form, agreement to forest treatment prescriptions, and obtaining at least three bids from contractors. Upon WA DNR's review and approval, the landowner is then responsible for project completion and tracking costs, and maintaining the treated area for at least 15 years following the project's completion.

Financial assistance is available for forest stewardship plans, with varying amounts based on acreage. Landowners are required to comply with legal requirements and permit regulations. Applications for stewardship plans are encouraged throughout the year, with funding available from both federal and state sources, emphasizing non-discrimination and equal opportunity.

Table 4.2. Recommendations for Creating Resilient Landscapes (Hazardous Fuels Modification)

Note: In the Project ID column RL stands for Resilient Landscapes

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 1		H	Spring 2025	Allocate resources for fuels management on city, county, state, and USFS roads and rights-of-way (ROWs).	All roads throughout the county, with emphasis on road segments determined to be at highest wildfire risk	All	- Streamline management of ROWs that interface with privately owned lands by grouping them into cohesive blocks, reducing complexity for the city in handling scattered strips of land within privately owned properties. - Prioritize providing funding support to Public Utility Districts (PUD) for the removal of fuels resulting from tree trimming in critical areas within ROW. - Support other agencies with funding support. - Update engineer design standards to account for wildfire resilience along road networks. - Work with agency vegetation managers/fuel specialists to develop prescriptions based on vegetation type and condition. - Expand ROW mowing program. - Seek funding to purchase masticator, grinder, and/or mulcher for use on City and County ROWs. Procure funds for continued masticator operations. Ensure regular maintenance plan is developed and adhered to.	- Reduce roadside wildfire risk and hazards. - Reduce number of human-caused wildfire ignitions. - Provide improved ingress/egress capabilities during wildfire.	Implement yearly maintenance and monitoring of roads.	- Building Resilient Infrastructure and Communities (BRIC) grants - National Fire Plan (NFP) grants - Regional Catastrophic Preparedness (RCP) grants - Community Wildfire Defense Grants (CWDG) - Fire Management Assistance Grant (FMAG) - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 2		H	Spring 2024	Utilize the CWPP Composite Risk-Hazard Model to identify specific areas in need of vegetation and brush removal. Focus on high-risk areas or critical locations (see areas of concern map [Figure 4.2]).	Countywide	All	- Invest in building the City's capacity to remove fuels by equipping personnel with the necessary training and equipment. - Enhance coordination between agencies to facilitate cross-boundary fuel modification efforts. - Secure funding resources dedicated to vegetation and brush removal in these identified areas. - Develop clear and comprehensive rules and guidelines for the removal of fuels. These rules should outline safety protocols, environmental considerations, and compliance with local regulations. - Evaluate the feasibility of establishing buffer zones on private land surrounding old complex forests where management of forest parcels could focus on reduced fuel loading, forest health resilience, and creation of potential control lines and anchor points. Develop a comprehensive monitoring and maintenance plan (including funding) to ensure long-term effectiveness and sustainability. - Carry out more detailed parcel-level home assessments to inform wildfire risk at a fine scale. - Hire a contractor or staff member to do a deep assessment of existing fuel models for the Olympic Peninsula area, in conjunction with local fuels specialists. Specifically, focus on modeling active and dynamic nature of fuels in treatment areas, as well as areas taken out of production for conservation and biodiversity and carbon offsets. Assess the role of increased structural diversity and biodiversity in forest resilience. Engage academic institutions as needed. - Prioritize areas of high fire risk, considering factors outlined within CWPP Composite Risk-Hazard Assessment. - Monitor treated areas for invasive and noxious species such as scotch broom. Complete invasive management as needed at treated sites. - Seek funding to recalibrate the fuel model to address limitations for modeling timber management areas (i.e., calibration from non-burnable to slash models).	- Protect life and property by mitigating fuels, providing defensible space for firefighters protecting structures. - Create a fuel arrangement unlikely to support crown fire or fast rates of spread. - Increase understanding of risks and hazards associated with different forest types and locations. - Reduce the potential for large and severe fires in the future amidst hotter and drier summers.	- Follow up with post-treatment stabilization practices. - Frequent communication, collaboration, and cooperation with landowners. - Regular maintenance to ensure the fuel break remains clear of vegetation. - Monitor and treat invasive species. - Continued management of fire breaks maintained by grazing, brush breaking, and prescribed burns. - Record number of acres treated (by fuel type, treatment method).	- Environmental Quality Incentives Program (EQIP) - U.S. Endowment for Forestry and Communities - NFP grants - BRIC grants - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 3		H	Spring 2024	Address fuels treatment in moderate, high, and extreme risk areas and promote equity in fire mitigation efforts.	Countywide	All	• Use existing organizations to leverage capabilities to carry out fuel treatment and forest resilience initiatives. Collaborate with organizations such as the Washington Conservation Corps or Team Rubicon, which can contribute valuable resources and personnel. • Offer support and assistance to individuals residing in moderate to high-risk areas to increase forest resilience, and remove fuels around their properties. Ensure that these efforts prioritize equity to assist those who may face financial or logistical barriers. • Explore opportunities to expand the workforce by engaging arborists and adults seeking gainful employment. • Consider the establishment of NPREP (Neighborhood Preparedness) crews dedicated to cleaning up fuels around residential properties. Identify and flag trees that require attention to minimize fire risks. • Address issue of non-resident property owners who implement limited property maintenance and tailor outreach approaches for fuels mitigation to accommodate those property owners. • Work to optimize cost-effective thinning techniques for younger forests by working with private companies and/or County Forestry Consultant to develop and implement strategies. • Learn from other programs. Research and adopt successful programs from other regions, such as Community Planning Assistance for Wildfire, the Flagstaff, Arizona Fire Prevention Permitting, and Flagstaff, Arizona Watershed Protection Programs to enhance Firewise prevention efforts. Use programs, like Habitat for Humanity, to combine fire prevention with emergency repairs for lower-income households for implementation. • Foster synergy between the proposed initiatives and existing programs to maximize resources and community impact. This dovetailing approach will help create a comprehensive and efficient fire mitigation strategy. • Implement fuel treatments along boundaries with private residential properties, encouraging individual defensible space for enhanced resilience and evacuation. • Enhance coordination between agencies to facilitate cross-boundary fuel modification efforts. • Collaborate with homeowners to achieve fuel breaks where needed in the Federal–State cross-boundary area. • Establish access road buffers through fuel mitigation and brush cutting. • Monitor treated areas for invasive and noxious species such as scotch broom. Complete invasive management as needed at treated sites. • Where circumstances permit and landowners are willing, reintroduce beavers to expand wetlands and riparian areas and support potential wildfire refuge or evacuation routes. • On high-risk slopes, consider how the removal of brush would impact erosion risk/rates.	• Build equitable community fire resiliency and address potential for extreme wildfire behavior for underserved populations. • Reduce the risk of home and structure ignitions for socially vulnerable communities.	• Follow up with post-treatment stabilization practices. • Frequent communication, collaboration, and cooperation with landowners. • Regular maintenance to ensure the fuel break remains clear of vegetation. • Monitor and treat invasive species. • Continued management of fire breaks maintained by grazing, brush breaking, and prescribed burns. • Record number of acres treated (by fuel type, treatment method).	• BRIC grants • NFP grants • RCP grants • Challenge Cost Share Grant Program • CWDG • FMAG • Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 4		H	Spring 2025	Create potential shelter locations.	Community specific	Community specific	• Work with the Fire Chiefs and Emergency Managers to identify and designate safe refuge areas where vegetation has been treated to a prescription that could reduce hazards (shielding needs to be 4 times potential flame lengths). • Focus ROW hardening and roadside clearance on areas that would accommodate passage to safe refuge areas. • Work with Public Information Officers and community leaders to communicate that any safe refuges should be considered an absolute last resort and that early evacuation should always be prioritized. • Clarify Fire Chiefs' roles during evacuation. Stop disinformation that Fire Chiefs would drive through neighborhoods and lead evacuations.	• Provide a "last resort" alternative for residents who are unable to evacuate safely.	• Ensure any plans for safe refuge areas are accompanied with comprehensive maintenance plans to ensure effectiveness and wildfire resilience	• BRIC grants • RCP grants
RL 5		M	Spring 2025	Integrate wildfire mitigation as a standard component of all resource management planning.	Countywide and all jurisdictions	Multi-agency	• Align existing and future planning efforts with the findings and recommendations in the CWPP (e.g., upcoming Port Townsend Urban Forestry Plan, County HMP, County Emergency Response Plan County/City Comprehensive Plan). • Utilize the CWPP Advisory Group as conduits to agency planning staff to facilitate coordination across jurisdictions and disciplines. • Utilize the CWPP hub site as a platform to share data and recommendations. • Work with agency planners and decision makers to integrate wildfire mitigation into other resource management efforts and planning projects countywide, for example considering hazardous fuel loading and wildfire hazard when planning for wildlife habitat improvements, maintenance of scenic vistas, recreational planning, environmental compliance, riparian enhancements, and sensitive species protections.	• Integrate wildfire mitigation into resource management planning to ensure a holistic approach to creating wildfire resilience	• Convene pertinent agency planning staff on an annual basis to review existing and upcoming plans for inclusion of wildfire mitigation measures.	• NFP grants • CWDG • FMAG • Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
RL 6		H	Spring 2024	Support green waste removal initiatives.	All WUI communities	County	• Create a mobile chipper program and/or leverage existing equipment for use by the public to support defensible space practices. • Create a mobile incinerator/biochar program. Purchase equipment for program. • Develop Washington Conservation Corps crew to operate equipment. • Provide training to staff. • Provide trained staff for safe operations when used in a community setting. • Research and compile best practices for managing slash piles.	• Encourage defensible actions by facilitating green waste removal	• Arrange meeting each year to assess participation, review accomplishments, and address future needs. • Frequent communication, collaboration, and cooperation with residents and landowners.	• BRIC grants • NFP grants • RCP grants • CWDG • FMAG • Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 7		H	Fall 2024	Develop standard wildfire mitigation prescriptions and management techniques for forestlands.	Public and private forest lands	Private, City, County, State, USFS, Land Trust, Climate Action Committee	• Work with academic institutions, subject matter experts, climate specialists, local fuels specialists, and other experts to assess appropriate management for forest types in the planning area. • Consider utilizing Land Trust management techniques as a possible template of management for biodiversity and wildfire resilience. • Ensure prescription considers potential climate change impacts on vegetation and forest health. Reference Climate Action Committee research and initiatives (e.g., canopy study). • Incorporate management actions that would reduce stems per acre, increase crown spacing, reduce heavy fuel loading, create greater structural diversity, and limit potential for crown fire initiation and spread. • Consider introduction of vegetation buffers through strategic planting of species like red alder. • Look for opportunities to implement an approach with emphasis on highest risk parcels adjacent to WUI and HVRA. • Look for potential land acquisitions where the above approach would create buffers to WUI areas.	• Reduce fire spread potential and protect HVRA	• Follow up with post-treatment stabilization practices and regular maintenance. • Use the project tracker to document updates for stakeholders and other entities throughout the project's lifetime. • Frequent communication, collaboration, and cooperation with academic institutions, subject matter experts, climate specialists, local fuels specialists. • Monitor and treat invasive species. • Record number of acres treated (by fuel type, treatment method).	• BRIC grants • NFP grants • RCP grants • CWDG • FMAG • Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
RL 8		H	Spring 2025	Implement countywide hazardous fuels and forest health project tracking system.	Public and Private forest lands	Private, City, County, State, USFS, Land Trust, Climate Action Committee	• Create an interactive web application accessible to stakeholders throughout the county, allowing for easy tracking and monitoring of hazardous fuels projects. • Incorporate CWPP wildfire risk layer into web application to visualize areas of high wildfire hazards and track progress toward overall risk reduction. • Populate attribute tables within the web application to provide detailed information on each hazardous fuels project, including data points such as: ◦ Project status ◦ Locations ◦ Objectives ◦ Funding sources	• Provide an efficient and effective tool for tracking and monitoring hazardous fuels projects countywide.	• Ensure web application is regularly updated. • Solicit feedback from uses to identify area of improvement. • Conduct periodic evaluation to assess web application effectiveness.	• BRIC grants • NFP grants • RCP grants • CWDG • FMAG • Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
RL 9		M	Spring 2025	Determine feasibility of a goat grazing program.	Countywide	Public lands	• Carry out feasibility study to determine potential acreages and carrying capacity of a goat herding program. • Work with livestock providers to design program and assess investment needs and sourcing.	• Provide alternative treatment methods for areas where mechanical treatments are not feasible due to slope and vegetation type	• Follow up with post-treatment stabilization practices and continued maintenance. • Utilize project tracker to document updates for stakeholders and other entities throughout the project's lifetime.	• BRIC grants • NFP grants • RCP grants • CWDG • FMAG • Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 10		H	Spring 2024	Foster economic incentives to mitigate fire risk through forest harvest practices that increase forest resilience.	Countywide	All	- Evaluate existing economic incentives for forest management and timber harvest practices, collaborating with local government agencies, landowners, timber companies, and forest management. - Define the objectives of enhancing forest resilience, taking into account local ecological conditions, climate change projections, and community interests. - Invest in research and innovation to develop and promote best practices for sustainable forest management. - Work with relevant government agencies and organizations to design and implement new economic incentive programs tailored to the community's needs, conducting financial analysis to determine cost-benefit effectiveness. - Assess results, best practices, and lessons learned from the economic incentive programs from forest management organizations throughout the region and industry.	Increase forest resilience and community wildfire resilience through greater participation in mitigative action.	- Track the number of participants, the acreage of forest land under improved management, and the reduction in fire risk. - Maintain an open feedback loop with stakeholders and adjust the economic incentive programs based on their input and evolving forest management needs.	- BRIC grants - NFP grants - RCP grants - CWDG - Check Inflation Reduction Act Forestry grants
RL 11				Promote the production and use of cross-laminated timber (CLT) through Forest Stewardship Council (FSC)-certified practices. *see table note	Countywide	All	- Actively seek out and develop new regional markets within the most urbanized areas of the county (including Port Angeles) for timber that is removed during forest management operations, with a focus on CLT. CLT is a sustainable building material made from timber that isn't otherwise merchantable. - Identify potential clients in construction sector that may be interested in using CLT. - Consider development and funding of marketing campaigns to promote FSC-certified CLT. - Education campaigns to raise awareness about CLT and highlight its benefits. - Continue to invest in research and development to explore new uses for CLT (such as furniture) and to develop other building materials.	- Encourage sustainable practices to increase forest health and resiliency. - Encourage the use of fire-resistant building materials.	- Arrange meeting each year to assess participation, review accomplishments, and address future needs. - Frequent communication, collaboration, and cooperation with residents and landowners. - Facilitate regular FSC audits to ensure compliance.	- BRIC grants - NFP grants - RCP grants - CWDG - Check Inflation Reduction Act Forestry grants
RL 12		H	Spring 2024	Develop collaborative efforts and partnerships.	Countywide	All	- Explore opportunities to leverage partnership with the DNR. - Utilize DNR's expertise and resources to achieve goals more efficiently. - Communication consistency with DNR messages. - Explore opportunities to leverage Natural Resources Conservation Service (NRCS) conservation programs for private forested landowners.	Enhance community resilience through collaborative efforts.	- Arrange a standing multi-agency meeting each year to review accomplishments and address future needs. - Establish channels of communication between participating groups, organizations, and agencies. - Consider formation of an local wildfire coordinating/working group.	- BRIC grants - NFP grants - CWDG

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance/ Requirements	Funding Sources
RL 13		M	Spring 2025	Improve water systems.	Community specific	County, City	- Invest in new, and upgrade current, water infrastructure. - Identify and allocate water resources for wildfire prevention and response. - Protect key water resources in areas of elevated fire risk through fuel mitigation and other mitigation activities.	- Protect life and property by improving fire suppression capabilities. - Improve efficiency and speed of wildfire response and suppression. - Enhance public and firefighter safety and mitigate wildfire risk within the county.	- Convene annually to assess and document status of county-specific water resource capabilities. - Conduct an annual review of water resources.	- BRIC grants - NFP grants - RCP grants - CWDG - FMAG - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

*While not considered experts on cross-laminated timber (CLT), it is our opinion that mass timber buildings, using CLT and other methods, can be safely constructed in wildfire-prone areas, taking all things into consideration. Mitigation measures such as noncombustible siding, 1/8-inch or rated vents, tempered glass where appropriate, and adequate separation from accessory structures and highly combustible vegetation should be incorporated into building design, with the intent of protecting the structure from exposures related to embers, direct flame, and radiant heat. More information on fire performance of cross-laminated timber assemblies can be found at: https://bit.ly/CLT_Fire . Additional information on exposures and recommended separation distances can be found at https://bit.ly/NIST_HMM .

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4.2 GOAL 2: FIRE-ADAPTED COMMUNITIES

Efforts to create fire-adapted communities include public education and outreach actions and actions to reduce structural ignitability.



4.2.1 RECOMMENDATIONS FOR PUBLIC EDUCATION AND OUTREACH

Just as environmental hazards must be mitigated to reduce the risk of fire loss, so must human hazards. Lack of knowledge, lack of positive actions (e.g., failing to create adequate defensible space), and negative actions (e.g., keeping large amounts of flammable debris and rubbish on the property) all contribute to increased risk of loss in the WUI.

Methods to improve public education could include increasing awareness about fire department response and resource needs; providing workshops at demonstration sites showing Firewise landscaping techniques or fuels treatment projects; organizing community cleanups to remove green waste; publicizing availability of government funds for treatments on private land; providing specific outreach targeted toward seasonal and recreational visitors to the Olympic Peninsula; developing resources to support vulnerable populations, such as elderly residents; 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 across property boundaries and in the interface between public and private land. The Advisory Group emphasizes that wildfire resilience requires residents to not be complacent in their role and responsibility for mitigating wildfire risk.

The Jefferson DEM provides the community with a webpage containing resources for various disaster and emergency scenarios including wildfires. Included are general recommendations for implementing defensible space on one's property and various home hardening strategies such as clearing vegetation around homes and structures and prepping for various levels of evacuation. In addition, county fire departments and districts are active in addressing the necessity of community engagement with the implementation of various education programs, tools, and safety guidelines.

4.2.2 RECOMMENDATIONS FOR REDUCING STRUCTURAL IGNITABILITY

Reducing structural ignitability is a core focus that should be implemented throughout the county. Reduction of structural ignitability depends largely on public education, which provides homeowners the information they need to take responsibility for protecting their own properties. Carrying out fuels reduction treatments on public land may only be effective in reducing fire risk to some communities. 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 wildfire by creating defensible space around the home is an effective strategy for reducing structural ignitability as discussed under Cohesive Strategy Goal 1: Resilient Landscapes. 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 firebrands 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, through a series of actionable steps including maintaining vent coverings and other openings, is also strongly advised and imperative to protect a home from structural ignitability. It is highly encouraged that homeowners prioritize this step to reduce the structural ignitability of their homes in the event of wildfire. Managing the landscape around a structure by removing weeds and debris within a 30-foot radius and keeping the roof and gutters clean are two maintenance measures proven to limit combustible materials that could provide an ember bed and ignite the structure. Unplanned developments, such as those discussed in Chapter 1, pose a significant hazard to WUI communities and forest lands. The Jefferson County Department of Community Development maintains a *Wildland Urban Interface Property Development Guide*, which provides requirements for defensible space and building construction materials along with a checklist to guide WUI home construction. As of July 2023, the county adopted the International WUI Code with all new building plans required to meet code standards (Jefferson County 2023b). These requirements should be administered to all planned and unplanned housing units to reduce the potential of WUI ignitions and spread. More information is on the City of Port Townsend's Building Code is found here:

<https://www.codepublishing.com/WA/PortTownsend/#!/PortTownsend16/PortTownsend1604.html#16.04>.

Detailed information regarding defensible space practices, as well as a list of actions for reducing structural ignitability, can be found in Appendix E.

Table 4.3. Recommendations for Creating Fire-Adapted Communities (Public Education and Structural Ignitability)

Note: In the Project ID column, FAC stands for Fire-Adapted Communities

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FAC 1		H	Summer 2025	Design and implement a unified initiative for a marketing campaign/strategy for wildfire mitigation alongside a comprehensive countywide public education program.	Countywide	All	• Work with the DNR Community Resilience team to launch the Wildfire Ready Neighbors Program. • Convene a committee of public information officers and relevant agency staff to develop a comprehensive, multi-jurisdictional approach. • Develop wildfire mitigation materials tailored specifically to Jefferson County communities and forest types, emphasizing the significance of fuels reduction practices. • Focus Firewise messaging on potential entrapment due to evacuation concerns, including evacuation and safe refuge strategies. • Disseminate materials through varied channels to increase exposure, considering diverse communication preferences. • Allocate resources within the City of Port Townsend to build staff capacity dedicated to Firewise education initiatives, ensuring sustainable programs. • Utilize existing community events as platforms for disseminating wildfire mitigation/safety messaging. • Utilize the CWPP hub site to share materials and resource links for broader accessibility. Seek grant support to provide finances for long-term hub site maintenance. • Establish regular media and social media posts to maintain wildfire mitigation awareness among residents. Emphasize that complacency limits resilience. • Collaborate with all participating agencies and entities to ensure a unified and consistent message. • Create messaging targeted to vulnerable populations about fire safety, emphasizing self-sufficiency and personal preparedness. • Address all wildfire risks facing communities through various communication channels, including community meetings, social media, and educational materials. • Emphasize the importance of creating personal preparedness plans, including shelter in place considerations and maintaining essential resources like gas and electric vehicle charging during wildfire season. • Promote safe fuel storage practices as part of wildfire mitigation efforts.	• Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fires. • Reduce wildfire risk through greater adoption of Firewise and structure hardening measures. • Educate public on the importance of adapting to future changes in climate and fuel conditions.	• Yearly updates to marketing materials, ensuring alignment with best science. • Annual review of number and turnout of events implemented. • Establish a feedback mechanism to continuously assess the program's impact and gather insights from residents. • Set goals for the following year.	• Regional Catastrophic Preparedness (RCP) grants • Building Resilient Infrastructure and Communities (BRIC) grants • Community Wildfire Defense Grants (CWDG) • Firewise grants National Urban and Community Forest Program • FP&S (FEMA) • Environmental Protection Grants (EPA)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FAC 2		H	Fall 2024	Create demonstration sites for healthy forests and defensible space.	County Fire Departments/Schools/ Community Centers, Chimacum Ridge Community Forest)	WA DNR, County, Jefferson Land Trust, Jefferson County Conservation District, Master Gardeners/ WSU	- Identify suitable demonstration sites for defensible space in prominent locations with Firewise landscaping (e.g., fire stations with demonstration landscaping with native Firewise plants). Take into consideration variation of natural ecosystems and fire regimes present across the county. - Identify suitable demonstration sites for healthy forests in different prominent forest types around the county. Take into consideration active management that increases the fire resilience condition of forests. Host public events to display Firewise gardens. - Assess demonstration materials. - Incentivize Firewise landscaping. - Utilize the WA DNR western WA fire-resistant plant and landscaping guide. - Coordinate the adoption of the WUI code (in March 2024) with landscaping regulations or guidance. Coordinate with the DNR for consistent talking points about WA-WUI maps. - Consider the implementation of Firewise landscape around communal structures.	- Educate residents on appropriate and manageable actions to create defensible spaces and landscapes. - Educate residents on appropriate and manageable actions private forest land owners and public land managers can take to improve forest health and resilience as fire risk increases.	- Follow up with post-treatment stabilization practices and continued maintenance. - Annual review of effectiveness.	- Firewise grants including WA DNR Firewise Microgrant - FP&S (FEMA) - EPA Environmental Education Grants - CWDG - BRIC grants - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FAC 3		H	Fall 2025	Effectively communicate how to prepare for wildfire using accessible language and symbols, for non-English speakers, and those with vision, hearing or language impairments.	Countywide	All	- Work through the Wildfire Ready Neighbors Program resources to translate outreach materials. - Connect with the Washington State Fire Adapted Communities Learning Network (WAFAC) to access resources for vision-, hearing-, or language-impaired residents. - Translate printed and virtual materials to make information accessible to non-English speakers and individuals with varying abilities, including those with vision, language, and hearing impairments. - Direct community engagement with community members through targeted outreach programs and events. - Conduct demographic analysis (using census data) to identify community make up and tailor outreach efforts accordingly.	Protect communities and infrastructure by raising awareness of residents and visitors regardless of their background.	- Conduct yearly updates to materials. - Establish channels of communication with targeted groups.	- Firewise grants including WA DNR Firewise Microgrant - FP&S (FEMA) - EPA Environmental Education Grants - CWDG - BRIC grants - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR) - County Accessible Communities Advisory Committee

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FAC 4		H	Summer 2025	Coordination of City and County codes.	Countywide	City, County	- Revise land use codes to encourage holistic planning approaches that reduce wildfire risks and hazards. - Code Compliance: Enforce code compliance across all phases of a project, with a focus on the WUI codes to be adopted March 15, 2024. New WUI codes focus on roof, building materials, and vegetation management near driveways. Consider distributing doorhanger notices defining new codes for homeowners. - New Development: When planning new developments, reference the latest International Building Code rules, particularly those related to defensible space. - Legacy Development: Review and update safety measures to align with current standards and regulations to enhance fire mitigation efforts. - Fuel Disposal: Implement responsible fuel disposal practices within the easement or ROW, adhering to regulations. - Setback Requirements: Ensure adequate setback distances are established to enhance fire safety. Develop setback requirements for the areas below powerlines. - Road Standards: Ensure alignment with existing municipal, county, and state road development and maintenance standards. Where necessary, update road maintenance standards to maintain safe conditions on evacuation routes. Prioritize standards to address private roads, shared driveways, and bridged driveways if such standards do not already exist.	Ensure regulatory alignment and safety.	Conduct review of fire code and update accordingly.	- FP&S (FEMA) - EPA Environmental Education Grants - CWDG - BRIC grants - National Urban and Community Forest Program - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FAC 5		M	Summer 2025	Create a Fire Safe Council for the County.	Countywide	All	- Analyze the identified risks, vulnerabilities, and community needs outlined in the CWPP; provide a solid foundation for the establishment of a collaborative Fire Safe Council. - Establish a Jefferson County Wildfire Coordinator position to lead the Fire Safe Council. - Use the Fire Safe Council as a platform for messaging and public engagement. - Task the Fire Safe Council with providing oversight for the CWPP and manage the annual review and update of the plan. Tasks would include: - Track changes to the WA DNR WUI and implement updates to the Composite Risk-Hazard Model as needed. - Review the project tracker and identify obstacles to implementation. - Seek grant opportunities to facilitate implementation of CWPP recommendations. - Investigate potential to expand Firewise Community initiatives across the county, providing more detailed community-scale risk analysis and mitigation projects. - Oversee annual CWPP updates including integration of other ancillary planning efforts that are pertinent to the CWPP. - Oversee the 5-year full CWPP update.	Provide a central organization for wildfire mitigation in the County.	- Convene annually to document actions taken and document success and failures of mitigative action. - Conduct an annual assessment of staffing needs. - Track community participation and engagement.	- Emergency Management Performance Grant (EMPG) (FEMA) - RCP grants - BRIC grants - CWDG

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FAC 6		H	Spring 2024	Introduce or increase use of signage about fire bans.	Countywide	WSDOT, Fire Departments, City, County	Coordinate with WSDOT for marquees with messages about fire bans.	Protect communities and infrastructure by raising awareness of local citizens and those traveling in the area about actions that can prevent fires.	- Conduct yearly reviews and updates/improvements to materials. - Set goals for expanding signage the following year.	- RCP grants - BRIC grants - CWDG - National Urban and Community Forest Program - FP&S (FEMA) - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FAC 7		M	Spring 2024	Emphasize the significance of defensible space in light of the growing mandates for urban density.	Countywide	WSDOT, Fire Departments, City, County	- Develop zoning regulations that balance urban density goals with defensible space requirements. - Consider differentiating zones within urban areas, allowing for varying density in centralized areas, gradually decreasing densities toward the WUI. - Promote the use of fire-resistant plants in landscaping designs, reducing the risk of fire spread. - Enforce building codes that require the use of fire-resistant materials in construction. This includes roofing, siding, and windows. - Advocate for designs that incorporate defensible space directly into new developments, such as setbacks, firebreaks, and noncombustible zones.	Create resilient communities that can withstand the threat of wildfires while still meeting the demands of urbanization	- Continuously evaluate and adapt defensible space strategies based on changing environmental conditions. - Conduct assessments to track participation and assess need for levels of enforcement.	- RCP grants - BRIC grants - CWDG - National Urban and Community Forest Program - FP&S (FEMA) - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FAC 8				Create a Port Townsend-specific CWPP Addendum.	Port Townsend	City	- Create a CWPP Annex that addresses specific wildfire hazards that face Port Townsend. - Leverage countywide CWPP as a foundation and develop a document in a style and format that is consistent with the County plan. - Convene a Core Team of City stakeholders. - Create subdivision-scale base maps. - Delineate the WUI in conjunction with DNR. - Create subdivision-scale Composite Risk-Hazard Model that is ground truthed through the field assessment process described below. - Carry out subdivision-scale field assessments using the NFPA 1144 protocols to identify high-risk areas due to structure type, access, firefighting resource availability, and adjacent fuels. - Hold public education and outreach meetings to engage the community and provide buy-in. - Develop a written document and integrate with the county document by reference or as an appendix to the countywide plan. - Upload to the County CWPP hub site to increase visibility. - Plan for periodic updates to the Annex in coordination with the CWPP.	Address finer resolution mapping and planning needs.	N/A	- City funds - CWDG - BRIC grants - WA DNR
FAC 9		H	Spring 2024	Create an interagency calendar for WUI-related public engagement events.	Host on the hub site	All agencies on the Advisory Group	Create and regularly update a calendar of WUI-related public engagement events organized and hosted by agencies in Jefferson County.	Increases public awareness.	Monthly or as needed updates to calendar.	County/City funds

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FAC 10		H	Spring 2024	Identify and collaborate with social service agency partners within Jefferson County to enhance wildfire readiness for low-income and vulnerable populations.	Countywide	Fire Departments, City, County, Health Department, Red Cross	- Conduct a comprehensive survey of social service agencies within Jefferson County and Contact potential partners. - Determine and allocate resources (financial, informational, logistical) to support wildfire preparedness activities tailored to vulnerable populations. - Set up communication channels to facilitate ongoing collaboration and updates. - Create and distribute customized educational materials and emergency kits for vulnerable populations.	Provide targeted support to those who are most at risk and may lack the resources or knowledge to prepare adequately.	Monitor specific milestones (e.g. number of agencies engaged, training sessions conducted, and materials distributed).	- RCP grants - BRIC grants - CWDG - National Urban and Community Forest Program - FP&S (FEMA) - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FAC 11		M	Spring 2025	Provide information and resources related to farming and agricultural lands and wildfires.	Countywide	Washington State University Extension and Disaster Education Network	Provide information on the following topics: livestock movement and housing during an emergency; information on livestock injury assessment and health; ag producer safety during wildfires and emergency preparedness, wildfire recovery assistance for farms, soil erosion and rehabilitation; grass reseeding, vegetation rehabilitation, grazing mitigation as well as other preventative educational resources including planned grazing and holistic management of lands.	Provide information targeted toward farms, farmers, ranchers and agricultural lands.	Update as new information becomes available.	County/City funds

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4.3 GOAL 3: WILDFIRE RESPONSE

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



4.3.1 RECOMMENDATIONS FOR IMPROVING FIRE RESPONSE CAPABILITIES

Informing and empowering the public so they can reduce dependence on fire departments is essential because these resources are often stretched thin due to limited personnel. Increasing awareness and knowledge to enhance community preparedness is a key factor in supporting local fire departments in fire response, particularly educating residents about emergency notifications and evacuation protocols so that residents can safely evacuate an area while emergency responders prepare to protect life and property.

These recommendations for promoting safe and effective wildfire response incorporate a variety of measures and actions that aim to enhance the county's fire safety and emergency response capabilities. They include establishing improved response coordination, creating new positions, improving public safety communications, and enhancing fire response resources and capabilities. Additionally, there is a focus on increasing budget and funding support. Descriptions of each fire response recommendation, with the goal of accomplishing Cohesive Strategy Goal 3, can be found in Appendix H. Appendix H also includes details regarding these recommendations, including a broad timeline, location specifics, potential collaborators, approach methodology, monitoring approaches, and potential funding channels.

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Table 4.4. Recommendations for Safe, Effective, Risk-based Wildfire Response

Note: In the Project ID column, FR stands for Fire Response

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FR 1		H	Spring 2024	Fire departments to prioritize a strategy to secure funding for wildland firefighting equipment, especially water tenders.	Countywide	Fire Departments	- Develop a funding strategy to acquire and maintain wildland firefighting equipment, including vehicles, protective gear, and communication tools. - Upgrade water tenders. - Recognize that their use is different from traditional fire response (the need to transport water to rural areas is different from fire response in urban areas). - Current fleet is aging. The youngest tender is 18 years old. There is a need to invest in modern efficient tenders. - Evaluate the impact on pump systems from pulling water from various sources. Ensure that the system can safely extract water while considering the wear and tear on the pumps. - Acknowledge the difficulty of accessing water sources in wildland areas and recognize that tenders provide a reliable and efficient supply of water for remote locations. - Encourage property owners in vulnerable areas to consider the installation of sprinkler kits as part of their wildfire preparedness strategy, conduct an awareness campaign to spread knowledge about the benefits of sprinkler kits and their proper use. - Explore partnerships and collaborate with local, state, or federal agencies, as well as community organizations, to acquire the necessary funding for fire inspection and investigation vehicle.	Enhance public safety, improve wildfire response, and limit size of wildfires.	- Conduct fire stations inventories of tools and appliances. - Replace outdated/degraded tools and appliances.	- Emergency Management Performance Grant (EMPG) (FEMA) - Regional Catastrophic Preparedness (RCP) grants - Building Resilient Infrastructure and Communities (BRIC) grants - Firefighter Property Program (DNR) - Federal Excess Personal Property (DNR)
FR 2		M	Spring 2025	Increase wildfire training opportunities for fire department and other appropriate agency personnel.	Lands appropriate for prescribed fire exercises	DNR, Conservation Districts/Conservation Commission, Land Trust, Fire Departments	- Send staff to NFPA's Assessing Structure Ignition Potential (ASIP) Trainings hosted by WA DNR, Conservation Commission, and other partners throughout the state. - Utilize prescribed fire management opportunities on public lands as a way to train County firefighters (career and volunteer) in wildfire management and suppression techniques. Partner with federal agencies, DNR, County Parks and Recreation, and the Land Trust. - Support training for fire and land managers on fire operations in the WUI. - Look at possible training opportunities with tribal communities to integrate cultural burning (prairie maintenance and traditional foods program) concepts and Traditional Ecological Knowledge. - Utilize resources and expertise from the Center for Natural Lands Management.	- Increase staff understanding of WUI fire behavior and wildfire risk reduction actions residents should take. - Increase capacity for wildfire response by local crews. - Enhance public safety, improve wildfire response, and limit size of wildfires.	- Provide annual red card training/refreshers/pack test events before start of fire season. - Provide online wildfire training classes/refreshers courses.	- RCP grants - BRIC grants - Firewise grants National Urban and Community Forest Program - FP&S (FEMA) - Funding support associated with Wildfire Ready Neighbors - Firefighter Property Program (DNR) - Wildland Fire Training (DNR)
FR 3		H	Spring 2024	Increase access for fire response.	Private lands	Private, County, Fire Departments	- Fire Departments to work with large landowners to identify access issues and coordinate future access – locked gates and blocked roads. - Develop new protocols for access rights to public lands.	- Reduce response times for emergency responders. - Provides safe and effective wildfire response capabilities. - Provides safe and effective means of evacuation in case of emergencies.	- Conduct regular monitoring and maintenance to make sure roads are drivable for emergency response vehicles. - Consider the use of herbicide on invasive species growth encroaching on access routes, in consultation with Jefferson County Noxious Weed Board.	- BRIC grants - National Fire Plan (NFP) grants - RCP grants 2022 Infrastructure Investments and Jobs Act - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FR 4		M	Spring 2025	Address the need for increased human resources.			- Focus on the “people element” of the operations. - Investigate potential for more career firefighting staff in areas of concern. - Enhance coordination with local contractors and tree service organizations. - Establish a comprehensive “Call When Needed” list of personnel who can be deployed when needed. List to include individuals with various skillsets and qualifications (e.g., dozer operators). - All people on the “Call When Needed” list should meet recommended training recommendations so they are prepared to respond in their respective roles.	- Increase capacity for wildfire response. - Enhance public safety, improve wildfire response, and limit size of wildfires.	- Provide annual red card training/refresher/pack test events before start of fire season. - Provide online wildfire training classes/refresher courses.	- EMPG (FEMA) - BRIC grants - RCP grants - Wildland Fire Training (DNR)
FR 5		H	Spring 2025	Develop Comprehensive Evacuation Plan.	Countywide	County DEM, County Roads, landowners	- Create a committee with multiple agencies to develop a countywide evacuation plan. - Develop specific evacuation plans for residences along specific highways (e.g. Highway 101, Highway 104, SR 20). - Identify WUI communities vulnerable to the impacts of evacuation, devising solutions and mitigative efforts. - Utilize Ladriss analysis to identify high-risk areas for evacuation. - Hold mock evacuation to inform plan utilizing live response and “opt in” using NIXEL. - Model a fire response through selected WUI neighborhood. - Focus on coordination between agencies. - Utilize event as a way to inform and educate the public on the Incident Command System and terminology. - Test Ladriss software in real time. - Conduct after-action review to inform planning. - Align plan with Emergency Response Plan and HMP. - Integrate with evacuation planning for all natural hazards, as appropriate. - Include “micro-evacuation planning” in the plan, specifically identifying areas that might increase hazards for evacuees (e.g., avoiding passage or sheltering near hazardous materials sites). - Work on fuels mitigation, defensible space, and possible shaded fuel breaks.	- Facilitate safe evacuation of residents and support emergency response for responders. - Protect life and lessen high-risk fire behavior along important roads. - Educate the public about efficient safe evacuations.	- Conduct annual maintenance. - Updates materials annually.	- RCP grants - BRIC grants - Firewise grants National Urban and Community Forest Program - FP&S (FEMA) - Community Wildfire Defense Grants (CWDG)
FR 6		H	Spring 2025	Build tribal fire management capacity.	Hoh Reservation, Queets	Tribal, DNR, BIA	- Build firefighting capacity for wildfire suppression. - Seek funding to support creation of fire department (or enhancements of fire department) for each tribal community, equipment, apparatus, personnel, and training.	Enhance fire response and protection of life and property on the western side of the County.	- Conduct annual maintenance. - Update materials annually.	- RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA) - Firefighter Property Program (DNR) - Federal Excess Personal Property (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FR 7		H	Summer 2025	Create unified protocol for fire restrictions and communications.	Countywide	All	- Develop definitive protocols for communications on fire restrictions. - Identify lessons learned from previous events. - Investigate limitations for existing notifications, including residents with no cell phone access. Consider hard line notifications or radio announcements. Coordinate through DEM, NPREP, and PUD. - Identify the locations of residents who don't have cell phones.	- Reduce conflicts and confusion across jurisdictions. - Enhance public safety and improve wildfire response.	- Conduct regular monitoring and review of effectiveness. - Provide updates to materials as necessary.	- RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA) - CWDG
FR 8		L	Spring 2025	Improve fire recording and documentation.	Countywide	County Fire Marshal	- Establish standardized protocols for documenting wildfires, ensuring consistent data collection, and reporting by all relevant agencies and personnel. - Allocate funding for necessary resources, personnel and training for comprehensive fire recording and documentation. - Track fire ignitions and causes and document with meta data. - Assess how education, outreach, mitigation, and prevention could be used to address common ignition sources. - Update spatial data related to past wildfires in the county.	- Better understand causes of wildfire and utilize data to inform education and outreach. - Better understand areas with history of regular wildfire activity to prioritize risk and hazard reduction.	- Maintain database of pertinent wildfire data. - Review and update outreach materials.	- RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA) - Federal Excess Personal Property (DNR)
FR 9		H	Summer 2025	Enhance pre-event planning.	Countywide	All	- Pre-identify Incident Command Posts. - Identify and map dip sites. - Document and inventory personnel and equipment. - Implement mock events that practice transition from initial attack and extended attack. - Carry out after-action review of mock event to inform future wildfire response training and resource needs.	Train and inform fire responders to enhance wildfire response.	- Conduct yearly review and updates to materials. - Set goals for the following year.	- EMPG (FEMA) - CWDG - BRIC grants - RCP grants - Wildland Fire Training (DNR)
FR 10		H	Spring 2024	Identify the needs of each fire district to ensure they have the specific equipment essential for fire response.	Countywide	All fire districts	- East Jefferson Fire District has identified a need for a dozer and hand crews (Type 2) to mitigate threats. - Hand crews are needed for work throughout the entire county.	Enhance fire response and protection of life and property.	- Conduct review of effectiveness and update accordingly. - Set goals for the following year.	- BRIC grants - NFP grants - RCP grants - Community Wildfire Defense Grants (CWDG) - Fire Management Assistance Grant (FMAG) - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FR 11		H	Spring 2024	Increase the housing supply for workforces.	Countywide	All	- Initiate a plan to create more housing options to meet the needs of the workforce. Currently, there is an insufficient availability of housing for workers. - Perhaps create specific housing for fire-related workforce.	Improve the living situations for wildfire responders.	- Conduct annual maintenance. - Communicate with firefighting personnel on effectiveness.	- RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA)
FR 12		M	Spring 2025	Use a code or regulatory program to address the issue of residents creating their own addresses and posting these addresses on signs, making fire response more difficult.	Port Townsend	City of Port Townsend	- Ensure the code applies to all homes. (Second homes are presently excluded from standardized address signs.) - Raise awareness that address signs need to be accurate for emergency response services.	Protect life and property through improving wildfire response.	- Ensure regulatory alignment and safety. - Conduct review of code and update accordingly.	- RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FR 13		M	Spring 2025	Consider using investigative drones and operators to provide real-time aerial insights, enabling efficient monitoring, assessment, and response to fire incidents.	Countywide	Fire departments, City, County	- Conduct a feasibility study to assess the suitability of using investigative drones in the designated wildfire-prone areas covered by the CWPP. - Collaborate with experienced drone operators with expertise in wildfire monitoring and response. - Develop protocols for deploying drones in different wildfire scenarios, considering factors such as weather conditions, terrain, and potential risks. - Using drones at initial attack is ideal for hard-to-reach areas. - Can be crucial in identifying imminent danger to structures, such as the Beaver Valley Fire.	Enhance decision-making and resource allocation.	- Conduct review of effectiveness and update accordingly. - Regular training sessions and updates will ensure effective utilization of this technology.	- RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA) - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FR 14		M	Spring 2025	Expand the city's legal capacity to address concerns related to wildfire.	Countywide	City of Port Townsend	- Conduct a comprehensive review of existing legal frameworks, ordinances, and regulations related to wildfire, ensuring they are up-to-date and aligned with best practices in wildfire management. - Identify potential legal obstacles for wildfire mitigation activities and evaluate possible solutions. - Examples of legal obstacles: Zoning and land-use regulations, Property access and easements, Property rights and liability issues, Building codes and permits, etc. - Collaborate with regional, state, and federal policy authorities to create and enhance litigation related to wildfire management (e.g. land-use planning, permitting, and building codes). - Increase or establish abatement funding to address various community concerns.	- Enhance the County's ability to address wildfire-related concerns and challenges effectively. - Protect life and property through improving wildfire mitigation impacted by legal hurdles.	- Continuously evaluate the legal framework and policies for alignment with changing wildfire dynamics and community needs. - Periodically review the legal capacity expansion efforts.	- RCP grants - BRIC grants - National Urban and Community Forest Program
FR 15		H	Spring 2024	Prepare community for red flag day power shutoffs.	Countywide	All	- Implement power shutoff protocols on red flag days. - Launch community-wide awareness campaign to educate citizens about the procedure. - Prioritize support for vulnerable populations, such as the elderly, by offering guidance on preserving medications, as well as guidance on electric vehicle charging alternatives.	Enhance public safety by reducing ignition potential.	Conduct review of effectiveness and update accordingly.	- RCP grants - BRIC grants - National Urban and Community Forest Program - CWDG - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FR 16		H	Spring 2024	Enhance personnel.	Countywide	DNR, fire departments, City, County	- Expand volunteer base for water tender drivers. - Bolster staffing for the County Office of the Fire Marshal. - Offer training to interested volunteers to increase their depth and availability. - Collaborate for cross training with the DNR. - Establish a workforce exchange with the DNR during wildfire season.	Enhance public safety, improve wildfire response, and limit size of wildfires.	- Provide annual red card training/refresher/pack test events before start of fire season. - Provide online wildfire training classes/refresher courses.	- EMPG (FEMA) - RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA) - CWDG Firefighter Property Program (DNR)
FR 17		H	Spring 2024	Fire departments should invest in back-up fuel pods.	Countywide	All	- Back-up fuel pods are needed to ensure adequate gas supply for reaching remote locations during emergencies. - Integrate the inclusion of fuel tenders into pre-event planning to enhance the efficiency of resource refueling on larger wildland incidents, particularly in rural areas.	Enhance public safety, improve wildfire response, and limit size of wildfires.	- Conduct review of effectiveness and update accordingly. - Set goals for the following year.	- EMPG (FEMA) - RCP grants - BRIC grants - National Urban and Community Forest Program - FP&S (FEMA) - Firefighter Property Program (DNR) - Federal Excess Personal Property (DNR)

Project ID	Status	Priority (H,M,L)	Timeline for Action	Project Description	Location	Land Ownership/ Lead Agency	Methodology/Approach	Serves To	Monitoring/Maintenance Requirements	Funding Sources
FR 18		H	Spring 2024	Coordinate City and County to optimize fire safety efforts.	Countywide	All	- City should consider strengthen its capacity for fire prevention, safety, and response. - County (or Jefferson Conservation District) should consider hiring a community wildfire risk specialist. - Explore collaboration with the Jefferson Conservation District, leveraging their potential staff capacity to support and house a wildfire position or work group. - Consolidate funding and resources collaboratively between the City and County. - Coordinate regular communications with private landowners on wildfire risks and hazards, and where to find resources to address high-risk conditions. - Coordinate with county to create a local Fire Safe Council.	Improve overall fire safety and coordination within the community.	- Conduct review of effectiveness and update accordingly. - Set goals for the following year.	- RCP grants - BRIC grants - Firewise grants National Urban and Community Forest Program - CWDG - Washington State Conservation Commission - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FR 19		M	Spring 2024	Increase fire hydrants in communities.	Countywide	City water departments, PUD, private water purveyors	- Evaluate the community to identify areas with a higher risk of fires, considering factors such as population density, historical fire incidents, and proximity to flammable structures or materials. - Identify locations/communities that need fire hydrants. - Install fire hydrants in these designated locations. - Explore the feasibility of mobile and stationary “fracking” style water tanks as hydrant alternatives.	Improve wildfire response capabilities and capacity to suppress fires.	Ongoing design, planning, and implementation of projects is necessary.	- RCP grants - BRIC grants - National Urban and Community Forest Program - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FR 20		H	Fall 2024	Conduct a comprehensive review and redesign standards for new subdivisions with a focus on wildfire safety.	Port Townsend	City of Port Townsend	- Set standards to be used as appropriate model for new subdivisions. - Address ingress and egress, street width, and driveway related issues in accordance with new subdivision codes. - Address the challenges posed by old plats that lack planning for the back side of the subdivision, which currently has no secondary access. - Implement zoning and land-use policies that promote higher-density development within existing urban areas, allowing for more efficient land use while reducing the pressure to expand into undeveloped forestland. *See table note. - Explore the possibility of incentive programs for property developers, builders, and homeowners who contribute to increasing density in urban areas (e.g., permitting fees, tax credits, or other financial benefits).	Enhance public safety and improve wildfire response.	Conduct review effectiveness and update accordingly.	- BRIC grants - National Urban and Community Forest Program - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)
FR 21		L	Fall 2025	East Jefferson County RAWs Installation and Monitoring	Eastern Jefferson County	Fire departments, City, County	- Conduct a geographic and climatic survey of eastern Jefferson County to identify optimal locations for RAWs. - Collaborate with local meteorologists, fire departments, and environmental scientists. - Identify and apply for grant funding opportunities from federal, state, and private sources. - Partner with a professional installation team to set up the stations. - Establish a data management system to collect, store, and analyze weather data.	Improve understanding of local weather and microclimates to inform wildfire mitigation strategies. Foster a safer and more informed community.	Conduct regular reviews and calibrations of the RAWs to ensure data accuracy and reliability. Schedule frequent maintenance checks and inspections. Generate monthly and annual reports summarizing weather data.	- FEMA Hazard Mitigation Assistance Grants - RCP grants - BRIC grants - Firewise grants National Urban and Community Forest Program - CWDG - Financial Assistance Program for Wildfire Resilience & Forest Health (DNR)

* Increased density and narrower streets may be appropriate for urban core areas that do not have an increased hazard from wildfire exposures (e.g. windblown embers, direct flame, and radiant heat). However, planners should be extremely careful when dealing with areas that have a higher hazard from these exposures. Increased density creates more risk for urban conflagration (e.g., Marshall Fire, Camp Fire, Maui Wildfires, etc.), and narrower streets create increased congestion for ingress and egress during emergency situations and evacuations. Policy makers and community planners should be cognizant of these considerations when allowing development in wildfire-prone areas. Local jurisdictions should also collaborate with their fire district code officials in these matters.

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CHAPTER 5 – MONITORING AND EVALUATION

All stakeholders and signatories to this Plan desire worthwhile outcomes. The amount of money and effort invested in implementing a plan such as this requires that there be a means to describe whether the goals and objectives expressed in this plan are being accomplished according to expectations. Furthermore, as the Plan 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 Plan.

It is recommended that project monitoring be a collaborative effort. There are many resources for designing and implementing community-based, multi-party monitoring that could support and further inform a basic monitoring program for the Plan (Egan 2013). Table 5.1 identifies suggested monitoring strategies.

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 toward wildfire hazard and risk reduction. The 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 GPS location; photo points of cardinal directions; keep photos protected in archival location	Advisory Group 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	Advisory Group member	Evaluating costs, potential fire behavior

Strategy	Task/Tool	Lead	Remarks
Number of HIZs/defensible space treated to reduce structural ignitability	GPS	Homeowner	Structure protection
Number of residents/citizens participating in any Plan projects and events	Meetings, media interviews, articles	Advisory Group 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	Advisory Group member	Evaluate local job growth
Education outreach: number, kinds of involvement	Workshops, classes, field trips, signage	Advisory Group member	Evaluate objectives
Emergency management: changes in agency response capacity	Collaboration	Agency representative	Evaluate mutual aid
Codes and policy changes affecting the Plan	Qualitative	Advisory Group	Plan changes
Number of stakeholders	Added or dropped	Advisory Group	Plan changes
Wildfire acres burned, human injuries/fatalities, infrastructure loss, environmental damage, suppression, and rehabilitation costs	Wildfire records	Advisory Group	Compare with 5- or 10-year average

5.1 IMPLEMENTATION

This Plan makes recommendations for prioritized fuels reduction projects, measures to reduce structural ignitability, and methods for carrying out public education and outreach. Implementation of projects must be tailored to the specific project and will be unique to the location depending on available funding resources and regulations. Information pertaining to funding is provided in Appendix D.

5.2 PLAN EVALUATION

CWPPs are intended to reduce the risk from wildfire for a community and surrounding environment. However, over time, communities change and expand, vegetation grows back, and forests and wildlands evolve. As such, the risk of wildfire to communities is constantly changing. The plans and methods to reduce risk must be dynamic to keep pace with the changing environment. An evaluation of this Plan will gather information and identify whether the plans and strategies are on course to meet the desired outcomes or if modifications are needed to meet expectations. It is recommended that the Plan be evaluated on an annual basis, which should be completed by convening the existing Advisory Group so that all entities contribute to the evaluation. The Plan document and planning goals and objective should be updated annually, based on findings from the evaluation.

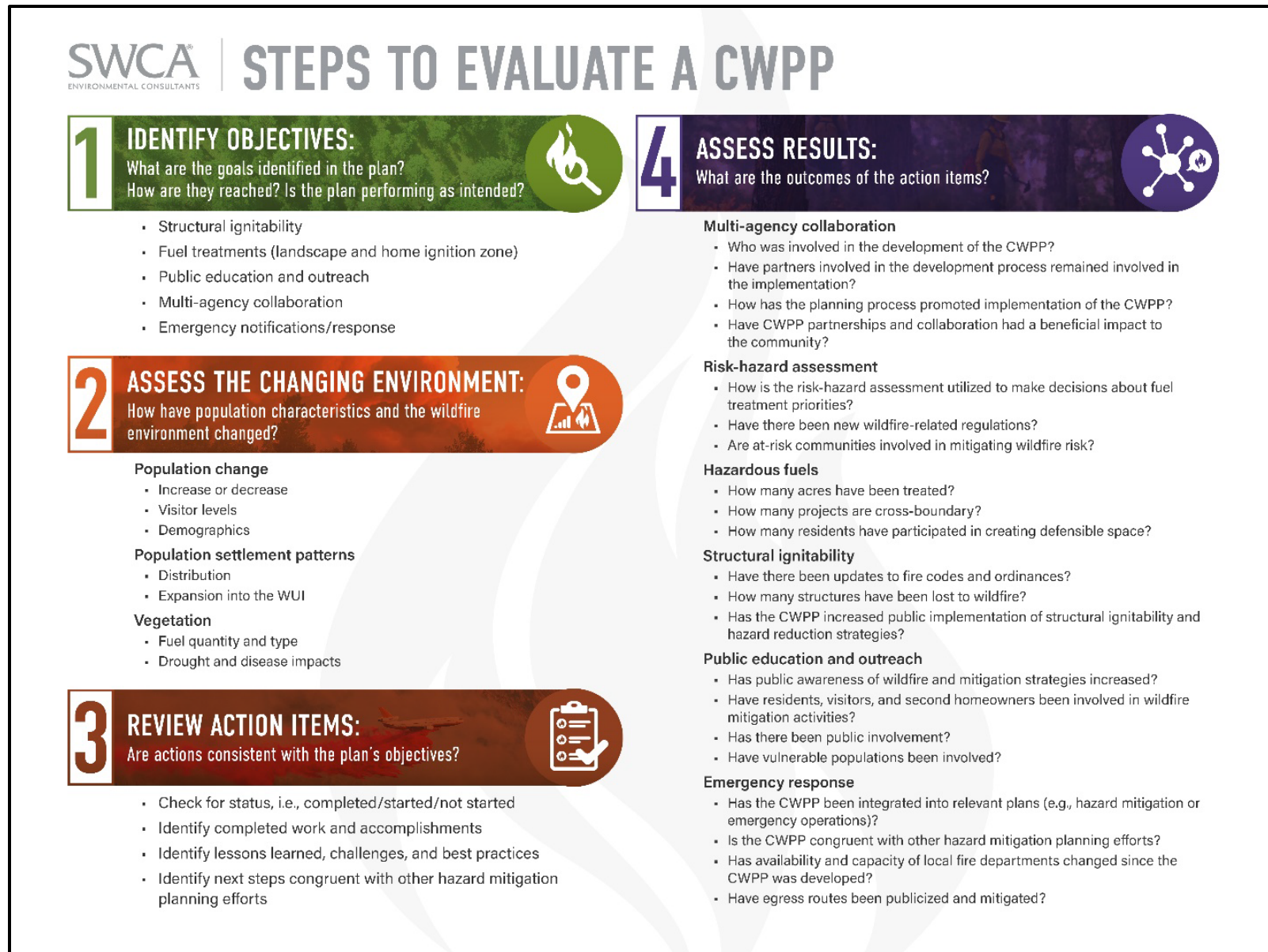


Figure 5.1. Plan evaluations steps for CWPPs.

5.3 TIMELINE FOR UPDATING THE PLAN

The HFRA allows for maximum flexibility in the planning process, permitting the Advisory Group to determine the time frame for updating the Plan. The Advisory Group members are encouraged to meet on an annual basis to review the project list, discuss project successes, and strategize regarding project implementation funding. It is suggested that the evaluation framework above be used annually to make plan updates, and a more formal revision be made on the fifth anniversary of signing and every 5 years following.

ABBREVIATIONS AND ACRONYMS

BAER	Burned Area Emergency Response
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BRIC	Building Resilient Infrastructure and Communities
CAL FIRE	California Department of Forestry and Fire Protection
CA GOPR	California Governor's Office of Planning and Research
CCFPD1	Clallam County Fire District No. 1
CCFPD3	Clallam County Fire District No. 3
CIG	Conservation Innovation Grant
CLT	cross-laminated timber
CUSP	Coalition for the Upper South Platte
CWDG	Community Wildfire Defense Grants
CWPP	community wildfire protection plan
EAS	Emergency Alert System
EFRP	Emergency Forest Restoration Program
EMD	Emergency Management Division
EPA	U.S. Environmental Protection Agency
EQIP	Environmental Quality Incentives Program
EWP	Emergency Watershed Protection
FACLN	Fire Adapted Communities Learning Network
FEMA	Federal Emergency Management Agency
FHSP	Forest Health Strategic Plan
FMAG	Fire Management Assistance Grant
FMP	fire management plan
FP&S	Fire Prevention and Safety
GIS	geographic information system
HFRA	Healthy Forests Restoration Act of 2003
HIZ	home ignition zone
HMGP	Hazard Mitigation Grant Program
HMP	hazard mitigation plan
HVRA	highly valued resource and asset
IBHS	Insurance Institute for Business and Home Safety
IFTDSS	Interagency Fuel Treatment Decision Support System

JCCD	Jefferson County Conservation District
Jefferson County DEM	Jefferson County Department of Emergency Management
NFP	National Fire Plan
NFPA	National Fire Protection Association
NIFC	National Interagency Fire Center
NPS	National Park Service
NRCA	natural resource conservation area
NRCS	Natural Resources Conservation Service
NWCG	National Wildfire Coordinating Group
OIC	Office of the Insurance Commissioner
PG&E	Pacific Gas and Electric Company
Plan	Jefferson County Community Wildfire Protection Plan
PUD	Public Utility District
PWFC	Washington State Post-Wildfire Flood Committee
QIN	Quinault Indian Nation
RAW	remote automated weather
RCP	Regional Catastrophic Preparedness
RWC	Revised Code of Washington
SAFER	Staffing for Adequate Fire and Emergency Response
SEPA	State Environmental Policy Act
SWCA	SWCA Environmental Consultants
ULI	Urban Land Institute
USDA	U.S. Department of Agriculture
USFA	U.S. Fire Administration
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WA DNR	Washington State Department of Natural Resources
WAFAC	Washington State Fire Adapted Communities Learning Network
WA-WUI	Washington Wildland-Urban Interface
WSDOT	Washington Department of Transportation
WUI	wildland-urban interface

GLOSSARY

Aspect: Cardinal direction toward which a slope faces in relation to the sun (NWCG 2021).

Active Crown Fire: A crown fire in which the entire fuel complex is involved in flame, but the crowning phase remains dependent on heat released from surface fuel for continued spread. An active crown fire presents a solid wall of flame from the surface through the canopy fuel layers. Flames appear to emanate from the canopy as a whole rather than from individual trees within the canopy. Active crown fire is one of several types of crown fire and is contrasted with passive crown fires, which are less vigorous types of crown fire that do not emit continuous, solid flames from the canopy (SWCA).

Available Canopy Fuel: The mass of canopy fuel per unit area consumed in a crown fire. There is no postfrontal combustion in canopy fuels, so only fine canopy fuels are consumed. We assume that only the foliage and a small fraction of the branchwood is available (Wooten 2021).

Available Fuel: The total mass of ground, surface and canopy fuel per unit area available fuel consumed by a fire, including fuels consumed in postfrontal combustion of duff, organic soils, and large woody fuels (Wooten 2021).

Backfiring: Intentionally setting fire to fuels inside a control line to contain a fire (Wooten 2021).

Biomass: Organic material. Also refers to the weight of organic material (e. g. biomass roots, branches, needles, and leaves) within a given ecosystem (Wooten 2021).

Burn Severity: A qualitative assessment of the heat pulse directed toward the ground during a fire. Burn severity relates to soil heating, large fuel and duff consumption, consumption of the litter and organic layer beneath trees and isolated shrubs, and mortality of buried plant parts (SWCA).

Canopy: The more or less continuous cover of branches and foliage formed collectively by adjacent trees and other woody species in a forest stand. Where significant height differences occur between trees within a stand, formation of a multiple canopy (multi-layered) condition can result (SWCA).

Chain: Unit of measure in land survey, equal to 66 feet (20 m) (80 chains equal 1 mile). Commonly used to report fire perimeters and other fireline distances. Popular in fire management because of its convenience in calculating acreage (example: 10 square chains equal one acre) (New Mexico Future Farmers of America 2010).

Climate adaptation: Adaptation is an adjustment in natural or human systems to a new or changing environment. Adaptation to climate change refers to adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (California Governor's Office of Planning and Research [CA GOCR] 2020).

Climate Change: A change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods (CA GOCR 2020).

Community Assessment: An analysis designed to identify factors that increase the potential and/or severity of undesirable fire outcomes in WUI communities (SWCA).

Communities at Risk: Defined by the HFRA as "Wildland-Urban Interface Communities within the vicinity of federal lands that are at high risk from wildfire."

Community Wildfire Protection Plan (CWPP): A planning document that seeks to reduce the threat to life and property from wildfire by identifying and mitigating wildfire hazards to communities and infrastructure located in the WUI. Developed from the HFRA, a CWPP addresses issues such as wildfire response, hazard mitigation, community preparedness, or structure protection (SWCA).

Conditional Surface Fire: A potential type of fire in which conditions for sustained conditional surface fire active crown fire spread are met but conditions for crown fire initiation are not. If the fire begins as a surface fire, then it is expected to remain so. If it begins as an active crown fire in an adjacent stand, then it may continue to spread as an active crown fire (Wooten 2021).

Contain: A tactical point at which a fire's spread is stopped by and within specific contain features, constructed or natural; also, the result of stopping a fire's spread so that no further spread is expected under foreseeable conditions. For reporting purposes, the time and date of containment. This term no longer has a strategic meaning in federal wildland fire policy (Wooten 2021).

Control: To construct fireline or use natural features to surround a fire and any control spot fires therefrom and reduce its burning potential to a point that it no longer threatens further spread or resource damage under foreseeable conditions. For reporting purposes, the time and date of control. This term no longer has a strategic meaning in federal wildland fire policy (Wooten 2021).

Cover Type: The type of vegetation (or lack of it) growing on an area, based on cover type minimum and maximum percent cover of the dominant species, species group or non-living land cover (such as water, rock, etc.). The cover type defines both a qualitative aspect (the dominant cover type) as well as a quantitative aspect (the abundance of the predominant features of that cover type; Wooten 2021).

Creeping Fire: A low-intensity fire with a negligible rate of spread (Wooten 2021).

Crown Fire: A fire that advances at great speed from crown to crown in tree canopies, often well in advance of the fire on the ground (National Geographic 2021).

Defensible Space: An area around a structure where fuels and vegetation are modified, cleared, or reduced to slow the spread of wildfire toward or from a structure. The design and distance of the defensible space is based on fuels, topography, and the design/materials used in the construction of the structure (SWCA).

Duff: The layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil (SWCA).

Ecosystem: An interacting natural system including all the component organisms together with the abiotic environment and processes affecting them (SWCA).

Environmental Conditions: That part of the fire environment that undergoes short-term changes: weather, which is most commonly manifest as windspeed, and dead fuel moisture content (Wooten 2021).

Escape Route: A preplanned and understood route firefighters take to move to a temporary refuge area or other low-risk area. When escape routes deviate from a defined physical path, they should be clearly marked (SWCA).

Evacuation: The temporary movement of people and their possessions from locations threatened by wildfire (SWCA).

Fire-Adapted Community: A fire-adapted community collaborates to identify its wildfire risk and works collectively on actionable steps to reduce its risk of loss. This work protects property and increases the safety of firefighters and residents (USFA 2021b).

Fire Behavior: The manner in which fuel ignites, flame develops, and fire spread and exhibits other related phenomena as determined by the interaction of fuels, weather, and topography (Fire Research and Management Exchange System 2021).

Fire Break: Areas where vegetation and organic matter are removed down to mineral soil (SWCA).

Fire Environment: The characteristics of a site that influence fire behavior. In fire modeling the fire environment is described by surface and canopy fuel characteristics, windspeed and direction, relative humidity, and slope steepness (Wooten 2021).

Fire Frequency: A broad measure of the rate of fire occurrence in a particular area. For historical analyses, fire frequency is often expressed using the fire return interval calculation. For modern-era analyses, where data on timing and size of fires are recorded, fire frequency is often best expressed using fire rotation (SWCA).

Fire Hazard: Fire hazard is the potential fire behavior or fire intensity in an area, given the type(s) of fuel present – including both the natural and built environment – and their combustibility (CA GOPR 2020).

Fire History: The chronological record of the occurrence of fire in an ecosystem or at a specific site. The fire history of an area may inform planners and residents about the level of wildfire hazard in that area (SWCA).

Fire Intensity: A general term relating to the heat energy released in a fire (SWCA).

Fireline Intensity: Amount of heat release per unit time per unit length of fire front. Numerically, the product of the heat of combustion, quantity of fuel consumed per unit area in the fire front, and the rate of spread of a fire, expressed in kilowatts per minute (SWCA). This expression is commonly used to describe the power of wildland fires, but it does not necessarily follow that the severity, defined as the vegetation mortality, will be correspondingly high (Wooten 2021).

Fire Prevention: Activities such as public education, community outreach, planning, building code enforcement, engineering (construction standards), and reduction of fuel hazards that is intended to reduce the incidence of unwanted human-caused wildfires and the risks they pose to life, property or resources (CA GOPR 2020).

Fire Regime: A measure of the general pattern of fire frequency and severity typical to a particular area or type of landscape: The regime can include other metrics of the fire, including seasonality and typical fire size, as well as a measure of the pattern of variability in characteristics (SWCA).

Fire Regime Condition Class: Condition classes are a function of the degree of fire regime condition class departure from historical fire regimes resulting in alterations of key ecosystem components such as composition structural stage, stand age, and canopy closure (Wooten 2021).

Fire Return Interval: Number of years (interval) between two successive fires in a designated area (SWCA).

Fire Severity: A qualitative measure of the immediate effects of fire on the fire severity ecosystem. It relates to the extent of mortality and survival of plant and animal life both aboveground and belowground and to loss of organic matter. It is determined by heat released aboveground and belowground. Fire Severity is dependent on intensity and residence dependent of the burn. For trees,

severity is often measured as percentage of basal area removed. An intense fire may not necessarily be severe (Wooten 2021).

Fire Risk: “Risk” takes into account the intensity and likelihood of a fire event to occur as well as the chance, whether high or low, that a hazard such as a wildfire will cause harm. Fire risk can be determined by identifying the susceptibility of a value or asset to the potential direct or indirect impacts of wildfire hazard events (CA GOPR 2020).

Flammability: The relative ease with which fuels ignite and burn regardless of the quantity of the fuels (SWCA).

Flame Length: The length of flames in the propagating fire front measured along the slant of the flame from the midpoint of its base to its tip. It is mathematically related to fireline intensity and tree crown scorch height (Wooten 2021).

Foliar Moisture Content: Moisture content (dry weight basis) of live foliage, foliar moisture content expressed as a percent. Effective foliar moisture content incorporates the moisture content of other canopy fuels such as lichen, dead foliage, and live and dead branchwood (Wooten 2021).

Forest Fire: uncontrolled burning of a woodland area (National Geographic 2021).

Fuel Bed: An array of fuels usually constructed with specific loading, depth, and particle size to meet experimental requirements; also, commonly used to describe the fuel composition.

Fuel Break: A natural or manmade change in fuel characteristics which affects fire behavior so that fires burning into them can be more readily controlled (NWCG 2021).

Fuel Complex: The combination of ground, surface, and canopy fuel strata (Wooten 2021).

Fuel Condition: Relative flammability of fuel as determined by fuel type and environmental conditions (SWCA).

Fuel Continuity: A qualitative description of the distribution of fuel both horizontally and vertically. Continuous fuels readily support fire spread. The larger the fuel discontinuity, the greater the fire intensity required for fire spread (Wooten 2021).

Fuel Loading: The volume of fuel in a given area generally expressed in tons per acre (SWCA). Dead woody fuel loadings are commonly described for small material in diameter classes of 0 to 0.25, 0.25 to 1, and 1 to 3 inches and for large material greater than 3 inches (Wooten 2021).

Fuel Management: Manipulation or removal of fuels to reduce the likelihood of ignition and to reduce potential damage in case of a wildfire. Fuel management methods include prescribed fire, mechanical treatments (mowing, chopping), herbicides, biomass removal (thinning or harvesting of trees, harvesting of pine straw), and grazing. Fuel management techniques may sometimes be combined for greater effect (SWCA).

Fuel Model: A set of surface fuel bed characteristics (load and surface-area-to- fuel model volume-ratio by size class, heat content, and depth) organized for input to a fire model (Wooten 2021).

Fuel Modification: The manipulation or removal of fuels (i.e., combustible biomass such as wood, leaves, grass, or other vegetation) to reduce the likelihood of igniting and to reduce fire intensity. Fuel modification activities may include lopping, chipping, crushing, piling and burning, including prescribed burning. These activities may be performed using mechanical treatments or by hand crews. Herbicides

and prescribed herbivory (grazing) may also be used in some cases. Fuel modification may also sometimes be referred to as “vegetation treatment” (CA GOPR 2020).

Fuel Moisture Content: This is expressed as a percent or fraction of oven dry fuel moisture content weight of fuel. It is the most important fuel property controlling flammability. In living plants, it is physiologically bound. Its daily fluctuations vary considerably by species but are usually above 80 to 100 percent. As plants mature, moisture content decreases. When herbaceous plants cure, their moisture content responds as dead fuel moisture content, which fluctuates according to changes in temperature, humidity, and precipitation (Wooten 2021).

Fuel Treatment: The manipulation or removal of fuels to minimize the probability of ignition and/or to reduce potential damage and resistance to fire suppression activities (NWCG 2021). Synonymous with fuel modification.

Grazing: There are two types of grazing: 1) traditional grazing, and 2) targeted grazing. Traditional grazing refers to cattle that are managed in extensive pastures to produce meat. Targeted grazing involves having livestock graze at a specific density for a given period of time for the purpose of managing vegetation. Even though both kinds of grazing manage fuel loading in range- and forested lands, targeted grazing is different in that its sole purpose is to manage fuels. Targeted grazing is done by a variety of livestock species such as sheep, goats, or cows (University of California Division of Agriculture and Natural Resources [UCANR] 2019).

Ground Fire: Fire that burns organic matter in the soil, or humus; usually does not appear at the surface (National Geographic 2021).

Ground Fuels: Fuels that lie beneath surface fuels, such as organic soils, duff, decomposing litter, buried logs, roots, and the below-surface portion of stumps (Wooten 2021).

Hazard: A “hazard” can be defined generally as an event that could cause harm or damage to human health, safety, or property (CA GOPR 2020).

Hazardous Areas: Those wildland areas where the combination of vegetation, topography, weather, and the threat of fire to life and property create difficult and dangerous problems (SWCA).

Hazardous Fuels: A fuel complex defined by type, arrangement, volume, condition, and location that poses a threat of ignition and resistance to fire suppression (NWCG 2021).

Hazardous Fuels Reduction: Any strategy that reduces the amount of flammable material in a fire-prone ecosystem. Two common strategies are mechanical thinning and prescribed burning (Wooten 2021).

Hazard Reduction: Any treatment that reduces the threat of ignition and spread of fire (SWCA).

Highly Valued Resources and Assets (HVRAs): Landscape features that are influenced positively and/or negatively by fire. Resources are naturally occurring, while Assets are human made (IFTDSS 2021).

Ignition: The action of setting something on fire or starting to burn (SWCA).

Incident: An occurrence or event, either natural or person-caused, which requires an emergency response to prevent loss of life or damage to property or natural resources (Wooten 2021).

Influence Zone: An area that, with respect to wildland and urban fire, has a set of conditions that facilitate the opportunity for fire to burn from wildland fuels to the home and or structure ignition zone (NWCG 2021).

Initial Attack: The actions taken by the first resources to arrive at a wildfire to protect lives and property and prevent further extension of the fire (SWCA).

Invasive Species: An introduced, nonnative organism (disease, parasite, plant, or animal) that begins to spread or expand its range from the site of its original introduction and that has the potential to cause harm to the environment, the economy, or to human health (USGS 2021).

Ladder Fuels: Fuels that provide vertical continuity allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease (SWCA).

Litter: Recently fallen plant material that is only partially decomposed and is still discernible (SWCA).

Manual Treatments: Felling and piling of fuels done by hand. The volume of material generated from a manual fuel treatment is typically too small to warrant a biomass sale therefore collected material is disposed of by burning or chipping. The work can be performed by either a single individual or a large, organized crew with powered equipment (UCANR 2021a).

Mechanized Treatments: Mechanical treatments pulverize large continuous patches of fuel to reduce the volume and continuity of material. Mechanical treatments can be applied as either mastication or chipping treatments. Both treatments shred woody material, but mastication leaves residue on-site while chipping collects the particles for transportation off site. Similar to hand treatments, mechanical treatments can target specific areas and vegetation while excluding areas of concern. In addition, mechanical treatment is easily scalable to large areas (>30 acres) with little added cost. (UCANR 2021b).

Mitigation: Action that moderates the severity of a fire hazard or risk (SWCA).

Mutual Aid: Assistance in firefighting or investigation by fire agencies, irrespective of jurisdictional boundaries (NWCG 2021).

Native Revegetation: The process of replanting and rebuilding the soil of disturbed land (e.g., burned) with native plant species (USDA 2005).

Native Species: A species that evolved naturally in the habitat, ecosystem, or region as determined by climate, soil, and biotic factors (USDA 2005).

National Cohesive Strategy: The National Cohesive Wildland Fire Management Strategy is a strategic push to work collaboratively among all stakeholders and across all landscapes, using best science, to make meaningful progress toward three goals:

- Resilient Landscapes
- Fire-Adapted Communities
- Safe and Effective Wildfire Response

Vision: To safely and effectively extinguish fire when needed; use fire where allowable; manage our natural resources; and as a nation, to live with wildland fire (Forests and Rangelands 2023).

Overstory: That portion of the trees in a forest which forms the upper or uppermost layer (SWCA).

Passive Crown Fire: A type of crown fire in which the crowns of individual trees or small groups of trees burn, but solid flaming in the canopy cannot be maintained except for short periods. Passive crown fire

encompasses a wide range of crown fire behavior, from occasional torching of isolated trees to nearly active crown fire. Passive crown fire is also called torching or candling. A fire in the crowns of the trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface (SWCA).

Prescribed Burning: Any fire ignited by management actions under specific, predetermined conditions to meet specific objectives related to hazardous fuels or habitat improvement. Usually, a written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition (USFS n.d.).

Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information. Usually, it is expressed in chains or acres per hour for a specific period in the fire's history (NWCG 2021).

Resilience: Resilience is the capacity of any entity – an individual, a community, an organization, or a natural system – to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience (CA GOPR 2020).

Resilient Landscape: Landscapes or ecosystems that resist damage and recover quickly from disturbances (such as wildland fires) and human activities (Forests and Rangelands 2014).

Response: Movement of an individual firefighting resource from its assigned standby location to another location or to an incident in reaction to dispatch orders or to a reported alarm (SWCA).

Roadside Buffer: Intentional change or alteration in land cover and vegetation composition along roadways intended to reduce ladder fuels and canopy continuity. Buffers can reduce fire spread across roadways and improve the safety of designated evacuation routes.

Safety Element: One of the seven mandatory elements of a local general plan (a county plan that forms the foundation for future development), the safety element must identify hazards and hazard abatement provisions to guide local decisions related to zoning, subdivisions, and entitlement permits. The element should contain general hazard and risk reduction strategies and policies supporting hazard mitigation measures (CA GOPR 2020).

Shaded Fuel Break: Fuel breaks where understory vegetation is primarily cleared, leaving the forest canopy in-tact. These areas maintain higher relative humidity, lower temperatures, and sustain higher biodiversity while also reducing fuel loads.

Slash: Debris left after logging, pruning, thinning, or brush cutting. Slash includes logs, chips, bark, branches, stumps, and broken trees or brush that may be fuel for a wildfire (SWCA).

Slope Percent: The ratio between the amount of vertical rise of a slope and horizontal distance as expressed in a percent. One hundred feet of rise to 100 feet of horizontal distance equals 100 percent (NWCG 2021).

Suppression: The most aggressive fire protection strategy, it leads to the total extinguishment of a fire (SWCA).

Surface Fire: fire that typically burns only surface litter and undergrowth (National Geographic 2021).

Surface Fuel: Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants (SWCA).

Structural Ignitability: The ability of structures (such as homes or fences) to catch fire (SWCA).

Topography: The arrangement of the natural and artificial physical features of an area (SWCA).

Total Fuel Load: The mass of fuel per unit area that could possibly be consumed in a hypothetical fire of the highest intensity in the driest fuels (Wooten 2021).

Tree Crown: The primary and secondary branches growing out from the main stem, together with twigs and foliage (SWCA).

Understory: Low-growing vegetation (herbaceous, brush or reproduction) growing under a stand of trees. Also, that portion of trees in a forest stand below the overstory (SWCA).

Understory Fire: A fire burning in the understory, more intense than a surface fire with flame lengths of 1 to 3 m (Wooten 2021).

Values and Assets at Risk: The elements of a community or natural area considered valuable by an individual or community that could be negatively impacted by a wildfire or wildfire operations. These values can vary by community and can include public and private assets (natural and manmade) -- such as homes, specific structures, water supply, power grids, natural and cultural resources, community infrastructure-- as well as other economic, environmental, and social values (CA GOPR 2020).

Vulnerable Community: Vulnerable communities experience heightened risk and increased sensitivity to natural hazard and climate change impacts and have less capacity and fewer resources to cope with, adapt to, or recover from the impacts of natural hazards and increasingly severe hazard events because of climate change. These disproportionate effects are caused by physical (built and environmental), social, political, and/ or economic factor(s), which are exacerbated by climate impacts. These factors include, but are not limited to, race, class, sexual orientation and identification, national origin, and income inequality (CA GOPR 2020).

Wildfire: A “wildfire” can be generally defined as any unplanned fire in a “wildland” area or in the WUI (CA GOPR 2020).

Wildfire Exposure: During fire suppression activities, an exposure is any area/property that is threatened by the initial fire, but in National Fire Incident Reporting System a reportable exposure is any fire that is caused by another fire, i.e., a fire resulting from another fire outside that building, structure, or vehicle, or a fire that extends to an outside property from a building, structure, or vehicle (USFA 2020).

Wildfire Influence Zone: A wildland area with susceptible vegetation up to 1.5 miles from the interface or intermix WUI (CA GOPR 2020).

Wildland: Those unincorporated areas covered wholly or in part by trees, brush, grass, or other flammable vegetation (CA GOPR 2020).

Wildland Fire: Fire that occurs in the wildland as the result of an unplanned ignition (CA GOPR 2020).

Wildland Fuels (aka fuels): Fuel is the material that is burning. It can be any kind of combustible material, especially petroleum-based products, and wildland fuels. For wildland fire, it is usually live, or dead plant material, but can also include artificial materials such as houses, sheds, fences, pipelines, and trash piles. In terms of vegetation, there are six wildland fuel types (fuel type: an identifiable association of fuel elements of distinctive species, form, size, arrangement, or other characteristics that will cause a predictable rate of spread or resistance to control under specified weather conditions.) The six wildland fuel types are (NWCG 2021):

- Grass

- Shrub
- Grass-Shrub
- Timber Litter
- Timber-Understory
- Slash-Blowdown

Wildland-Urban Interface (WUI): The WUI is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels (USFA 2021a). WUI areas in the state of Washington are determined using the WA-WUI map for implementing and enforcing building codes across all counties and cities. Chapter 51-55 WAC outlines the adoption and amendment of the 2021 edition of the Wildland-Urban Interface Code. The code mandates compliance in construction within the interface or intermix areas and specifies the process for updating or designating new WUI, with only the local jurisdiction's code official having the authority to modify the WA-WUI map (WA DNR 2023a). Section 302.3.6 of WAC 51-55 outlines the process for WUI area designation. It involves determining structure density, vegetation density, and proximity categories for a given area, and based on these criteria, the site is designated as either intermix or interface, depending on the specified conditions. Compliance with the code, including the Wildland-Urban Interface Code, is then determined accordingly.

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REFERENCES

- Acker, S., and J. Kertis. 2004. Rapid Assessment Reference Condition Model, Sitka Spruce - Hemlock. Available at: https://www.fs.usda.gov/database/feis/pdfs/PNVGs/Pacific_NW/R-SSHE.pdf. Accessed December 2023.
- After the Fire WA. 2023. After the Fire Resources Homepage. Available at: <https://afterthefirewa.org>. Accessed December 2023.
- Bressette, D.K. 2014a. Sitka Spruce, *Picea sitchensis*. In Native Plants PNW. Available at: <https://nativeplantspnw.com/sitka-spruce-picea-sitchensis/>. Accessed December 2023.
- . 2014b. Western Red Cedar, *Thuja plicata*. In Native Plants PNW. Available at: <https://nativeplantspnw.com/western-red-cedar-thuja-plicata/>. Accessed December 2023.
- . 2014c. Mountain Hemlock, *Tsuga mertensiana*. In Native Plants PNW. Available at: <https://nativeplantspnw.com/mountain-hemlock-tsuga-mertensiana/>. Accessed December 2023.
- . 2014d. Subalpine Fir, *Abies lasiocarpa*. In Native Plants PNW. Available at: <https://nativeplantspnw.com/subalpine-fir-abies-lasiocarpa/>. Accessed December 2023.
- Brinnon Fire Rescue. 2023. Home Page. Available at: <https://brinnonfire.org>. Accessed September 2023.
- Bureau of Indian Affairs (BIA). 2023. Wildfire Response. Available at: <https://www.bia.gov/service/wildfire-response>. Accessed October 2023.
- Butler, B.W., and J.D. Cohen. 1996. An Analytical Evaluation of Firefighter Safety Zones. 12th Fire and Forest Meteorology Conference, Lorne, Australia, 1996.
- California Department of Forestry and Fire Protection (CAL FIRE). 2019. Post-wildfire Recovery. Available at: <https://www.readyforwildfire.org/post-wildfire/after-a-wildfire/>. Accessed December 2023.
- . 2022. Defensible Space. Available at: <https://www.fire.ca.gov/programs/communications/defensible-space-prc-4291/>. Accessed October 2023.
- California Department of Public Health. 2017. Reduce Exposure to Ash When Returning Home After a Fire. Available at: <https://www.cdph.ca.gov/Programs/CCDPPH/DEODC/CDPH%20Document%20Library/ReturnHomeAshGuide.pdf>. Accessed December 2023.
- California Governor's Office of Planning and Research (CA GPR). 2020. Fire Hazard Planning Technical Advisory. Available at: https://www.opr.ca.gov/docs/20201109-Draft_Wildfire_TA.pdf. Accessed December 2023.
- Casualty Actuarial Society (CAS). 2023. Mitigation That Matters: A Wildfire Case Study. Available at: <https://ar.casact.org/mitigation-that-matters-a-wildfire-case-study/>. Accessed October 2023.
- City of Port Townsend. 2023. Chapter 16.04 Building Construction Code. Available at: <https://www.codepublishing.com/WA/PortTownsend/#!/PortTownsend16/PortTownsend1604.html>. Accessed October 2023.

- Clallam County Emergency Management. 2019. Clallam County Multi-Jurisdictional Hazard Mitigation Plan. Available at: <https://www.clallamcountywa.gov/DocumentCenter/View/3304/Hazard-Mitigation-Plan-2019-Plan-Update-PDF>. Accessed October 2023.
- Clallam County Fire District No. 1 (CCFPD1). 2023. The Department. Available at: <https://www.clallamfire1.org/departement/>. Accessed December 2023.
- Clallam County Fire District No. 3 (CCFPD3). 2024. About. Available at: <https://www.ccf3.org/about#:~:text=District%20Overview,fire%20suppression%2C%20and%20public%20education>. Accessed June 2024.
- Coalition for the Upper South Platte (CUSP). 2016. The Phoenix Guide. Available at: https://cusp.ws/wp-content/uploads/2016/12/phoenix_guide.pdf. Accessed September 2023.
- Collins, B.D., D.R. Montgomery, K.L. Fetherston, and T.B. Abbe. 2012. The floodplain large-wood cycle hypothesis: A mechanism for the physical and biotic structuring of temperate forested alluvial valleys in the North Pacific coastal ecoregion. *Geomorphology* 139–140:460–470. Available at: <https://www.sciencedirect.com/science/article/abs/pii/S01695555X11006088>. Accessed May 2024.
- Congressional Research Service. 2023. Wildfire Statistics. Available at: <https://sgp.fas.org/crs/misc/IF10244.pdf>. Accessed December 2023.
- Cope, A.B. 1992. *Abies amabilis*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available: <https://www.fs.usda.gov/database/feis/plants/tree/abiama/all.html>. Accessed October 2023.
- Discover Washington State. 2023. Washington State Parks in Jefferson County. Available at: <https://www.discoveringwashingtonstate.com/visit-these-10-washington-state-parks-in-jefferson-county/>. Accessed October 2023.
- Discovery Bay Volunteer Fire and Rescue. 2023. Home Page. Available at: www.dbvfr.org/index.html. Accessed September 2023.
- Dye, A.W., M.J. Reilly, A. McEvoy, R. Lemons, K.L. Riley, J.B. Kim, and B.K. Kerns. 2024. Simulated future shifts in wildfire regimes in moist forests of Pacific Northwest, USA. *Journal of Geophysical Research: Biogeosciences* 129:e2023JG007722. Available at: <https://doi.org/10.1029/2023JG007722>. Accessed April 2024.
- East Jefferson Fire Rescue. 2022. East Jefferson Fire Rescue Strategic Plan 2022. Available at: <https://www.ejfr.org/wp-content/uploads/2020/05/EJFR-Strategic-Plan-2022-Accepted-11-10-22.pdf>. Accessed September 2023.
- . 2023. Home Page. Available at: <https://www.ejfr.org>. Accessed September 2023.
- Egan, D. 2013. Monitoring- Organizing a Landscape-Scale Forest Restoration Multi-Party Monitoring Program. 38pp. Available at: https://openknowledge.nau.edu/id/eprint/2501/1/Dubay_C_etal_2013_HandbookBreakingBarriers3.pdf. Accessed September 2023.
- Evans, A., S. Auerbach, L.W. Miller, R. Wood, K. Nystrom, J. Loevner, A. Argon, M. Piccarello, and E. Krasilovsky. 2015. Evaluating the Effectiveness of Wildfire Mitigation Activities in the Wildland Urban Interface. Forest Guild, October 2015.

- Federal Emergency Management Agency (FEMA). 2023. Social Vulnerability. Available at: <https://hazards.fema.gov/nri/social-vulnerability>. Accessed September 2023.
- Fire Adapted Communities Learning Network (FACLN). 2017. Telling the “Good Fire” Story: Two Communities’ Prescribed Fire Outreach Efforts. Available at: <https://fireadaptednetwork.org/telling-good-fire-story-two-communities-prescribed-fire-outreach-efforts/>. Accessed October 2023.
- Fire Research and Management Exchange System. 2021. Applied Wildland Fire Behavior Research and Development. Available at: <https://www.frames.gov/applied-fire-behavior/home>. Accessed December 2023.
- Forests and Rangelands. 2014. *The National Strategy: The Final Phase in the Development of the National Cohesive Wildland Fire Management Strategy*. Available at: <https://www.forestsandrangelands.gov/strategy/documents/strategy/CSPHaseIIINationalStrategyApr2014.pdf>. Accessed December 2023.
- . 2023. National Cohesive Wildland Fire Management Strategy Addendum Update. Available at: <https://www.forestsandrangelands.gov/documents/strategy/natl-cohesive-wildland-fire-mgmt-strategy-addendum-update-2023.pdf>. Accessed December 2023.
- Fryer, J.L., and P.S. Luensmann. 2012. Fire regimes of the conterminous United States. Available at: https://www.fs.usda.gov/database/feis/fire_regime_table/fire_regime_table.html#3. Accessed December 2023.
- Graham, R., S. McCaffrey, and T. Jain. 2004. Science Basis for Changing Forest Structure to Modify Wildfire Behavior and Severity. Gen. Tech. Rep. RMRS-GTR-120. Fort Collins, Colorado: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station.
- Grays Harbor County Department of Emergency Management. 2018. Grays Harbor County Multi-Jurisdictional 2018 Hazard Mitigation Plan Update. Available at: https://cms5.revize.com/revize/graysharborcounty/Emergency%20Management/Planning/Grays%20Harbor%20County%20HMP_Plan_Final_2018.pdf. Accessed October 2023.
- Griffith, R.S. 1992. *Picea sitchensis*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at: <https://www.fs.usda.gov/database/feis/plants/tree/picsit/all.html>. Accessed October 2023.
- Halofsky, J.E., D.L. Peterson, K.A. O’Halloran, and C.H. Hoffman (eds.). 2011. Adapting to climate change at Olympic National Forest and Olympic National Park. Gen. Tech. Rep. PNW-GTR-844. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.
- Hoh Indian Tribe. 2022. Hoh Indian Tribe 2022 Hazard Mitigation Plan Tribe. Available at: https://hohtribe-nsn.org/wp-content/uploads/2022/10/Hoh_Tribe_HMP_Public_Review_10172022.pdf. Accessed October 2023.
- . 2023. Government. Available at: <https://hohtribe-nsn.org/government/natural-resources/>. Accessed October 2023.

- Interagency Fuel Treatment Decision Support System (IFTDSS). 2021. About Map Values - Highly Valued Resources or Assets (HVRAs). Available at: <https://iftdss.firenet.gov/firenetHelp/help/pageHelp/content/30-tasks/qwra/mapvalues/hvraabout.htm>. Accessed December 2023.
- Island County Department of Emergency Management. 2020. Multi-Jurisdiction Hazard Mitigation Plan 2020 Update Volume 1: Planning-Area-Wide Elements. Available at: <https://www.islandcountywa.gov/DocumentCenter/View/2262/Island-County-Hazard-Mitigation-Plan-2020-Vol-1-pdf>. Accessed October 2023.
- Jefferson County. 2019. Jefferson County Forestry Study. Available at: <https://www.co.jefferson.wa.us/DocumentCenter/View/8174/JCForestryStudy?bidId=>. Accessed November 2023.
- . 2020. Jefferson County Forest Management Program Web Map. Available at: <https://www.arcgis.com/home/webmap/viewer.html?webmap=df3327387852447492e7f147a9db9c0f>. Accessed November 2023.
- . 2023a. Office of the Fire Marshal. Available at: <https://www.co.jefferson.wa.us/1687/Office-of-the-Fire-Marshar>. Accessed October 2023.
- . 2023b. WUI Property Development Guide. Available at: <https://www.co.jefferson.wa.us/DocumentCenter/View/16526/WUI-Brochure>. Accessed December 2023.
- . 2024. Noxious Weed Resources. Available at: <https://jeffersoncountypublichealth.org/1046/Noxious-Weed-Resources>. Accessed May 2024.
- Jefferson County Conservation District (JCCD). 2023. Resource Hub. Available at: <https://www.jeffersoncd.org/resources/>. Accessed December 2023.
- Jefferson County Department of Community Development. 2023a. Declaration of Ban on All Recreational Fires for All of Unincorporated Jefferson County. Available at: <https://www.co.jefferson.wa.us/DocumentCenter/View/16709/2023-Declaration-of-Burn-Ban---final>. Accessed October 2023.
- . 2023b. Amended Declaration of High Fire Hazard. Available at: <https://www.co.jefferson.wa.us/DocumentCenter/View/16724/Amended-High-Fire-hazard-Declaration---FINAL>. Accessed October 2023.
- Jefferson County Department of Emergency Management (Jefferson County DEM). 2016. Jefferson County - City of Port Townsend All Hazard Mitigation Plan. Available at: <https://www.co.jefferson.wa.us/DocumentCenter/View/3318/2016-Hazard-Mitigation-Plan?bidId=>. Accessed September 2023.
- . 2018. Comprehensive Emergency Management Plan. Available at: <https://www.co.jefferson.wa.us/DocumentCenter/View/3255/2018-Comprehensive-Emerg-Mgt-Plan?bidId=>. Accessed October 2023.
- . 2023. Alerts and Warnings. Available at: <https://www.co.jefferson.wa.us/1066/Alerts-Warnings>. Accessed September 2023.
- Jefferson County Land Trust. 2010. Conservation Plan. Available at: https://www.saveland.org/wp-content/uploads/2016/06/2010_JLT_ConservationPlan_LoRes.pdf. Accessed November 2023.

- Jefferson County Parks and Recreation. 2022. Jefferson County Parks, Recreation, Trails, & Open Space Comprehensive Plan 2022. Available at: https://jeffersoncountywa.myrec.com/forms/7581_jefferson_county_parks_recreation_open_space_and_trails_comprehensive_plan_october_10_2022.pdf. Accessed September 2023.
- Jefferson County Public Utility District. 2023. Jefferson County PUD 2021 Water System Plan - Technical Standards and Specifications. Available at: <https://www.jeffpud.org/wp-content/uploads/2021/05/Standards-and-Specs-Workbook.pdf>. Accessed December 2023.
- Kertis, J., K. Kopper, and S. Acker. 2004. Rapid Assessment Reference Condition Model, Douglas-fir Hemlock-Wet Mesic. Available at: https://www.fs.usda.gov/database/feis/pdfs/PNVGs/Pacific_NW/R-DFHEwt.pdf. Accessed October 2023.
- Kitsap County Department of Emergency Management. 2020. Kitsap County Multi-hazard Mitigation Plan. Available at: <https://www.kitsapdem.com/wp-content/uploads/2021/08/2019-multi-hazard-mitigation-plan-for-Kitsap-County-WA.pdf>. Accessed October 2023.
- Kopper, K., and S. Acker. 2004. Rapid Assessment Reference Condition Model, Subalpine Fir. Available at: https://www.fs.usda.gov/database/feis/pdfs/PNVGs/Pacific_NW/R-ABLA.pdf. Accessed October 2023.
- LANDFIRE. 2020. LANDFIRE Remap 2016 Biophysical Settings (BPS) CONUS. Available at: <https://landfire.gov/frg.php>. Accessed January 2023.
- Long, J.W., F.K. Lake, and R.W. Goode. 2021. The importance of Indigenous cultural burning in forested regions of the Pacific West, USA. *Forest Ecology and Management* 500 (2021):119597, ISSN 0378-1127, <https://doi.org/10.1016/j.foreco.2021.119597>.
- Lovreglio, R., O. Meddour-Sahar and V. Leone. 2014. Goat grazing as a wildfire prevention tool: a basic review. *iForest* 7:260–268. doi: 10.3832/ifor1112-007
- Mason County Division of Emergency Management. 2023. Mason County Multi-Jurisdictional 2023 Hazard Mitigation Plan Update. Available at: https://masoncountywa.gov/dem/plan-update/HMP_Hazard_Chapters_04192023.pdf. Accessed October 2023.
- Mathys, A., N.C. Coops, R.H. Waring. 2014. Soil water availability effects on the distribution of 20 tree species in western North America. *Forest Ecology and Management* 313:144–152.
- McDougall, Susan. 1991. Photo Credit of Pacific silver fir. United State, Washington, Mount Rainier National Park. Available at: <https://plants.usda.gov/home/plantProfile?symbol=ABAM>. Accessed December 2023.
- National Fire Protection Association (NFPA). 2022. Preparing Homes for Wildfire. Available at: <https://www.nfpa.org/Public-Education/Fire-causes-and-risks/Wildfire/Preparing-homes-for-wildfire>. Accessed October 2023.
- National Geographic Society. 2021. Resource Library, Wildfires. Available at: <https://www.nationalgeographic.org/encyclopedia/wildfires/>. Accessed December 2023.

- National Institute of Standards and Technology. 2023. WUI Definitions. Available at: <https://www.nist.gov/el/fire-research-division-73300/wildland-urban-interface-fire-73305/hazard-mitigation-methodology-9#:~:text=Interface%3A%20High%2Ddensity%20development%20adjacent,mingled%20with%20undeveloped%20wildland%20vegetation>. Accessed March 2024.
- National Interagency Fire Center (NIFC). 2022. Post Fire Recovery. Available at: <https://www.nifc.gov/programs/post-fire-recovery>. Accessed December 2023.
- National Park Service (NPS). 2005. Olympic National Park Fire Management Plan. Available at: <https://www.nps.gov/olym/learn/management/upload/FINAL-OLYM-FMP-11212005.pdf>. Accessed September 2023.
- . 2008. Olympic National Park General Management Plan. Available at: <https://parkplanning.nps.gov/projectHome.cfm?projectID=10233>. Accessed October 2023.
- . 2015. Invasive Exotic Plants. Available at: <https://www.nps.gov/olym/learn/nature/invasiveplants.htm>. Accessed May 2024.
- . 2016. Olympic National Park Fire History. Available at: <https://www.nps.gov/olym/learn/management/fire-history.htm>. Accessed September 2023.
- National Wildfire Coordinating Group (NWCG). 1998. Fireline Handbook. NWCG Handbook 3. PMS 410-1. NFES 0065. Boise: National Interagency Fire Center.
- . 2020. Smoke Management Guide for Prescribed Fire. Available at: <https://www.nwcg.gov/sites/default/files/publications/pms420-3.pdf>. Accessed September 2023.
- . 2021. NWCG Glossary of Wildland Fire, PMS 205. Available at: <https://www.nwcg.gov/publications/pms205/nwcg-glossary-of-wildland-fire-pms-205>. Accessed June 2024.
- National Park Service (NPS) and U.S. Department of the Interior. 2005. Olympic National Park Fire Management Plan. Available at: <https://www.nps.gov/olym/learn/management/upload/FINAL-OLYM-FMP-11212005.pdf>. Accessed December 2023.
- National Register of Historic Places. 2023. Washington – Jefferson County. Available at: <https://nationalregisterofhistoricplaces.com/wa/jefferson/state.html>. Accessed September 2023.
- National Science Foundation. 2022. Climate change increases risks of tree death. Available at: <https://new.nsf.gov/news/climate-change-increases-risks-tree-death>. Accessed December 2023.
- National Weather Service. 2023a. NOWData – NOAA Online Weather Data, Quilcene station. Available at: <https://www.weather.gov/wrh/climate?wfo=sew>. Accessed September 2023.
- . 2023b. NOWData – NOAA Online Weather Data, Chimacum station. Available at: <https://www.weather.gov/wrh/climate?wfo=sew>. Accessed September 2023.
- . 2023c. NOWData – NOAA Online Weather Data, Olympic Area, WA. Available at: <https://www.weather.gov/wrh/climate?wfo=sew>. Accessed December 2023.

- New Mexico Future Farmers of America. 2010. Introduction to Wildland Fire Behavior for NM Forestry CDE. Available at: http://www.nmffa.org/uploads/4/1/0/7/41075673/wildland_fire_behavior.pdf#:~:text=Wildland%20fuels%20are%20basically%20live%20and%20For%20dead%20plant,fire%20behavior%20is%20dependent%20on%20certain%20fuel%20characteristics%3A. Accessed December 2023.
- Northwest Climate Adaptations Science Center. 2020. Decline of Western Redcedar: Using Tree Rings to Understand Mortality Patterns and Identify Drought-Resilient Populations Under Climate Change. Available at: <https://nwcasc.uw.edu/science/project/decline-of-western-red-cedar-using-tree-rings-to-understand-mortality-patterns-and-identify-drought-resilient-populations-under-climate-change/>. Accessed January 2024.
- Northwest Interagency Coordination Center. 2023. Welcome to the Northwest Coordination Center. Available at: <https://gacc.nifc.gov/nwcc/>. Accessed: October 2023.
- Northwest Natural Resource Group. 2021. Hands-On Forest Health Strategies for Jefferson County Forest Owners. Available at: <https://www.nnrg.org/hands-on-forest-health-strategies-for-jefferson-county-forest-owners/>. Accessed November 2023.
- Olympic Region Fire Defense Board. 2021. Olympic Region Fire Defense Plan. Available at: https://www.quilcenefirerescue.org/files/728b70119/orfdp_v7.1.pdf. Accessed December 2023.
- Powell, D. 2002. Photo credit from *Pseudotsuga menziesii* var. *glauca*. In: Fire Effects Information System. Available at: <https://www.fs.usda.gov/database/feis/plants/tree/psemeng/all.html>. Accessed December 2023.
- Quinault Indian Nation (QIN). 2023a. About Us. <https://www.quinaultindiannation.com/>. Accessed October 2023.
- . 2023b. Quinault Indian Nation Tribal Hazard Mitigation Plan Update. Available at: <https://www.quinaultindiannation.com/THMP.htm>. Accessed October 2023.
- . n.d. Quinault Indian Nation Hazard Summary. Available at: <https://www.quinaultindiannation.com/documents/Synopsis%20of%20Risk%20Analysis%202023.pdf>. Accessed October 2023.
- Quilcene Fire Rescue. 2023. Home Page. Available at: <https://www.quilcenefirerescue.org/about-us>. Accessed September 2023.
- Rayonier. 2023. Image credit from Working to Prevent Wildfire Through Responsible Management. Clear cut image. Available at: <https://www.rayonier.com/our-land-base/wildfire-prevention/>. Accessed December 2023.
- Read, W. 2015. The 1962 Columbus Day Storm. Available at: <https://www.climate.washington.edu/stormking/October1962.html>. Accessed September 2023.
- Reeves, S.L. 2007. *Arbutus menziesii*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available at: <https://www.fs.usda.gov/database/feis/plants/tree/arbmen/all.html#:~:text=Pacific%20madrone%20is%20most%20abundant,northern%20portion%20of%20its%20range>. Accessed November 2023.

- Rothermel, R.C. 1983. How to Predict the Spread and Intensity of Forest and Range Fires. Gen. Tech. Rep. INT-143. Ogden, Utah: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station.
- Scott, J.H., and R.E. Burgan. 2005. Standard Fire Behavior Fuel Models: A Comprehensive Set for Use with Rothermel's Surface Fire Spread Model. Available at: <https://www.resolutionmineeis.us/sites/default/files/references/scott-burgan-2005.pdf>. Accessed September 2023.
- Society of American Foresters. 2004. Preparing a Community Wildfire Protection Plan: A Handbook for Wildland Urban Interface Communities. Sponsored by Communities Committee, National Association of Counties, National Association of State Foresters, Society of American Foresters, and Western Governors' Association. Available at: <https://gacc.nifc.gov/gbcc/dispatch/wy-tdc/documents/information/education-prevention/cwpphandbook.pdf>. Accessed December 2023.
- Snover, A.K, G.S. Mauger, L.C. Whitely Binder, M. Krosby, and I. Tohver. 2013. Climate Change Impacts and Adaptation in Washington State: Technical Summaries for Decision Makers. State of Knowledge Report prepared for the Washington State Department of Ecology. Climate Impacts Group, University of Washington, Seattle. Available at: <https://cig.uw.edu/wp-content/uploads/sites/2/2020/12/snoveretalsok816.pdf>. Accessed November 2023.
- Suzuki, S., and S.L. Manzello. 2021. Ignition vulnerabilities of combustibles around houses to firebrand showers: further comparison of experiments. Sustainability 13(4).
- SWCA Environmental Consultants (SWCA). 2019. Environmental Assessment Olympic National Park Fire Management Plan. Available at: <https://parkplanning.nps.gov/document.cfm?documentID=93963>. Accessed October 2023.
- Tesky, J.L. 1992a. *Thuja plicata*. In: Fire Effects Information System, U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available at: <https://www.fs.usda.gov/database/feis/plants/tree/thupli/all.html#BOTANICAL%20AND%20ECOLOGICAL%20CHARACTERISTICS>. Accessed November 2023.
- Team Rubicon. 2022. Capabilities and Services. Available at: <https://teamrubiconusa.org/capabilities-services/>. Accessed December 2023.
- Uchytel, R.J. 1991. *Abies lasiocarpa*. In: Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. Available: <https://www.fs.usda.gov/database/feis/plants/tree/abilas/all.html>. Accessed October 2023.
- University of California Division of Agriculture and Natural Resources (UCANR). 2019. Grazing for fire fuels management. Available at: <https://ucanr.edu/blogs/blogcore/postdetail.cfm?postnum=31445>. Accessed November 2023.
- . 2021a. Manual. Available at: <https://ucanr.edu/sites/fire/Prepare/Treatment/Manual/>. Accessed November 2023.
- . 2021b. Mechanical. Available at: <https://ucanr.edu/sites/fire/Prepare/Treatment/Mechanical/>. Accessed November 2023.
- . 2024. UCANR Fire Network: Assess risks and prioritize your actions. Available at: <https://ucanr.edu/sites/fire/Preparedness/Building/>. Accessed June 2024.

- University of Washington Climate Impact Group. 2009. The Washington Climate Change Impacts Assessment. Available at: <https://cig.uw.edu/wp-content/uploads/sites/2/2020/12/wacciareport681-3.pdf>. Accessed October 2023.
- . 2023a. How will climate change affect Northwest forests? Part two of five in the series: Climate Impacts In The Northwest. Available at: <https://express.adobe.com/page/udaAw5GCBxYBe/>. Accessed November 2023.
- . 2023b. Climate Impacts in the Northwest; Forests. Available at: <https://express.adobe.com/page/udaAw5GCBxYBe/>. Accessed October 2023.
- U.S. Census Bureau. 2022a. Quick Facts: Jefferson County, Washington. Available at: <https://www.census.gov/quickfacts/fact/table/jeffersoncountywashington/PST040222#PST040222>. Accessed September 2023.
- . 2022b. ACS Demographic and Housing Estimates. Available at: <https://data.census.gov/table?q=Jefferson+County,+Washington>. Accessed September 2023.
- U.S. Department of Agriculture (USDA). 2005. Terminology and Definitions Associated with Revegetation. Available at: https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/wapmctn6333.pdf. Accessed November 2023.
- . 2012a. Fire regimes of Pacific Northwest coastal forests, Fire Effects Information System. Available at: https://www.fs.usda.gov/database/feis/fire_regimes/PN_coastal_forest/all.html. Accessed October 2023.
- . 2012b. Fire regimes of mesic-dry western hemlock communities, Fire Effects Information System. Available at: https://www.fs.usda.gov/database/feis/fire_regimes/Western_hemlock_dry/all.html. Accessed October 2023.
- . 2012c. Fire regimes of wet-mesic western hemlock communities, Fire Effects Information System. Available at: https://www.fs.usda.gov/database/feis/fire_regimes/Western_hemlock_wet/all.html. Accessed October 2023.
- . 2012d. Fire regimes of Pacific Northwest mountain hemlock communities, Fire Effects Information System. Available at: https://www.fs.usda.gov/database/feis/fire_regimes/PN_mountain_hemlock/all.html. Accessed October 2023.
- . 2023. Olympic National Forest Current and Recent Projects. Available at: <https://www.fs.usda.gov/projects/olympic/landmanagement/projects>. Accessed October 2023.
- U.S. Environmental Protection Agency (EPA). 2019. Wildfire Smoke: A Guide for Public Health Officials. Available at: <https://www.airnow.gov/sites/default/files/2021-05/wildfire-smoke-guide-revised-2019.pdf>. Accessed September 2023.
- . 2023a. Air Plan Approval; WA; Smoke Management Plan Update. Available at: <https://www.federalregister.gov/documents/2023/08/10/2023-16409/air-plan-approval-wa-smoke-management-plan-update>. Accessed September 2023.
- . 2023b. EPA approves Washington's Smoke Management Plan to allow strategic use of prescribed fires to manage forest health and protect air quality. Available at: <https://www.epa.gov/newsreleases/epa-approves-washingtons-smoke-management-plan-allow-strategic-use-prescribed-fires>. Accessed September 2023.

- U.S. Fire Administration (USFA). 2020. Exposures. Available at: <https://www.usfa.fema.gov/nfirs/coding-help/nfirsgrams/nfirsgram-including-exposures.html>. Accessed November 2023.
- . 2021. Fire-Adapted Communities. Available at: <https://www.usfa.fema.gov/wui/communities/>. Accessed December 2023.
- U.S. Forest Service (USFS). 2022. Pacific Southwest Region (R5) Post-Fire Recovery Action Plan 2022 (Version 1.0). Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd1062404.pdf. Accessed December 2023.
- . 2023a. Root Diseases in Oregon and Washington Conifers. Available at: https://www.fs.usda.gov/detail/r6/forest-grasslandhealth/insects-diseases/?cid=fsbdev2_027376. Accessed October 2023.
- . 2023b. Olympic Non-Commercial Thinning Olympic National Forest Hood Canal Ranger District. Available at: <https://www.highergov.com/document/1240bd23q0067-1095999-oly-non-commercialthinning-pdf-07de50/>. Accessed November 2023.
- . 2024. Olympic National Forest. Available at: <https://www.fs.usda.gov/olympic/>. Accessed June 2024.
- . n.d. After the Fire. Available at: <https://www.fs.usda.gov/science-technology/fire/after-fire>. Accessed December 2023.
- U.S. Fish and Wildlife Service (USFWS). n.d. Information for Planning and Consultation Tool. Available at: <https://ipac.ecosphere.fws.gov/location/FBTDFVX7ZNAJBFV7Y4ZMQCMKEM/resources#endangered-species>. Accessed January 2023.
- . 2007. Washington Island National Wildlife Refuges Comprehensive Conservation Plan. Available at: <https://permanent.fdlp.gov/LPS105595/LPS105595/www.fws.gov/pacific/planning/main/docs/WA/waislands/WAIsICC.pdf>. Accessed October 2023.
- . 2022. Fire Management. Available at: <https://www.fws.gov/program/fire-management>. Accessed December 2023.
- . 2023a. Fire Management. Available at: <https://www.fws.gov/program/fire-management>. Accessed October 2023.
- . 2023b. Quillayute Needles Wildlife Refuge. Available at: <https://www.fws.gov/refuge/quillayute-needles>. Accessed October 2023.
- U.S. Geological Survey (USGS). 2021. What is an invasive species and why are they a problem? Available at: https://www.usgs.gov/faqs/what-invasive-species-and-why-are-they-a-problem?qt-news_science_products=0#qt-news_science_products. Accessed November 2023.
- Van Pelt, R. 2007. Identifying Mature and Old Growth Forests in Western Washington. Available at: https://www.dnr.wa.gov/publications/lm_hcp_west_oldgrowth_guide_full_lowres.pdf. Accessed December 2023.

- Washington Geospatial Open Data Portal. 2024. Washington Large Fires 1973-2023. Available at: https://geo.wa.gov/datasets/6f31b076628d4f8ca5a964cbefd2cccc_0/about. Accessed March 2024.
- Washington Smoke Information. 2023. Washington Smoke Information Blog. Available at: <https://wasmoke.blogspot.com>. Accessed September 2023.
- Washington State Building Code Council. 2023. 2021 Washington Wildland-Urban Interface Code First Edition. Available at: <https://www.sbcc.wa.gov/sites/default/files/2023-05/2021%20WAWUIC%20Insert%20Pages%201st%20Printing.pdf>. Accessed 2023.
- Washington State Department of Ecology. 2024. Statewide drought declared due to low snowpack and dry forecast. Available at: <https://ecology.wa.gov/about-us/who-we-are/news/2024-news-stories/april-16-drought-declaration>. Accessed April 2024.
- Washington State Department of Natural Resources (WA DNR). 2018. Washington State Wildland Fire Protection 10-Year Strategic Plan. Available at: https://www.dnr.wa.gov/publications/rp_wildfire_plan_summary.pdf. Accessed October 2023.
- . 2019. Washington State Wildland Fire Protection 10-Year Strategic Plan. Available at: https://www.dnr.wa.gov/publications/rp_wildfire_strategic_plan.pdf. Accessed September 2023.
- . 2020a. Forest Health Treatment Prioritization and Implementation on State Trust Lands in Eastern Washington. Available at: https://www.dnr.wa.gov/sites/default/files/publications/rp_2020_hb1711_report.pdf. Accessed October 2023.
- . 2020b. Plan for Climate Resilience. Available at: https://www.dnr.wa.gov/publications/em_climateresilienceplan_1pager.pdf. Accessed October 2023.
- . 2021. Forest Health Highlights in Washington. Available at: https://www.dnr.wa.gov/publications/rp_fh_2022_forest_health_highlights.pdf. Accessed October 2023.
- . 2022a. 2022 Forest Action Plan Annual Report. Available at: https://www.dnr.wa.gov/sites/default/files/publications/rp_2022_forest_action_plan_annual_report.pdf. Accessed October 2023.
- . 2022b. 20-Year Forest Health Strategic Plan: Eastern Washington | Summary. Available at: https://www.dnr.wa.gov/publications/rp_forest_health_summary.pdf?hiyez. Accessed October 2023.
- . 2022c. Washington Large Fires 1973-2022. Available at: <https://geo.wa.gov/datasets/6f31b076628d4f8ca5a964cbefd2cccc/explore?location=47.336210%2C-120.225150%2C8.22>. Accessed October 2023.
- . 2023a. Community Wildfire Protection Plan Guidance. Available at: https://www.dnr.wa.gov/sites/default/files/publications/rp_cwpp_guidance_04102023.pdf.pdf. Accessed October 2023.
- . 2023b. Fighting Fire. Available at: <https://www.dnr.wa.gov/FightingFire>. Accessed October 2023.

- . 2023c. Wildfire Resources. Available at: <https://www.dnr.wa.gov/programs-and-services/wildfire-resources>. Accessed October 2023.
 - . 2023d. DNR Regions and Districts. Available at: <https://www.dnr.wa.gov/about/dnr-regions-and-districts>. Accessed October 2023.
 - . 2023e. Emergency Preparedness. Available at: <https://www.dnr.wa.gov/programs-and-services/geology/geologic-hazards/emergency-preparedness#families,-individuals,-and-pets.4>. Accessed December 2023.
 - . 2023f. Prescribed Fire Program. Available at: <https://www.dnr.wa.gov/prescribedfire>. Accessed October 2023.
 - . 2023g. Managed Lands. Available at: <https://www.dnr.wa.gov/managed-lands>. Accessed October 2023.
 - . 2023h. Forest and Trust Lands. Available at: <https://www.dnr.wa.gov/managed-lands/forest-and-trust-lands>. Accessed October 2023.
 - . 2023i. Aquatics. Available at: <https://www.dnr.wa.gov/programs-and-services/aquatics>. Accessed October 2023.
 - . 2023j. Natural Areas. Available at: <https://www.dnr.wa.gov/managed-lands/natural-areas>
 - . 2023k. Wildfire Smoke. Available at: <https://www.dnr.wa.gov/smoke>. Accessed September 2023.
 - . 2023l. Prescribed Fire Program. Available at: <https://www.dnr.wa.gov/prescribedfire>. Accessed September 2023.
 - . 2023m. WA DNR Burn Portal. Available at: <https://burnportal.dnr.wa.gov>. Accessed September 2023.
 - . 2023n. Wildfire-Associated Debris Flows. Available at: <https://www.dnr.wa.gov/wildfire-debris-flows>. Accessed October 2023.
- Washington State Department of Transportation (WSDOT). 2023. Emergency management. Available at: <https://wsdot.wa.gov/about/emergency-management>. Accessed October 2023.
- Washington State Emergency Management Division (Washington State EMD). 2023. Recovery. Available at: <https://mil.wa.gov/recovery>. Accessed October 2023.
- Washington State Fire Adapted Communities Learning Network (WAFAC). 2023. Our Work. Available at: <https://www.fireadaptedwashington.org/our-work/>. Accessed October 2023.
- Washington State Fire Marshal's Office. 2023. Washington State Fire Services Resource Mobilization Plan. Available at: <https://www.wsp.wa.gov/wp-content/uploads/2023/06/2023-Mobilization-Plan-1.pdf>. Accessed October 2023.
- Washington State Legislature. 2017. SB 5546 - 2017-18. Available at: <https://app.leg.wa.gov/billssummary?BillNumber=5546&Year=2017>. Accessed October 2023.
- . 2018a. HB 2561 - 2017-18. Available at: <https://app.leg.wa.gov/billssummary?BillNumber=2561&Year=2017>. Accessed October 2023.
- . 2018b. Substitute House Bill 2733. Available at: <https://lawfilesexternal.leg.wa.gov/biennium/2017-18/Pdf/Bills/House%20Bills/2733-S.pdf>. Accessed October 2023.

- . 2018c. Final Bill Report. Available at: <https://apps.leg.wa.gov/documents/billdocs/2017-18/Pdf/Bill%20Reports/Senate/6211.E%20SBR%20FBR%2018.pdf>. Accessed October 2023.
- . 2023a. HB 1168 - 2021-22. Available at: <https://app.leg.wa.gov/billssummary?BillNumber=1168&Year=2021>. Accessed October 2023.
- . 2023b. Chapter 51-54A WAC. Available at: <https://apps.leg.wa.gov/wac/default.aspx?cite=51-54A>. Accessed October 2023.
- . 2023c. SB 5126 - 2021-22. Available at: <https://app.leg.wa.gov/billssummary?billnumber=5126&year=2021>. Accessed October 2023.
- . 2024. HB 1578 - 2023-24. Available at: <https://app.leg.wa.gov/billssummary?BillNumber=1578&Year=2023#:~:text=Improving%20community%20preparedness%2C%20response%2C%20recovery,in%20the%20wildland%20urban%20interface>. Accessed January 2024.
- Washington State Noxious Weed Control Board. 2023. Noxious Weed List. Available at: <https://www.nwcb.wa.gov/printable-noxious-weed-list>. Accessed September 2023.
- Washington State Office of the Insurance Commissioner (OIC). 2023a. Wildfires And Homeowner Insurance. Available at: <https://www.insurance.wa.gov/wildfires-and-homeowner-insurance>. Accessed October 2023a.
- . 2023b. Consumer alert: Kreidler's advice for claims from wildfire damage. Available at: <https://www.insurance.wa.gov/news/consumer-alert-kreidlers-advice-claims-wildfire-damage>. Accessed October 2023b.
- Washington State Post-Wildfire Flood Committee (PWFC). 2023. Available at: <https://afterthefirewa.org/about-the-pwfc/>. Accessed October 2023.
- Washington State University. 2023. Photo credit from Pacific Madrone About Madrone. Available at: <https://ppo.puyallup.wsu.edu/madrone/about/>. Accessed December 2023.
- Watts, A.C., and L.N. Kobziar. 2013. Smoldering combustion and ground fires: ecological effects and multi-scale significance. *Fire Ecology* 9:124–132. <https://doi.org/10.4996/fireecology.0901124>
- Western Regional Climate Center. 2023a. Quilcene 2 SW, Washington Daily Precipitation Average and Extreme. Available at: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?wa6846>. Accessed November 2023.
- . 2023b. Chimacum 4 S, Washington Daily Precipitation Average and Extreme. Available at: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?wa1414>. Accessed November 2023.
- . 2023c. Clearwater, Washington Daily Precipitation Average and Extreme. Available at: <https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?wa1496>. Accessed November 2023.
- Wooten, George. 2021. Fire and fuels management: Fire and fuels management: Definitions, ambiguous terminology and references. Available at: <https://www.nps.gov/olym/learn/management/upload/fire-wildfire-definitions-2.pdf>. Accessed December 2023.
- Wray, J., and M. K. Anderson. 2003. Restoring Indian-set fires to Prairie ecosystems on the Olympic Peninsula. Available at: <https://doi.org/10.3368/er.21.4.296>. Accessed January 2024.

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