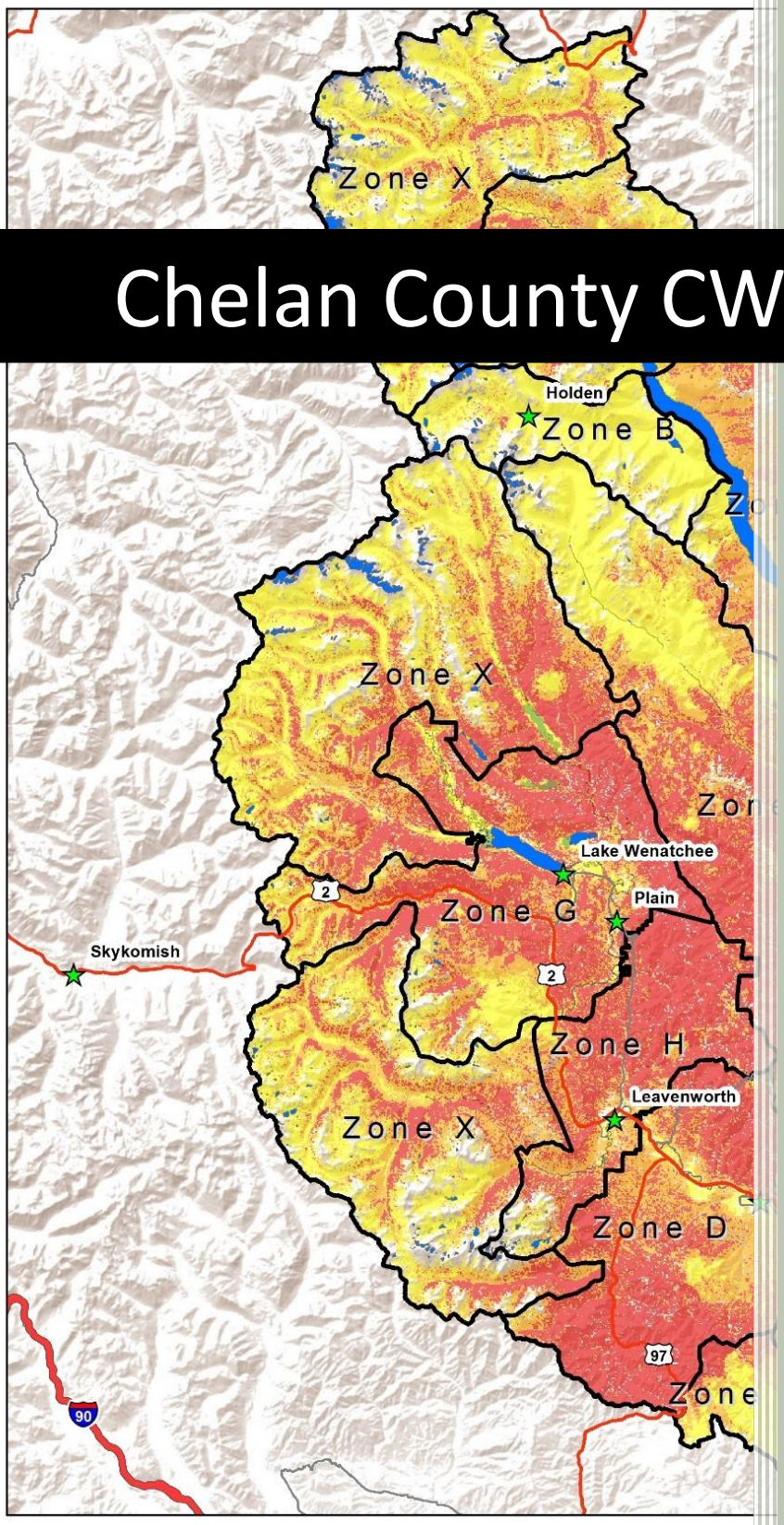
2018

Chelan County CWPP Update



GIS data layers provided courtesy of the CPAW Program. (CPAW) Community Planning Assistance for Wildfire, www.planningforwildfire.org

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Acknowledgements

This Community Wildfire Protection Plan represents the efforts and cooperation of several organizations and agencies working together to improve preparedness for wildfire events while reducing factors of risk.

Town of Entait
Town of Manson
Town of Lake Wenatchee

To obtain copies of this plan contact: Chelan County Natural Resources
316 Washington St # 401
Wenatchee, WA 98801

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Foreword

The process of developing a Community Wildfire Protection Plan (CWPP) can help a community clarify and refine its priorities for the protection of life, property, and critical infrastructure in the wildland–urban interface on both public and private land. It also can lead community members through valuable discussions regarding management options and implications for the surrounding land base. Local fire service organizations help define issues that may place the county, communities, and/or individual homes at risk. Through the collaboration process, the CWPP planning team discusses potential solutions, funding opportunities, and regulatory concerns and documents their resulting recommendations in the CWPP. The CWPP planning process also incorporates an element for public outreach. Public involvement in the development of the document not only facilitates public input and recommendations, but also provides an educational opportunity through interaction of local wildfire specialists and an interested public.

The idea for community-based wildland fire planning and prioritization is neither novel nor new. However, the incentive for communities to engage in comprehensive forest planning and prioritization was given new and unprecedented impetus with the enactment of the Healthy Forests Restoration Act (HFRA) in 2003. This landmark legislation includes the first meaningful statutory incentives for the US Forest Service (USFS) and the Bureau of Land Management (BLM) to give consideration to the priorities of local communities as they develop and implement forest management and hazardous fuel reduction projects. In order for a community to take full advantage of this new opportunity, it must first prepare a Community Wildfire Protection Plan (CWPP). A countywide CWPP planning team generally makes project recommendations based on the issue causing the wildfire risk, rather than focusing on individual landowners or organizations. Thus, projects are mapped and evaluated without regard for property boundaries, ownership, or current management. Once the CWPP is approved by the Chelan County Commissioner's and the State Forester, the planning team will begin further refining proposed project boundaries, feasibility, and public outreach as well as seeking funding opportunities.

*The **Chelan County Community Wildfire Protection Plan** was developed in compliance with the Federal Emergency Management Agency requirements for a wildfire mitigation plan, a chapter of a countywide Multi-Hazard Mitigation Plan.*

Signature Pages

This Chelan County Community Wildfire Protection Plan Update has been developed in cooperation and collaboration with representatives of the following organizations and agencies.

Chelan County Board of Commissioners

This Chelan County Community Wildfire Protection Plan has been developed in cooperation and collaboration with representatives of the following organizations and agencies.

Kevin Overbay, District #1	Date
Bob Bugert, District #2	Date
Doug Englan, District #3	Date

Signatures of Participation by Chelan County Fire Protection Districts and Departments

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP planning team formally recommended that this document be adopted by the County Commissioners.

Name, Position
Chelan County F. P. D. #1

Date

Name, Position
Chelan County F. P. D. #3

Date

Name, Position
Chelan County F. P. D. #5

Date

Name, Position
Chelan County F. P. D. #6

Date

Name, Position
Chelan County F. P. D. #7

Date

Name, Position Chelan County F. P. D. #8	Date
Name, Position Chelan County F. P. D. #10	Date
Name, Position Lake Wenatchee Fire & Rescue	Date
Mike Cushman, Program Manager Cascadia Conservation District	Date

Signatures of Participation by other Chelan County CWPP Planning Team Entities

This Community Wildfire Protection Plan and all of its components identified herein were developed in close cooperation with the participating entities listed. These members of the CWPP planning team formally recommended that this document be approved by the Chelan County Commissioners.

Name, Position Okanogan/Wenatchee National Forest	Date
Name, Resource Manager Bureau of Land Management	Date
Name, Position Forest Practices and Federal Relations, State Forester, Washington State Department of Natural Resources	Date

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Chapter 1

Overview of this Plan and its Development

In 2016, the Washington Department of Natural Resources (DNR) contracted with Northwest Management Inc. (NMI) to conduct an in-depth risk assessment for the hazards of wildland fire with funding from the Spokane District Bureau of Land Management (BLM). Wildfire events occur annually in Chelan County; thus, programs and projects that mitigate the impacts of this hazard is a benefit to the local residents, property, infrastructure, and the economy. In March of 2018, the DNR and BLM met with the CWPP Planning Team to introduce their plans in updating the CWPP.

This Community Wildfire Protection Plan (CWPP) for Chelan County, Washington, is the result of analysis, professional collaboration, and assessments of wildfire risks and other factors focused on reducing wildfire threats to people, structures, infrastructure, and unique ecosystems in Chelan County. Agencies and organizations that participated in the planning process included:

- Cities of Cashmere, Entiat, Chelan, Wenatchee, Leavenworth
- Communities of Holden Village, Mason, Lake Wenatchee
- Chelan County Citizens
- Chelan County Fire District #1
- Chelan County Fire District #5
- Chelan County Fire District #6
- Chelan County Fire District #7
- Chelan County Fire District #8
- Lake Wenatchee Fire & Rescue
- Chelan County Sheriff's Department
- Chelan County Conservation District
- Chelan County Natural Resources Department
- Chelan County Emergency Management Department
- Washington Department of Natural Resources
- Bureau of Land Management

- National Park Service
- United States Forest Service

Northwest Management, Inc. of Moscow, Idaho was selected to assist the planning team by facilitating meetings, leading the assessments, and authoring the document. The project manager from Northwest Management, Inc. was Brad Tucker.

Goals and Guiding Principles

Planning Philosophy and Goals

The goals of the planning process include integration with the National Fire Plan, the Healthy Forests Restoration Act, and the Disaster Mitigation Act. The plan utilizes the best and most appropriate science from all partners as well as local and regional knowledge about wildfire risks and fire behavior while meeting the needs of local citizens and recognizing the significance wildfire can have to the regional economy.

Mission Statement

To promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property and the environment from natural hazards by increasing public awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide Chelan County towards building a safer, more sustainable community.

Goals

- **To Improve Response Capabilities** of local fire protection services and other emergency responders to protect people and property through training, equipment needs and by increasing collaboration and coordination among public agencies, non-profit organizations, business, and industry
- **To Create Fire Resilient Landscapes** by preserving, rehabilitating, and enhancing natural systems to serve natural hazard mitigation functions
- **To Promote Fire Adapted Communities** through public education and outreach informing residents what they can do before, during and after a wildland fire and by providing tools and funding resources to assist in implementing pre and post disaster mitigation activities.
- **To Protect Economy** by developing mechanisms that ensure that commerce, trade, and essential business activities remain viable in the event of a wildland fire
- **To Develop a Short and Long-Term Wildfire Recovery Plan** which addresses the natural, social, and economic challenges associated with recovering from natural disasters.

- **To Utilize Existing Plans and Guidelines** when developing and implementing mitigation strategies by referring to the National Cohesive Strategy, CPAW Report and the Washington DNR 20-Year Forest Health Strategic Plan.

United States Government Accountability Office (GAO)

Since 1984, wildland fires have burned an average of more than 850 homes each year in the United States and, because more people are moving into fire-prone areas bordering wildlands, the number of homes at risk is likely to grow. The primary responsibility for ensuring that preventative steps are taken to protect homes lies with homeowners. Between 2003 and 2013, seven of the ten years have produced the largest direct property loss wildland fires in the United States, with five of the fires costing more than $400 million in damage.[1]

GAO was asked to assess, among other issues, (1) measures that can help protect structures from wildland fires, (2) factors affecting use of protective measures, and (3) the role technology plays in improving firefighting agencies' ability to communicate during wildland fires.

The two most effective measures for protecting structures from wildland fires are: (1) creating and maintaining a buffer, called defensible space, from 30 to 100 feet wide around a structure, where flammable vegetation and other objects are reduced; and (2) using fire-resistant roofs and vents. In addition to roofs and vents, other technologies – such as fire-resistant windows and building materials, surface treatments, sprinklers, and geographic information systems mapping can help in protecting structures and communities, but they play a secondary role.

Although protective measures are available, many property owners have not adopted them because of the time or expense involved, competing concerns such as aesthetics or privacy, misperceptions about wildland fire risks, and lack of awareness of their shared responsibility for fire protection. Federal, state, and local governments, as well as other organizations, are attempting to increase property owners' use of protective measures through education, direct monetary assistance, and laws requiring such measures. In addition, some insurance companies have begun to direct property owners in high risk areas to take protective steps[2].

State and Federal CWPP Guidelines

This Community Wildfire Protection Plan includes compatibility with FEMA requirements for a Hazard Mitigation Plan, while also adhering to the guidelines proposed in the National Fire Plan,

[1]National Fire Protection Association Fire Analysis and Research Division. Large-Loss Fires in the United States 2013. NFPA No. LLS10. November 2014.

[2] United States Government Accountability Office. Technology Assessment – Protecting Structures and Improving Communications during Wildland Fires. Report to Congressional Requesters. GAO-05-380. April 2005.

and the Healthy Forests Restoration Act (2003). This Community Wildfire Protection Plan has been prepared in compliance with:

- The National Fire Plan: A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment 10-Year Comprehensive Strategy Implementation Plan (December 2006).
- The Integrated Rangeland Fire Management Strategy (2015).
- Healthy Forests Restoration Act (2003).
- National Cohesive Wildland Fire Management Strategy (March 2011).
- The Federal Emergency Management Agency's Region 10 guidelines for a Local Hazard Mitigation Plan as defined in 44 CFR parts 201 and 206, and as related to a fire mitigation plan chapter of a Multi-Hazard Mitigation Plan.
- National Association of State Foresters – guidance on identification and prioritizing of treatments between communities (2003).

The objective of combining these complementary guidelines is to facilitate an integrated wildland fire risk assessment, identify pre-hazard mitigation activities, and prioritize activities and efforts to achieve the protection of people, structures, the environment, and significant infrastructure in Chelan County while facilitating new opportunities for pre-disaster mitigation funding and cooperation.

Additional information detailing the state and federal guidelines used in the development of the Chelan County Community Wildfire Protection Plan is included in Appendix 5.

Integration with other Local Planning Documents

During development of this Community Wildfire Protection Plan, several planning and management documents were reviewed to avoid conflicting goals and objectives. Existing programs and policies were reviewed to identify those that may weaken or enhance the mitigation objectives outlined in this document. The following sections identify and briefly describe some of the existing Chelan County planning documents and ordinances considered during development of this plan.

Chelan County Community Planning Assistance for Wildfire (2018)

The Community Planning Assistance for Wildfire (CPAW) program works with communities to reduce wildfire risks through improved land use planning. It is supported through grants from the U.S. Forest Service, the LOR Foundation, and other private foundations. It is a program of Headwaters Economics and Wildfire Planning International.

This report provided Chelan County with three recommendations to implement those tools most appropriate for addressing local conditions and opportunities. Each recommendation includes an overview of its importance and relevance, implementation guidance for staff, and any tips or additional resources. Many aspects of the recommendations are related to one another; where applicable, recommendations are cross-referenced.

The Wildfire Hazard Assessments and Wildland Urban Interface (WUI) developed by the Chelan County CPAW report was used in this Chelan County Community Wildfire Protection Plan (CWPP) analysis. The County did not want to have two wildfire hazard assessments, therefore, the CWPP process was postponed until after the CPAW process had finished.

Chelan County Natural Hazard Mitigation Plan (2018 Update)

The Disaster Mitigation Act of 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section, 322-Mitigation Planning. Section 322 places new emphasis on hazard mitigation planning. It requires local governments to develop and submit mitigation plans as a condition of receiving Hazard Mitigation Grant Program and Pre-Disaster Mitigation Program Funds. 44CFR Part 201 outlines the key responsibilities of local governments in carrying out Section 322.

The regulatory directive included in the Federal Statement of Purpose, under 44 CFR 201.1 subpart (b) states that:

> "The purpose of mitigation planning is for State, local, and Indian tribal governments to identify the natural hazards that affect them, to identify actions and activities to reduce losses from those hazards, and to establish a coordinated process to implement the plan, taking advantage of a wide range of resources."

The Chelan County Multi-Jurisdiction Natural Hazard Mitigation Plan (NHMP) meets the federal requirements outlined under the Act for the local governments in Chelan County, Washington, including Chelan County (including the unincorporated areas of Chelan County) and the cities of Cashmere, Chelan, Entiat, Leavenworth, and Wenatchee.

Chelan County is currently updating their Natural Hazard Mitigation Plan and intends to annex the 2018 version of the Community Wildfire Protection Plan into the NHNP.

Chelan County Comprehensive Emergency Management Plan (2006)

The purpose of the Comprehensive Emergency Management Plan (CEMP) is to guide the Chelan County Department of Emergency Management in its responsibility to preserve lives, protect

property and the environment, and to ensure public health in times of natural or technological disasters. The organization also provides for the coordination of recovery efforts following disasters and will provide actions to mitigate the effects of such disasters, to the extent possible.

The CEMP is an all hazard plan that is promulgated by Chelan County Board of Commissioners and Mayors of the participating cities and towns within the county and applies to all local public and private entities and organizations participating and included in the plan.

The CEMP is an all hazard approach to emergency and disaster situations likely to occur in the county, as described in the Chelan County Hazard Identification/Vulnerability Analysis (HIVA), and provides the foundation for:

1. The establishment of an organization and guidelines for efficient and effective use of government, private sector and volunteer resources.
2. An outline of local government responsibilities in emergency management activities as described under RCW 38.52 and other applicable laws.
3. An outline of other participants' responsibilities in emergency management activities as agreed upon by the participating agencies and organizations.

Community Wildfire Protection Plans

- Entiat Valley (2006)
- Lake Wenatchee/Plain Area (2007)
- Monitor, Cahsmere, Dryden and Peshastin Area (2008)
- Leavenworth Area (2018)
- Manson (2005)
- Peshastin Creek Drainage (2005)
- Ponderosa Area (2008)
- South Shore Lake Chelan (2006)
- Squilchuck Valley Area (2015)
- Stehekin Valley (2008)
- Union Valley Area (2004)

Eastern Washington 20-Year Forest Health Strategic Plan (2017)

In 2017, the Washington State Legislature unanimously passed additional legislation that provided additional direction to the DNR related to restoring forest health in the state. SB 5546 directed the DNR to develop an assessment and treatment framework designed to proactively and systematically address the forest health issues facing the state. Specifically, the framework

must endeavor to achieve an initial goal of assessing and treating one million acres of land by 2033. The framework must be utilized to assess and treat acreage in an incremental fashion each biennium and consists of three elements: assessment; treatment; and progress review and reporting. The Legislature also directed the DNR to utilize and build on the forest health strategic planning initiated under ESHB 2376 Sec. 308 to the maximum extent practicable, to promote the efficient use of resources.

Finally, HB 1711 directed the DNR to develop and implement a policy for prioritizing investments in forest health treatments to protect state lands and state forest lands to reduce wildfire hazards and losses from wildfire; reduce insect infestation and disease; and achieve forest health and resilience at a landscape-scale.

This plan focuses on eastern Washington's fire-prone forests in response to a current and pressing need. Wildfires in eastern Washington have grown larger in recent decades and are increasingly expensive and difficult to fight.

Okanogan-Wenatchee National Forest Plan (currently being updated)

The Forest Plan guides all natural resource management activities and establishes management standards and guidelines for the Okanogan-Wenatchee National Forest. It describes resource management practices, levels of resource production and management, and the availability and suitability of lands for resource management.

Chapter 2

Documenting the Planning Process

Documentation of the planning process, including public involvement, is necessary to meet FEMA's DMA 2000 requirements (44CFR§201.4(c)(1) and §201.6(c)(1)). This section includes a description of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how all of the involved agencies participated.

Description of the Planning Process

The Chelan County Community Wildfire Protection Plan was developed through a collaborative process involving all of the organizations and agencies detailed in Chapter 1 of this document. The planning process included five distinct phases which were in some cases sequential and in some cases intermixed (step 4 completed throughout the process):

1. **Collection of Data** about the extent and periodicity of the wildfire hazard in and around Chelan County.
2. **Field Observations and Estimations** about risks, location of structures and infrastructure relative to risk areas, access, and potential treatments.
3. **Mapping** of data relevant to pre-wildfire mitigation and treatments, structures, resource values, infrastructure, risk assessments, and related data.
4. **Facilitation of Public Involvement** from the formation of the planning team to news releases, public meetings, public review of draft documents, and acknowledgement of the final plan by the signatory representatives.
5. **Analysis and Drafting of the Report** to integrate the results of the planning process, provide ample review and integration of team and public input, and signing of the final document.

Chelan County was the recipient of a Community Planning and Assistance for Wildfire (CPAW) grant that would provide the County with an in-depth wildfire risk assessment and mitigation and Wildland-Urban Interface (WUI) designation recommendations. Simultaneously the County was awarded a grant from the Department of Natural Resources and Bureau of Land Management to update the County's Community Wildfire Protection Plan (CWPP) which is also designed to provide a wildfire risk assessment with mitigation recommendations and designate the WUI. The CWPP is required by the State and provides the County with an opportunity to have a say in how public lands are managed within the County and allows the County to be eligible for various grant funds. Chelan County and interested stakeholders did not want to have multiple risk assessment maps and therefore decided to continue with the CPAW project followed by the CWPP.

Therefore, the risk assessment and field observation phases were completed during the CPAW project. That project was completed in February of 2018 and the geodatabase that was developed was provided for use in the CWPP.

The Planning Team

Northwest Management facilitated the Community Wildfire Protection Plan meetings. Stakeholders involved in the meetings included representatives from local communities, Cascadia County Conservation District, Fire Protection Districts, federal and state agencies, and local organizations with an interest in the county's fire safety.

The planning philosophy employed in this project included the open and free sharing of information with interested parties. Information from federal, state, and local agencies was integrated into the database of knowledge used in this project. Meetings with the team were held throughout the planning process to facilitate a sharing of information between participants. When the public meetings were held, many of the team members were in attendance and shared their support and experiences and their interpretations of the results.

Multi-Jurisdictional Participation

44 CFR §201.6(a)(3) calls for multi-jurisdictional planning in the development of Hazard Mitigation Plans which impact multiple jurisdictions. In addition to the participation of federal agencies and other organizations, the following local jurisdictions were actively involved in the development of this Community Wildfire Protection Plan:

- Chelan County Fire District #1
- Chelan County Fire District #3
- Chelan County Fire District #5
- Chelan County Fire District #6
- Chelan County Fire District #7
- Chelan County Fire District #8
- Chelan County Fire District #10
- Lake Wenatchee Fire and Rescue
- Cascadia Conservation District
- Chelan County Public Works
- USDI National Park Service
- USDA Forest Service
- City of Leavenworth
- City of Wenatchee
- City of Entiat
- City of Cashmere
- Community of Holden Village
- Chelan County Fire Preventation & Investigations
- Chelan County Fire Districts Board of Commissioners
- Chelan County Board of Commissioners
- Chelan County Department of Natural Resources
- Chelan County Emergency Management
- Washington Department of Natural Resources

These jurisdictions were represented on the planning team and in public meetings either directly or through their servicing fire department or district. They participated in the development of hazard profiles, risk assessments, and mitigation measures. The planning team meetings were

the primary venue for authenticating the planning record. However, additional input was gathered from each jurisdiction in the following ways:

- Planning team leadership visits to local group meetings where planning updates were provided and information was exchanged.
- One-on-one visits between the planning team leadership and representatives of the participating jurisdictions (e.g. meetings with Chelan County Board of County Commissioners, city councilors and mayor, fire district commissioners, and community leaders).
- Written correspondence between the planning team leadership and each jurisdiction updating the participating representatives on the planning process, making requests for information, and facilitating feedback.

Like other areas of Washington and the United States, Chelan County's human resources have many demands placed on them in terms of time and availability. In Chelan County, elected officials (county and town councilors and mayor) do not serve in a full-time capacity; some of them have other employment and serve the community through a convention of public service. Recognizing this and other time constraints, many of the jurisdictions decided to identify a representative to cooperate on the planning team and then report back to the remainder of their organization on the process and serve as a conduit between the planning team and the jurisdiction.

Planning Team Meetings

The following people participated in planning team meetings, volunteered time, or responded to elements of the Chelan County Community Wildfire Protection Plan's preparation.

NAME **ORGANIZATION**

- Joel Walincki .....City of Leavenworth
- Craig Gildroy.....City of Chelan
- Luis Gonzalez.....City of Chelan
- Jim Brooks .....City of Entiat
- Jeff Gomes.....City of Cashmere
- Jerry Holm .....Forest Ridge Wildfire Collaborative
- Jeff Pierce.....Holden Village Fire Brigade
- Mick Lamar.....Lake Wenatchee Fire and Rescue
- Brian Brett.....Chelan County Fire District #1
- Mike Burnett .....Chelan County Fire District #1
- Dan Hilden.....Chelan County Fire District #1
- Jon Riley .....Chelan County Fire District #1
- Katz Kienel.....Chelan County Fire District #1

- Dave Nalle .....Chelan County Fire District #3
- Phil Mosher .....Chelan County Fire District #6
- Mike Asher .....Chelan County Fire District #8
- Brandon Asher .....Chelan County Fire & Rescue
- Keith Goehner .....Chelan County Commissioner
- Hillary Heard .....Chelan County Department of Natural Resources
- Mike Kaputa .....Chelan County Department of Natural Resources
- Bob Plumb .....Chelan County Fire Preventation & Investigations
- Stan Smoke .....Chelan County Emergency Management
- Kent Sisson .....Chelan County Emergency Management
- Jason Detamore .....Chelan County Public Works
- Mike Cushman .....Cascadia Conservation District
- Patrick Haggerty.....Cascadia Conservation District
- Mary Sutton-Carruthers.....Cascadia Conservation District
- Alan Lawson .....Washington Department of Natural Resources
- Scott Chambers.....Washington Department of Natural Resources
- Cindi Tonasket-Ebel .....Washington Department of Natural Resources
- Vicki Gempko .....National Park Service - North Cascades National Park
- Tonya Neider.....National Park Service - North Cascades National Park
- Scott Ebel .....National Park Service - North Cascades National Park
- Sonya Shaw .....National Park Service - North Cascades National Park
- Jaye Gilmore.....US Forest Service - Wenatchee River Ranger District
- Aaron Rowe.....US Forest Service - Entiat Ranger District
- Jon Tepley .....US Forest Service
- Kyle Cannon .....US Forest Service
- Matt Castle.....US Forest Service
- Monica Nicholson .....Bureau of Land Management
- Jason Cirksena.....Bureau of Land Management
- Nick Pieper .....Bureau of Land Management
- Rob Flanner .....Tetra Tech
- Brad Tucker .....Northwest Management, Inc.

Team Meeting Minutes

Team meetings were scheduled and held from February through October 2018. These meetings served to facilitate the sharing of information and to lay the groundwork for the Chelan County CWPP. Northwest Management, Inc. as well as other planning team leadership attended the

meetings to provide the group with regular updates on the progress of the document and gather any additional information needed to complete the Plan.

Planning team meeting minutes are included in Appendix 2.

Public Involvement

Public involvement was made a priority from the inception of the project. There were several ways that public involvement was sought and facilitated. The idea is to allow members of the public to provide information and seek an active role in protecting their own homes and businesses, and in some cases it may lead to the public becoming more aware of the process without becoming directly involved in the planning.

News Releases

Print Media	Other Media
Lake Chelan Mirror	Local Fire Protection Districts
The Wenatchee World	
Leavenworth Echo	
Cashmere Valley Record	

Under the auspices of the planning team, periodic press releases were submitted to the various print and online news outlets that serve Chelan County. Informative flyers were also distributed around communities by the team members.

Figure 2.1 News Article.

Chelan County Press Release
April 26, 2018

Chelan County Plans to Update Community Wildfire Protection Plan

Working in conjunction with Chelan County, the Washington Department of Natural Resources (DNR), and the Bureau of Land Management (BLM) has launched the process of updating the county-level Community Wildfire Protection Plan (CWPP). Local agencies and organizations in Chelan County have initiated a planning committee to complete CWPP as part of the National Fire Plan, National Cohesive Wildland Fire Management Strategy, and Healthy Forests Restoration Act as authorized by Congress and the White House. The Chelan County CWPP will include risk analyses with predictive models indicating where fires are likely to ignite and how they may impact local communities and the environment.

Northwest Management, Inc. has been retained by the DNR and BLM to facilitate meetings, conduct field inspections and interviews, develop vulnerability assessments, and collaborate with the committee to delineate mitigation projects. The planning committee includes representatives from local fire districts, cities and towns, Chelan County, Washington Department of Natural Resources, National Park Service, US Forest Service, Bureau of Land Management, and others.

The intention of the project is to conduct an assessment of wildland fire risk in Chelan County and the local communities, then make mitigation recommendations that will not only help prevent wildfire ignitions from occurring but will also guide decision-makers towards creating a more fire-resilient Chelan County and provide for public wildfire education. Some of the goals of this project are to improve awareness of wildland fire issues locally, identify high fire risk areas and develop strategies to reduce this risk, and improve accessibility of funding assistance to achieve these goals.

The planning committee will be conducting public meetings to discuss preliminary findings and to seek public involvement during the planning process during summer of 2018. A notice of the dates and locations of these meetings will be posted in local news outlets. For more information on the Chelan County CWPP please contact Brad Tucker, Northwest Management, Inc., at 208-883-4488 ext. 117.

Public Meetings

Public meetings were scheduled in strategic locations during the wildfire risk assessment phase of the planning process to share information on the Plan, obtain input on the details of the wildfire risk assessments, and discuss potential mitigation treatments. The CWPP public meetings were held in conjunction with the Chelan County Natural Hazard Mitigation Plan meetings. The idea to have combined meetings was to generate more public interest as well as streamline the process for residents.

The schedule of public presentation meetings in Chelan County included three locations: Wenatchee on the evening of October 9th, Leavenworth on October 10th and Chelan on October 11th, 2018. The public meetings were attended by numerous individuals from the planning teams however, no individuals from the general public attended. The public meeting announcement was sent to the local newspapers.

Documented Review Process

The opportunity to review and comment on this plan has been provided through several avenues for the team members as well as the members of the general public.

During regularly scheduled team meetings in the spring and summer of 2018, the team met to discuss findings, review mapping and analysis, and provide written comments on draft sections of the document. During the public meetings, attendees were able to observe map analyses and photographic collections, discuss general findings from the community assessments, and made recommendations on potential project areas.

The first draft of the document was prepared after the public meetings and presented to the team in December for a full team review. A focus group of team members assembled in February of 2019 to discuss comments received from the larger planning team. The team's comments were incorporated and then the next draft of the plan was opened to the public for review beginning March 11th and ending on March 25th.

Continued Public Involvement

Chelan County is dedicated to involving the public directly in review and updates of the Community Wildfire Protection Plan and Wildfire Risk Assessment. The Chelan County Commissioners, working through the Chelan County Department of Natural Resources, are responsible for review and update of the plan as recommended in chapter 6 of this document.

The public will have the opportunity to provide feedback annually on the anniversary of the adoption of this plan, at an open meeting of the planning team. Copies of the Chelan County

Wildfire Protection Plan will be catalogued and kept at all the appropriate agencies in the county. The Plan also includes the address and phone number of Chelan County Conservation District, who is responsible for keeping track of public comments on the Plan.

A public meeting will also be held as part of each annual evaluation or when deemed necessary by the planning team. The meetings will provide the public a forum for which they can express its concerns, opinions, or ideas about the Plan. The County Department of Natural Resources will be responsible for using county resources to publicize the annual public meetings and maintain public involvement through the webpage and various print and online media outlets.

Chapter 3

Chelan County Characteristics

The initial inhabitants of the region were Native Americans from the Wenatchi tribe residing along the Wenatchee River, as it flows from the Cascade Mountains to the Columbia River. The culture and economy of the tribe centered on fishing, hunting and gathering. Trappers and Chinese gold prospectors were among the first non-natives who arrived in the area during the early 1800s. White settlers followed, beginning in the 1870s.

After 1888, the current Chelan Valley was a designated part of Okanogan County, and the current Wenatchee Valley was part of Kittitas County. In 1899, the State Legislature created Chelan County taking portions from both of the other two other counties. Wenatchee became the county seat. The county name was derived from the Native American word "chelan" which means "deep water" and refers to the longest and deepest alpine lake in the country, Lake Chelan.

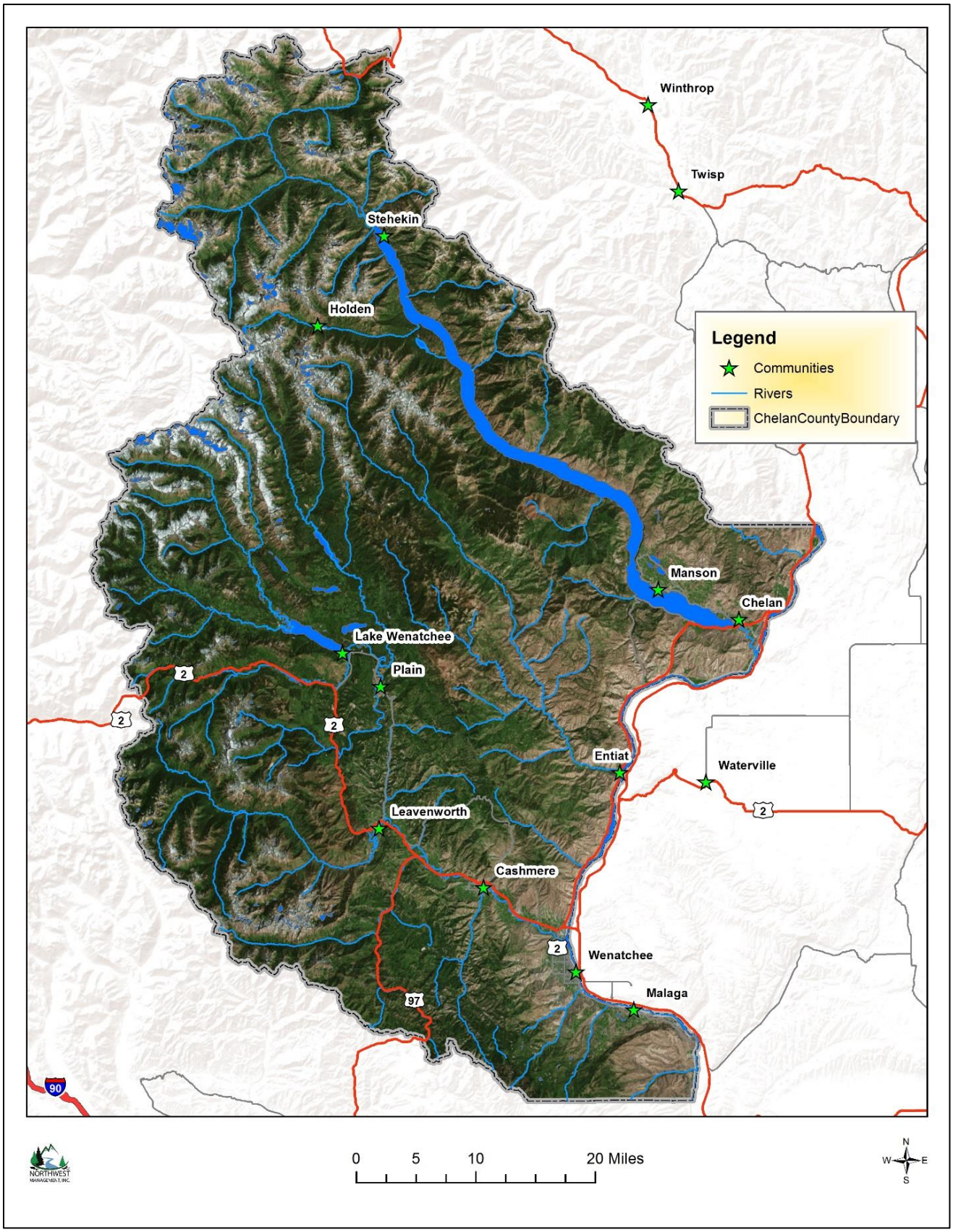
The federal Reclamation Act of 1902 (Newlands Act) provided for the organization and funding of irrigation districts that had the authority of government in acquiring land and issuing bonds. Irrigation along with railroads spurred agricultural development in Chelan County, particularly fruit orchards. Agriculture tends to be the economic force for the area and it specifically revolves around various tree fruit that includes apples, cherries, pears and peaches. While agriculture is a dominant industry in Chelan County with 23.1 percent of total covered employment in 2016, it is followed by private health services with 13.8 percent of total covered employment. Wineries are playing an increasing role in both agriculture and in tourism. Agricultural employment directly links to nonfarm employment through nondurable goods manufacturing (i.e. food processing), wholesale trade (i.e. fresh fruit packinghouses) and transportation.

Geography and Climate

Chelan County is located on the eastern slopes of the Cascade Mountain range in central Washington. The County embraces the drainages of the Wenatchee River, the Entiat River, Lake Chelan, and the Chelan River. According to the U.S. Census Bureau, the county has a total area of 2,994 square miles (7,750 km^2), of which 2,921 square miles (7,570 km^2) is land and 73 square miles (190 km^2) (2.5%) is water. It is the third-largest county in Washington by area.

Chelan County receives 9 inches of rainfall, on average per year and averages 21 inches of snow. On average, there are 199 days of sunshine each year, and some type of precipitation (rain, snow, sleet) 29 days per year. The annual average high temperature is 59.8 degrees with an average summer high of 85 degrees. The annual average low temperature is 41.3 degrees with a winter average low of 24 degrees.

Figure 3.1. Chelan County Aerial Map.



Population and Demographics

The 2010 Census established the Chelan County population at 72,453, which shows an increase from a population of 66,616 in 2000. Since 1900, the population of Chelan County has been increasing with every census with the highest percentage (+284%) increase occurring between 1900 and 1910. Over 25% of the population is of Hispanic or Latino descent. Table 3.1 shows historical changes in population in Chelan County. The U.S. Census Bureau estimates that Chelan County has only experienced an 8.8% increase in population since 2000 compared to a 13% increase statewide.

The Census Bureau also reported that there were 27,827 households. The median income for a household in Chelan County is $48,674, which is less than the statewide median of $59,478.[3] Health care and social assistance employ 13% of the working population while agriculture, forestry, fishing and hunting employ 12.7%.[4]

Table 3.1. Chelan County Historical Population Data.[5,6]

Census	Population
1900	3,931
1910	15,104
1920	20,906
1930	31,634
1940	34,412
1950	39,301
1960	40,744
1970	41,355
1980	45,061
1990	52,250
2000	66,616
2010	72,453

Land Ownership

Chelan County encompasses nearly 3,000 square miles. The clear majority (78%) of Chelan County is federally managed. Most of the privately-owned land (17%) is used for agriculture purposes; although, more and more residents are moving into the rural areas along the eastern

[3] U.S. Census Bureau. American Fact Finder: https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Accessed March, 2018.
[4] U.S. Census Bureau..Fact Finder. https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF. Accessed March, 2018.
[5] Decennial Census. https://www.census.gov/population/cencounts/wa190090.txt. Accessed March, 2018.
[6] U.S. Census Bureau. https://www.census.gov/population/www/cen2000/briefs/phc-t4/tables/tab02.pdf. Accessed March, 2018

slopes of the Cascade Range. Numerous subdivisions and housing clusters are developing in the more rural portions of the county.

Table 3.2. Ownership Categories in Chelan County.

Land Owner	Percent
US Forest Service	70%
Private	16%
US National Park Service	7%
Washington Department of Natural Resources	2%
Water	2%
US Bureau of Land Management	>1%
Washington Department of Fish and Wildlife	<1%
Washington State Parks	<1%
Bureau of Reclamation	<1%
Total	**100%**

A map of the land ownership pattern in Chelan County is included in Appendix 1.

Development Trends

***The following section was taken from the 2017 Chelan County Comprehensive Plan.[7] And the CPAW Report*

Chelan County has been identified as one of the fastest growing counties east of the Cascade Mountains. Land available for development, approximately 279,000 acres or 436 square miles, much of that area is considered Wildland-Urban Interface. The areas where most new development is forecasted to occur is on the outskirts of the existing communities within the wildland-urban interface/intermix. The largest populated area is located at the southeast corner of the County, around the City of Wenatchee.

The current County lands can meet current and projected population needs; however, due to constrained transportation facilities and funding resources for rural utilities, it is common to find development occurring adjacent to built infrastructure, such as roads and power lines, and where travel to services (such as grocery stores, churches or schools) is easily accessible. This type of development is not sprawl but rather follows the pattern of rural living in Chelan County with larger lot sizes used for residential living and often agricultural activities or clustered lots with large areas of protected open space. The County will continue to experience growth pressures on developable land.

[7] 2017-2037 Chelan County Comprehensive Plan. Available at: http://www.co.chelan.wa.us/files/community-development/documents/comps_plan/2017%20Comp%20Plan/Attachment%20A%20-%202017-27%20Comprehensive%20Plan.pdf. Accessed May, 2018.

As the population increases, conflicts between resources and more intense land uses will continue to arise. Chelan, Manson, Stehekin, Leavenworth, Plain, Lake Wenatchee and properties located along the shorelines are becoming increasingly popular as recreational and retirement property. Therefore, the County will continue to experience growth pressures on developable land.

The numerous water bodies of Chelan County provide opportunity for a mix of recreational and residential living adjacent to the water. It is common to find small lot development, primarily residential uses, along the shoreline. These areas were commonly platted prior to the Growth Management Act and reflect the County's character of rural recreational lifestyle. It is appropriate that newer developments provide for smaller lots and public access when consistent with the Shoreline Master Program.

Development among the hills and hilltops is relatively new but is consistent with the rural area, especially when developed in a manner which reduces road cuts and visual impacts, preserves open space, provides agriculture and/or recreational opportunities and protects critical areas.

Sprawl is defined, by Webster's Dictionary, as "to spread or develop irregularly or without restraint" and 'to cause to spread out carelessly or awkwardly". The negative effects associated with sprawl are a reduction in environmental and human health. Chelan County does not support sprawl rather development of rural land is consistent with the historic density patterns; provide for the protection of the natural and critical environment and habitat; supports the Federal and State natural wilderness and park lands; protects the small rural communities; allows for recreation throughout the County; and, encourages orderly growth of populated areas through adoption of subarea plans and city urban growth areas in a manner consistent with the State population forecasting and Chelan County's rural character.

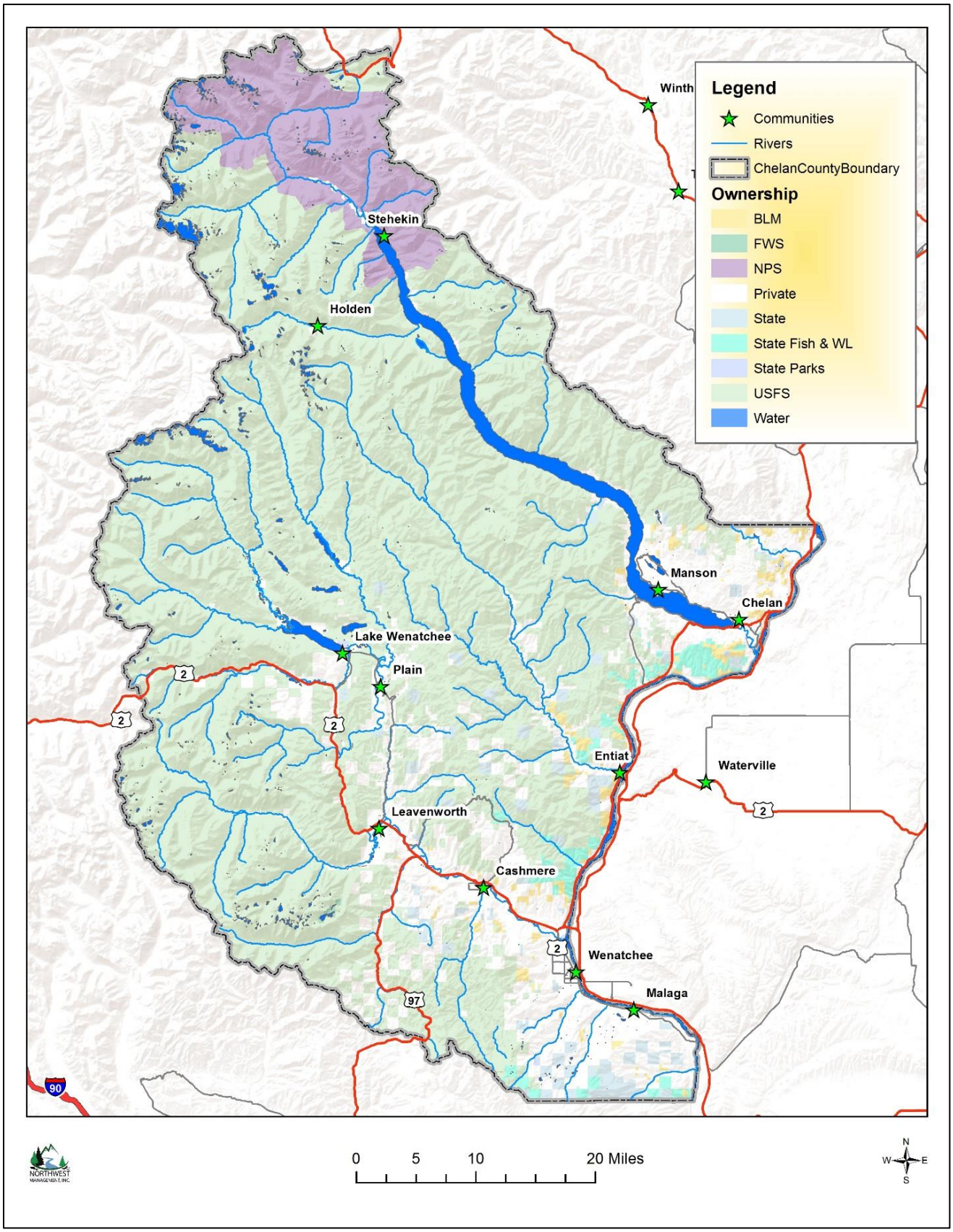
Agriculture

Agricultural uses continue to dominate as a rural economic benefit to the County. It should be noted that some historical agricultural activities, primarily orchards, are changing to vineyards, wineries and other nontraditional agricultural activities. It is the County's tradition to provide agricultural opportunities at a variety of scales, including various parcels sizes. Many of the new agricultural activities can and are occurring on smaller parcels of land near tourist communities. Other agricultural operations include organic farms, dairy production, row-crops, and where appropriate fish farms. The long-term changes in agricultural operations will be determined, in large part, by the economic and market demands.

According to the latest Agricultural Census for Chelan County (2012), over 40% of the privately-owned land in the County is considered cropland and 15% pastureland. Over 75,000 acres of privately-owned land is in farms which is down 19% from the 2007 ag census. Fruit orchards are the predominant crop grown in the County producing 98% of the total market value of agriculture products sold from farms within the County, which totaled $202,854,000. These orchards occur around the Columbia River in the eastern portion of the County. The top livestock inventory in the County starts with egg layers, then horses, cows and finally sheep.[8]

[8] U.S. Department of Agriculture's National Statistics Service 2012 Census of Agriculture: Washington State and County Data. Available online at: https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Washington/cp53007.pdf. Accessed May, 2018.

Figure 3.2. Chelan County Ownership



Natural Resources

Chelan County is a diverse ecosystem with a complex array of vegetation, wildlife, and fisheries that have developed with, and adapted to fire as a natural disturbance process. Nearly a century of wildland fire suppression coupled with past land-use practices (primarily timber harvesting and agriculture) has altered plant community succession and has resulted in dramatic shifts in the fire regimes and species composition. As a result, some forests and rangelands in Chelan County have become more susceptible to large-scale, higher-intensity fires posing a threat to life, property, and natural resources including wildlife and plant populations. High-intensity, stand-replacing fires have the potential to seriously damage soils and native vegetation. In addition, an increase in the number of large, high-intensity fires throughout the nation's forest and rangelands has resulted in significant safety risks to firefighters and higher costs for fire suppression (House of Representatives, Committee on Agriculture, Washington, DC, 1997).

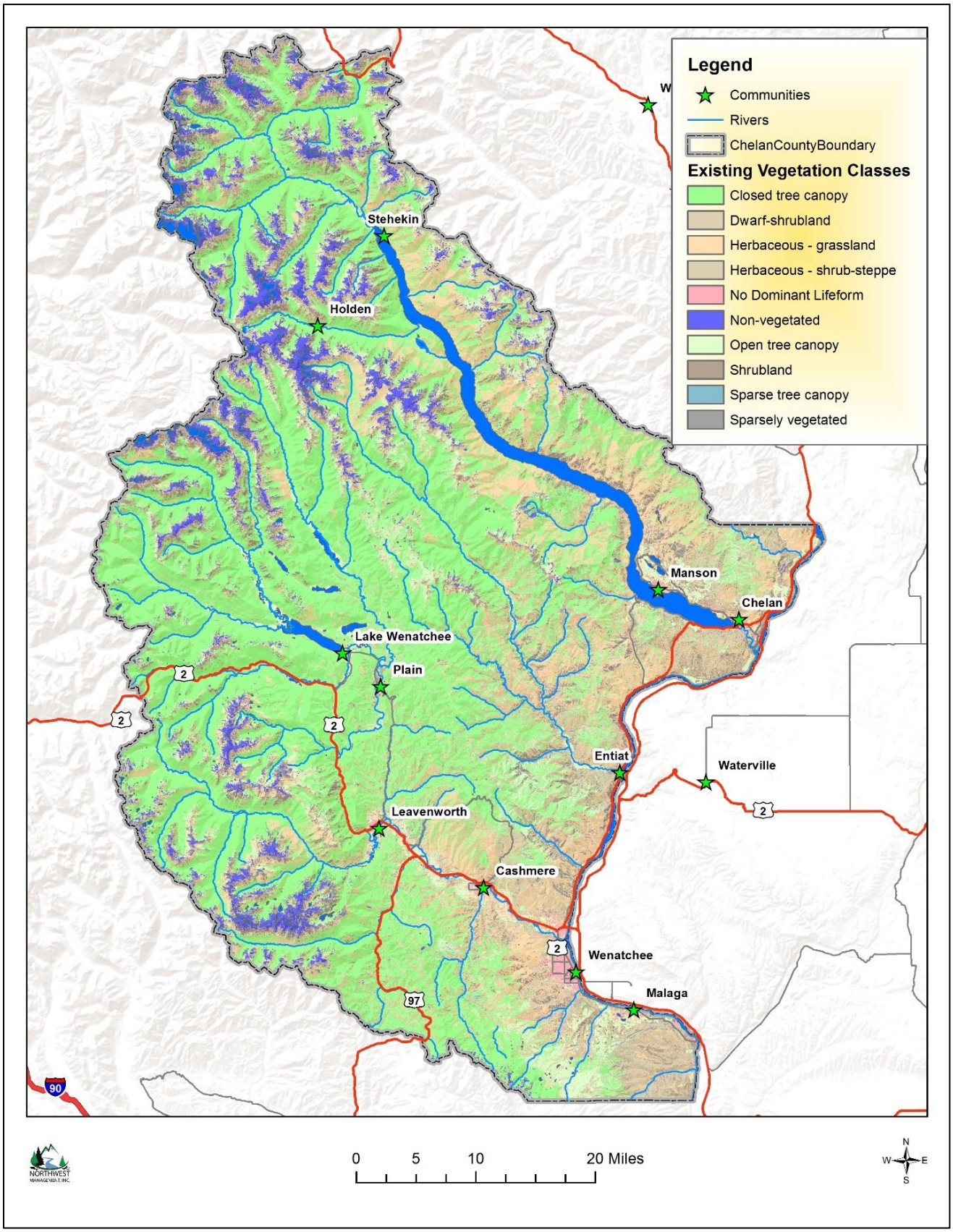
Vegetation

Vegetation also varies greatly throughout the county. The high western portion of the county abounds in dense pine, fir, and cedar forests and sometimes larch, whereas the arid eastern portion is covered primarily by sagebrush and native grasses. Areas located in between western and eastern portions of the county are comprised of varying amounts coniferous forests, sagebrush, and native grasses. Deciduous tree species such as cottonwood, willow, red osier dogwood, and aspen are mostly concentrated in stream valleys or along lakes. Additionally, fruit tree orchards are located on irrigable lands along the rivers and stream valley bottoms.

Table 3.3. Vegetative Cover Types in Chelan County.

Cover	Percent
Conifer	53%
Grassland	15%
Shrubland	9%
Sparsely-vegetated	5%
Non-vegetated	5%
Exotic Herbaceous	4%
Developed	3%
Riparian	<2%
Agriculture	<2%
Hardwood	<1%
Conifer-hardwood	<1%
Total	**100%**

Figure 3.3. Existing Vegetation Classes



Hydrology

The Washington Department of Ecology & Water Resources Program is charged with the development of the Washington State Water Plan. Included in the State Water Plan are the statewide water policy plan and component basin and water body plans, which cover specific geographic areas of the state (WDOE 2005). The Washington Department of Ecology has prepared general lithologies of the major ground water flow systems in Washington.

The state may assign or designate beneficial uses for particular Washington water bodies to support. These beneficial uses are identified in section WAC 173-201A-200 of the Washington Surface Water Quality Standards (WQS). These uses include:

- **Aquatic Life Uses:** char; salmonid and trout spawning, rearing, and migration; nonanadromous interior redband trout, and indigenous warm water species
- **Recreational Uses:** primary (swimming) and secondary (boating) contact recreation
- **Water Supply Uses:** domestic, agricultural, and industrial; and stock watering

While there may be competing beneficial uses in streams, federal law requires protection of the most sensitive of these beneficial uses.

A correlation to mass wasting due to the removal of vegetation caused by high intensity wildland fire has been documented. Burned vegetation can result in changes in soil moisture and loss of rooting strength that can result in slope instability, especially on slopes greater than 30%. The greatest watershed impacts from increased sediment will be in the lower gradient, depositional stream reaches. It is strongly recommended that Chelan County develop or adopt protocol/strategy for assessing post-fire impacts on watersheds on state and private land within the County.

Of critical importance to Chelan County will be the maintenance of the domestic watershed supplies in the Wenatchee Watershed (WRIA 45), Entiat Watershed (WRIA 46), and Chelan Watershed (WRIA 47).

Air Quality

The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides.[9]

[9] USDA-Forest Service (United States Department of Agriculture, Forest Service). 2000. Incorporating Air Quality Effects of Wildland Fire Management into Forest Plan Revisions – A Desk Guide. April 2000. – Draft.

The Clean Air Act, passed in 1963 and amended in 1977, is the primary legal authority governing air resource management. The Clean Air Act provides the principal framework for national, state, and local efforts to protect air quality. Under the Clean Air Act, OAQPS (Office for Air Quality Planning and Standards) is responsible for setting standards, also known as national ambient air quality standards (NAAQS), for pollutants which are considered harmful to people and the environment. OAQPS is also responsible for ensuring these air quality standards are met, or attained (in cooperation with state, Tribal, and local governments) through national standards and strategies to control pollutant emissions from automobiles, factories, and other sources.[10]

Smoke emissions from fires potentially affect an area and the airsheds that surround it. Climatic conditions affecting air quality in northeast Washington are governed by a combination of factors. Large-scale influences include latitude, altitude, prevailing hemispheric wind patterns, and mountain barriers. At a smaller scale, topography and vegetation cover also affect air movement patterns. Air quality in the area is generally moderate to good. However, locally adverse conditions can result from occasional wildland fires in the summer and fall, and prescribed fire and agricultural burning in the spring and fall. All major river drainages are subject to temperature inversions which trap smoke and affect dispersion, causing local air quality problems. This occurs most often during the summer and fall months and would potentially affect all communities in Chelan County. Winter time inversions are less frequent, but are more apt to trap smoke from heating, winter silvicultural burning, and pollution from other sources.

Washington Department of Ecology

The Washington Department of Ecology Air Quality Program protects public health and the environment from pollutants caused by vehicles, outdoor and indoor burning, and industry. The DOE oversees permitting for non-forested (i.e. agriculture and rangeland) burning. Chelan County falls under the jurisdiction of the Central Regional Office (CRO). The CRO can be reached at: 509-575-2490.

Washington State Smoke Management Plan

The Department of Natural Resources (DNR), Department of Ecology (DOE), U.S. Forest Service (USDA), National Park Service (NPS), Bureau of Land Management (BLM), U.S Fish and Wildlife Service (USDI), participating Indian nations, military installations (DOD), and small and large forest landowners have worked together to deal with the effect of outdoor burning on air.

[10] Louks, B. 2001. Air Quality PM 10 Air Quality Monitoring Point Source Emissions; Point site locations of DEQ/EPA Air monitoring locations with Monitoring type and Pollutant. Idaho Department of Environmental Quality. Feb. 2001. As GIS Data set. Boise, Idaho.

Protection of public health and preservation of the natural attractions of the state are high priorities and can be accomplished along with a limited, but necessary, outdoor burning program. Public health, public safety, and forest health can all be served through the application of the provisions of Washington State law and this plan, and with the willingness of those who do outdoor burning on forest lands to further reduce the negative effects of their burning.

The Washington State Smoke Management Plan pertains to DNR-regulated silvicultural outdoor burning only and does not include agricultural outdoor burning or outdoor burning that occurs on improved property. Although the portion of total outdoor burning covered by this plan is less than 10 percent of the total air pollution in Washington, it remains a significant and visible source.

The purpose of the Washington State Smoke Management Plan is to coordinate and facilitate the statewide regulation of prescribed outdoor burning on lands protected by the DNR and on unimproved, federally-managed forest lands and participating tribal lands. The plan is designed to meet the requirements of the Washington Clean Air Act.

The plan provides regulatory direction, operating procedures, and advisory information regarding the management of smoke and fuels on the forest lands of Washington State. It applies to all persons, landowners, companies, state and federal land management agencies, and others who do outdoor burning in Washington State on lands where the DNR provides fire protection, or where such burning occurs on federally-managed, unimproved forest lands and tribal lands of participating Indian nations in the state.

The plan does not apply to agricultural outdoor burning and open burning as defined by Washington Administrative Code (WAC) 173-425-030 (1) and (2), nor to burning done "by rule" under WAC 332-24 or on non-forested wildlands (e.g., range lands). All future reference to burning in this plan will refer only to silvicultural burning unless otherwise indicated.

Chapter 4

Risk and Preparedness Assessments

Wildland Fire Characteristics

An informed discussion of fire mitigation is not complete until basic concepts that govern fire behavior are understood. In the broadest sense, wildland fire behavior describes how fires burn; the manner in which fuels ignite, how flames develop and how fire spreads across the landscape. The three major physical components that determine fire behavior are the fuels supporting the fire, the topography in which the fire is burning, and the weather and atmospheric conditions during a fire event. At the landscape level, both topography and weather are beyond our control. We are powerless to control winds, temperature, relative humidity, atmospheric instability, slope, aspect, elevation, and landforms. It is beyond our control to alter these conditions, and thus impossible to alter fire behavior through their manipulation. When we attempt to alter how fires burn, we are left with manipulating the third component of the fire environment; fuels which support the fire. By altering fuel loading and fuel continuity across the landscape, we have the best opportunity to control or affect how fires burn.

A brief description of each of the fire environment elements follows in order to illustrate their effect on fire behavior.

Weather

Weather conditions contribute significantly to determining fire behavior. Wind, moisture, temperature, and relative humidity ultimately determine the rates at which fuels dry and vegetation cures, and whether fuel conditions become dry enough to sustain an ignition. Once conditions are capable of sustaining a fire, atmospheric stability and wind speed and direction can have a significant effect on fire behavior. Winds fan fires with oxygen, increasing the rate at which fire spreads across the landscape. Weather is the most unpredictable component governing fire behavior, constantly changing in time and across the landscape.

Topography

Fires burning in similar fuel types, will burn differently under varying topographic conditions. Topography alters heat transfer and localized weather conditions, which in turn influences vegetative growth and resulting fuels. Changes in slope and aspect can have significant influences on how fires burn. Generally speaking, north slopes tend to be cooler, wetter, more productive sites. This can lead to heavy fuel accumulations, with high fuel moistures, later curing

of fuels, and lower rates of spread. In contrast, south and west slopes tend to receive more direct sun, and thus have the highest temperatures, lowest soil and fuel moistures, and lightest fuels. The combination of light fuels and dry sites leads to fires that typically display the highest rates of spread. These slopes also tend to be on the windward side of mountains. Thus, these slopes tend to be "available to burn" a greater portion of the year.

Slope also plays a significant role in fire spread, by allowing preheating of fuels upslope of the burning fire. As slope increases, rate of spread and flame lengths tend to increase. Therefore, we can expect the fastest rates of spread on steep, warm south and west slopes with fuels that are exposed to the wind.[11]

Fuels

Fuel is any material that can ignite and burn. Fuels describe any organic material, dead or alive, found in the fire environment. Grasses, brush, branches, down woody material, forest floor litter, conifer needles, and buildings are all examples. The physical properties and characteristics of fuels govern how fires burn. Fuel loading, size and shape, moisture content, and continuity and arrangement all influence fire behavior. The smaller and finer the fuels, the faster the potential rate of fire spread. Small fuels such as grass, needle litter and other fuels less than a quarter inch in diameter are most responsible for fire spread. In fact, "fine" fuels, with high surface to volume ratios, are considered the primary carriers of surface fire. This is apparent to anyone who has ever witnessed the speed at which grass fires burn. As fuel size increases, the rate of spread tends to decrease due to a decrease in the surface to volume ratio. Fires in large fuels generally burn at a slower rate but release much more energy and burn with much greater intensity. This increased energy release, or intensity, makes these fires more difficult to control. Thus, it is much easier to control a fire burning in grass than to control a fire burning in timber.[12]

When burning under a forest canopy, the increased intensities can lead to torching (single trees becoming completely involved) and potential development of crown fires. That is, they release much more energy. Fuels are found in combinations of types, amounts, sizes, shapes, and arrangements. It is the unique combination of these factors, along with the topography and weather, which determines how fires will burn.

The study of fire behavior recognizes the dramatic and often-unexpected effect small changes in any single component have on how fires burn. It is impossible to speak in specific terms when predicting how a fire will burn under any given set of conditions. However, through countless

[11] Auburn University website https://fp.auburn.edu/fire/topos_effect.htm. Accessed on July 30,2012.
[12] Gorte, R. 2009. Congressional Research Service, Wildfire Fuels and Fuel Reduction.

observations and repeated research, some of the principles that govern fire behavior have been identified and are recognized.

Wildfire Hazards

In the 1930s, wildfires consumed an average of 40 to 50 million acres per year in the contiguous United States, according to US Forest Service estimates. By the 1970s, the average acreage burned had been reduced to about 5 million acres per year. Over this time period, fire suppression efforts were dramatically increased and firefighting tactics and equipment became more sophisticated and effective. For the 11 western states, the average acreage burned per year since 1970 has remained relatively constant at about 3.5 million acres per year. Based on the 10-year average, the Pacific Northwest saw near average number of starts during the 2017 wildfire season. In Washington, there were over 1,300 fires totaling over 400,000 acres burned. Over 12,000 structures were burned in 2017, a bulk of which occurred in California.[13]

The severity of a fire season can usually be determined in the spring by how much precipitation is received, which in turn determines how much fine fuel growth there is and how long it takes this growth to dry. These factors combined with annual wind events can drastically increase the chance a fire start will grow and resist suppression activities. Furthermore, recreational activities are typically occurring throughout the months of July, August, and September. Occasionally, these types of human activities cause an ignition that could spread into populated areas and wildlands.

Fire History

Fire was once an integral function within most ecosystems in Washington. The seasonal cycling of fire across most landscapes was as regular as the July, August and September lightning storms plying across the east slopes of the Cascades. Depending on the plant community composition, structural configuration, and buildup of plant biomass, fire resulted from ignitions with varying intensities and extent across the landscape. Shorter return intervals between fire events often resulted in less dramatic changes in plant composition.[14] These fires burned from 1 to 47 years apart, with most at 5- to 20-year intervals.[15] With infrequent return intervals, plant communities tended to burn more severely and be replaced by vegetation different in composition, structure,

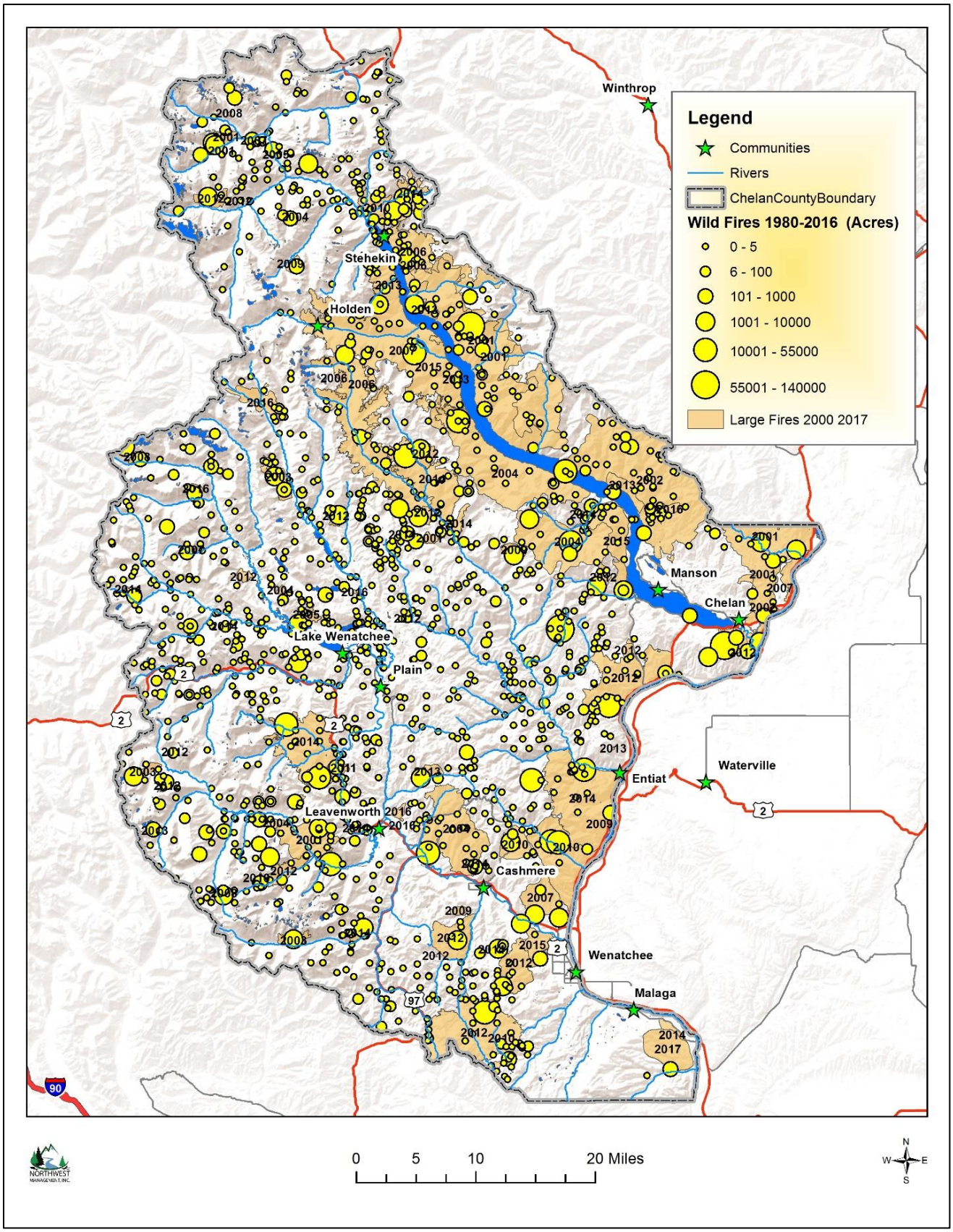
[13] National Interagency Fire Center website. https://www.nifc.gov/fireInfo/fireInfo_statistics.html. Accessed June 2018.
[14] Johnson, C.G. 1998. Vegetation Response after Wildfires in National Forests of Northeastern Oregon. 128 pp.
[15] Barrett, J.W. 1979. Silviculture of ponderosa pine in the Pacific Northwest: the state of our knowledge. USDA Forest Service, General Technical Report PNW-97. Pacific Northwest Forest and Range Experiment Station, Portland, OR. 106 p.

and age.[16] Native plant communities in this region developed under the influence of fire, and adaptations to fire are evident at the species, community, and ecosystem levels.

Historic fire history data for Chelan County is largely unknown. Local knowledge suggests that Native Americans did frequently burn which played an important role in shaping the vegetation throughout the County.[17]

[16] Johnson, C.G.; Clausnitzer, R.R.; Mehringer, P.J.; Oliver, C.D. 1994. Biotic and Abiotic Processes of Eastside Ecosytems: the Effects of Management on Plant and Community Ecology, and on Stand and Landscape Vegetation Dynamics. Gen. Tech. Report PNW-GTR-322. USDA-Forest Service. PNW Research Station. Portland, Oregon. 722pp.
[17] HistoryLink.org website. Available at: http://www.historylink.org/File/5496. Accessed September 2018.

Figure 4.1. Ignition History in Chelan County from 1980-2016.



2018 Cougar Creek Fire

A fire was reported 10 miles northwest of the Entiat on July 28th. The fire was ignited by lightning and burned over 42,000 acres according to InciWeb.[18] Fuels involved in the wildland fire included; lodgepole pine/mixed conifer stands and stands of beetle killed trees. This fire also burned through an old fire scar (Tyee 1994) with dense lodgepole regeneration, snags and dead/down material.

2015- Chelan Complex Fires

"These fires burned over 95,000 acres and destroyed over 50 homes in the First Creek Neighborhood and the City of Chelan. The entire Lake Chelan area lost power for three days, which affected their communications network and their ability to pump water from the city fire hydrants".[19]

2015 Wolverine Fire

"This fire ignited earlier than the Chelan Complex fire but burned through the summer. This fire destroyed 4 structures and threatened numerous others including in the Chiwawa Valley and the Ponderosa Neighborhood."[19]

2015 Sleepy Hollow Fire

"This fire burned 3,000 acres and destroyed 30 residences in the Broadview neighborhood located in the western foothills of Wenatchee. The city also experienced fire starts in the center of town at several warehouses due to embers from the burning homes."[19]

Wildfire Ignition Profile

Detailed records of wildfire ignitions and extents from the Washington Department of Natural Resources (DNR) and Bureau of Land Management (BLM) have been analyzed. In interpreting these data, it is important to keep in mind that the information represents only the lands protected by the agency specified and may not include all fires in areas covered only by local fire departments or other agencies.

The Federal and State agencies database of wildfire ignitions (1980-2016) used in this analysis includes ignition and extent data within their jurisdictions. During this period, the agencies recorded an average of 46 wildfire ignition per year resulting in an average total burn area of over 15,000 acres per year. The highest number of ignitions (104) occurred 1990, while the greatest number of acres burned in a single year occurred in 1994 with over 185,671 acres

[18] InciWeb – Incident Information System website available at: https://inciweb.nwcg.gov/incident/6053/. Accessed September 2018.
[19] Mowery M, Johnston K, and Yellin B. Community Planning Assistance for Wildfire Report. 2018.

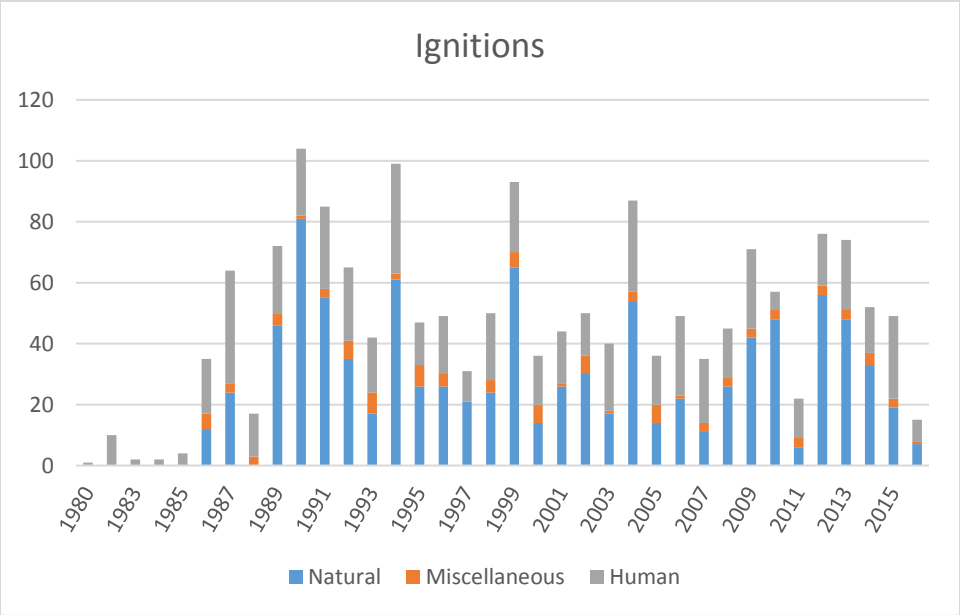
burned. According to this dataset, the clear majority of fires occurring in Chelan County are naturally caused (lightning); however, human caused fires do occur.

Table 4.1. Summary of Cause from State and Federal databases 1980-2016.

General Cause	Number of Ignitions	Percent of Total Ignitions	Acres Burned	Percent of Total Acres
Human-Caused	637	37%	78,878	14%
Natural Ignition	966	57%	406,143	73%
Unknown	107	6%	72,591	13%
Total	**1,710**	**100%**	**557,612**	**100%**

Based on the agencies' combined datasets specific to Chelan County, there is an upward trend in the number of human caused ignitions per year since 1980 but the number of acres burned annually remains relatively constant regardless of cause. The upward trend in human ignitions could be attributed to a higher amount of people moving to more rural areas of Chelan County.

Figure 4.2. Summary of Chelan County State and Federal Ignitions by Cause



The data reviewed above provides a general picture regarding the level of wildland-urban interface fire risk within Chelan County. There are several reasons why the fire risk may be even higher than suggested above, especially in developing wildland-urban interface areas.

1) Large fires may occur infrequently, but statistically they will occur. One large fire could significantly change the statistics. In other words, 40 years of historical data may be too short to capture large, infrequent wildland fire events.

2) The level of fire hazard depends profoundly on weather patterns. A several year drought period would substantially increase the probability of large wildland fires in Chelan County. For smaller vegetation areas, with grass, brush and small trees, a much shorter drought period of a few months or less would substantially increase the fire hazard.

3) The level of fire hazard in wildland-urban interface areas is likely significantly higher than for wildland areas due to the greater risk to life and property. The probability of fires starting in interface areas is much higher than in wildland areas because of the higher population density and increased activities. Many fires in the wildland urban interface are not recorded in agency datasets because the local fire department responded and successfully suppressed the ignition without mutual aid assistance from the state or federal agencies.

Wildfire Extent Profile

Across the west, wildfires have been increasing in extent and cost of control. Data summaries for 2008 through 2017 are provided and demonstrate the variability of the frequency and extent of wildfires nationally.

Table 4.2. Statistical Highlights of Wildfires from 2008 -2017 Nationally.

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of Fires	78,979	78,792	71,971	74,126	67,774	47,579	63,212	68,151	67,743	71,499
10-year Average ending with indicated year	79,919	78,549	76,521	75,526	74,958	73,353	73,128	73,267	70,403	68,983
Acres Burned (million acres)	5.3	5.9	3.4	8.7	9.2	4.3	3.6	10.1	5.5	10
10-year Average ending with indicated year (million acres)	6.91	6.94	6.54	7.05	7.25	7.28	6.83	6.97	6.53	6.6
Structures Destroyed			788	5,246	4,244	2,135	1,953	4,636	4,312	12,306
Estimated Cost of Fire Suppression (Federal agencies only)	$1.85 billion	$1.24 billion	$1.13 billion	$1.73 billion	$1.9 billion	$1.7 billion	$1.5 billion	$2.1 billion	$1.98 billion	$2.9 billion

The National Interagency Fire Center and the National Incident Coordination Center maintains records of fire costs, extent, and related data for the entire nation. Tables 4.2 and 4.3 summarize some of the relevant wildland fire data for the nation and some trends that are likely to continue unless targeted fire mitigation efforts are implemented and maintained. According to these data, the total number of fires is trending downward while the total number of acres burned is trending upward. Since 1980 there has been a significant increase in the number of acres burned.[20] In

[20] National Interagency Fire Center. 2015. Available online at http://www.nifc.gov/.

2015, Washington was second behind California for the highest structure loss per state, with 343 residences, 23 commercial and 182 outbuildings destroyed during the 2015 fire season.[21]

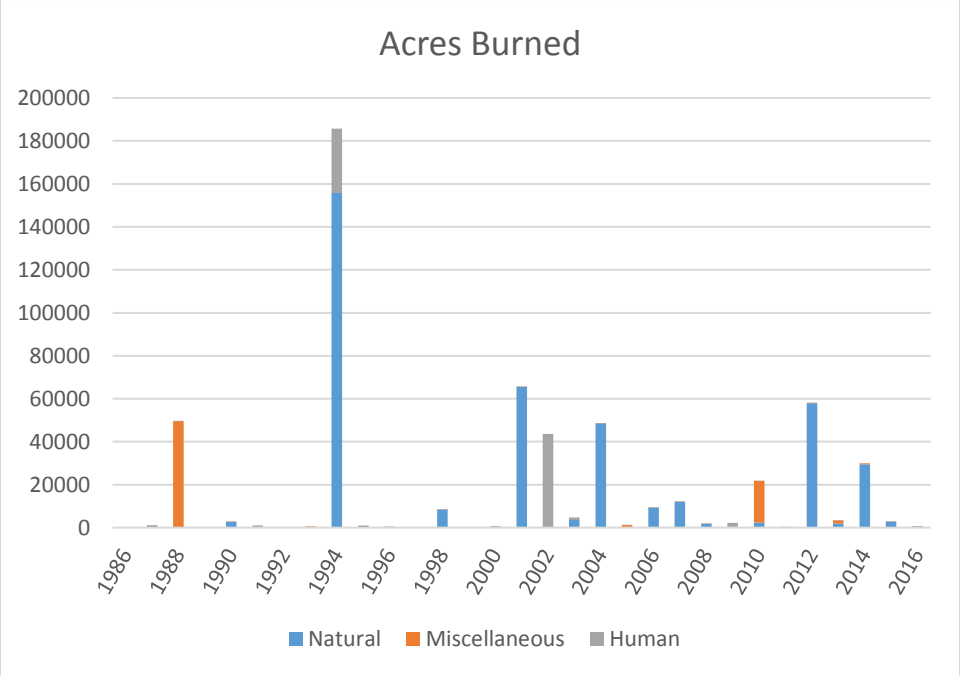
Table 4.3 Summary of National Ignitions and Acres Burned Annually (1980-2017).

Year	Fires	Acres	Year	Fires	Acres
2017	71,499	10,026,086	**1998**	81,043	2,329,709
2016	67,595	5,503,538	**1997**	89,517	3,672,616
2015	68,151	10,125,149	**1996**	115,025	6,701,390
2014	63,212	3,595,613	**1995**	130,019	2,315,730
2013	47,579	4,319,546	**1994**	114,049	4,724,014
2012	67,774	9,326,238	**1993**	97,031	2,310,420
2011	74,126	8,711,367	**1992**	103,830	2,457,665
2010	71,971	3,422,724	**1991**	116,953	2,237,714
2009	78,792	5,921,786	**1990**	122,763	5,452,874
2008	68,594	4,723,810	**1989**	121,714	3,261,732
2007	85,822	9,321,326	**1988**	154,573	7,398,889
2006	96,385	9,873,745	**1987**	143,877	4,152,575
2005	66,753	8,689,389	**1986**	139,980	3,308,133
2004	77,534	6,790,692	**1985**	133,840	4,434,748
2003	85,943	4,918,088	**1984**	118,636	2,266,134
2002	88,458	6,937,584	**1983**	161,649	5,080,553
2001	84,079	3,555,138	**1982**	174,755	2,382,036
2000	122,827	8,422,237	**1981**	249,370	4,814,206
1999	93,702	5,661,976	**1980**	234,892	5,260,825

These statistics are based on end-of-year reports compiled by all wildland fire agencies after each fire season. The agencies include: Bureau of Land Management, Bureau of Indian Affairs, National Park Service, US Fish and Wildlife Service, Forest Service, and all state agencies.

[21] National Interagency Fire Center. Wildland Fire Summary and Statistics Annual Report 2015. Available online at http://www.predictiveservices.nifc.gov/intelligence/2015_Statssumm/annual_report_2015.pdf.

Figure 4.3. Summary of Chelan County State and Federal Acres Burned by Cause.



The fire suppression agencies in Chelan County respond to numerous wildland fires each year, but few of those fires grow to a significant size. According to national statistics, only 2% of all wildland fires escape initial attack. However, that 2% accounts for most fire suppression expenditures and threatens lives, properties, and natural resources. These large fires are characterized by a size and complexity that require special management organizations drawing suppression resources from across the nation. These fires create unique challenges to local communities by their quick development and the scale of their footprint.

Wildfire Hazard Assessment

Chelan County was analyzed using a variety of models, managed on a Geographic Information System (GIS) system. Physical features of the region including roads, streams, soils, elevation, and remotely sensed images were represented by data layers. Field visits were conducted by specialists from Northwest Management, Inc. and others. Discussions with area residents and local fire suppression professionals augmented field visits and provided insights into forest health issues and treatment options. This information was analyzed and combined to develop an objective assessment of wildland fire risk in the region.

Historic Fire Regime

Historical variability in fire regime is a conservative indicator of ecosystem sustainability, and thus, understanding the natural role of fire in ecosystems is necessary for proper fire management. Fire is one of the dominant processes in terrestrial systems that constrain

vegetation patterns, habitats, and ultimately, species composition. Land managers need to understand historical fire regimes, the fire return interval (frequency) and fire severity prior to settlement by Euro-Americans, to be able to define ecologically appropriate goals and objectives for an area. Moreover, managers need spatially explicit knowledge of how historical fire regimes vary across the landscape.

"Natural" fires in Chelan County would have been disproportionately caused by Native Americans. Aboriginal peoples intentionally set fires throughout the region for the purposes of controlling tree and shrub expansion and for the cultivation of select plants. When we describe "natural" in the Range of Natural Variability we are including indigenous peoples as natural disturbance agents and contributors to perceptions of what is "natural".

A primary goal in ecological restoration is often to return an ecosystem to a previously existing condition that no longer is present at the site, under the assumption that the site's current condition is somehow degraded or less desirable than the previous condition and needs improvement

Land managers in Chelan County must determine if the past, Native American influenced condition of the County was necessarily healthier, had a higher level of integrity, and was more sustainable than the current condition. In other words, is "restoration" an appropriate course of action? After a prolonged absence, if fire is reintroduced to these ecosystems the result could be damaging. Fuel loads throughout most of the County today are quite high and most of the County is inhabited by people, homes, and infrastructure. The ecosystem was adapted to fire in the past, but is no longer adapted today, especially considering the human component.

In the absence of intensive Native American burning, a condition has developed where fire could/should not be reintroduced without some significant alteration of the current ecosystem structure. This would also require a significant assessment of social acceptance and financial contribution.

Many ecological assessments are enhanced by the characterization of the historical range of variability which helps managers understand: (1) how the driving ecosystem processes vary from site to site; (2) how these processes affected ecosystems in the past; and (3) how these processes might affect the ecosystems of today and the future. Historical fire regimes are a critical component for characterizing the historical range of variability in fire-adapted ecosystems. Furthermore, understanding ecosystem departures provides the necessary context for managing sustainable ecosystems. Land managers need to understand how ecosystem processes and functions have changed prior to developing strategies to maintain or restore sustainable systems.

In addition, the concept of departure is a key factor for assessing risks to ecosystem components. For example, the departure from historical fire regimes may serve as a useful proxy for the potential of severe fire effects from an ecological perspective.

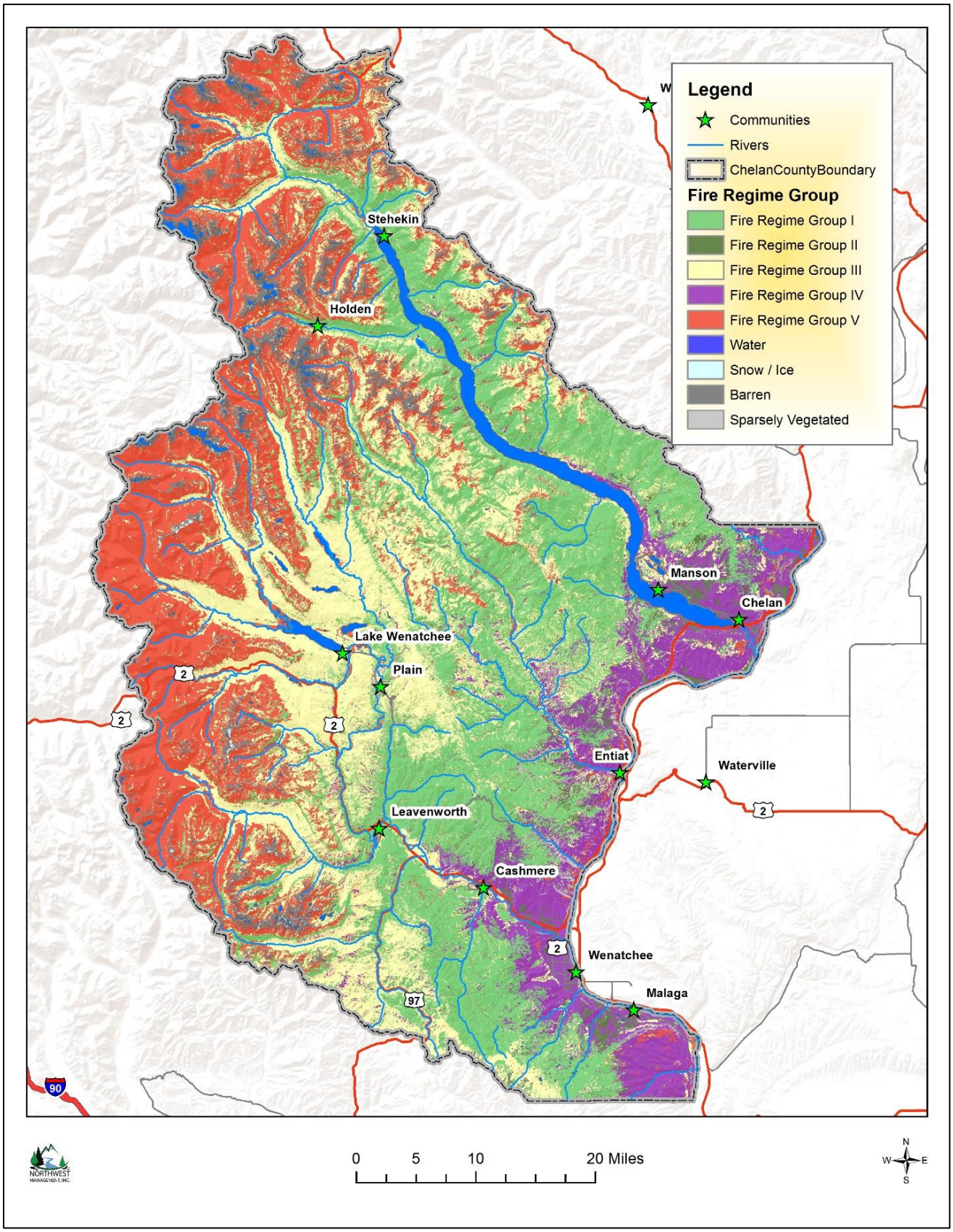
Table 4.4. Historic Fire Regimes in Chelan County.

Historic Fire Regime	Description	Percent of Total
Fire Regime Group I	<= 35 Year Fire Return Interval, Low and Mixed Severity	28%
Fire Regime Group II	<= 35 Year Fire Return Interval, Replacement Severity	<2%
Fire Regime Group III	35 - 200 Year Fire Return Interval, Low and Mixed Severity	27%
Fire Regime Group IV	35 - 200 Year Fire Return Interval, Replacement Severity	9%
Fire Regime Group V	> 200 Year Fire Return Interval, Any Severity	26%
Water	Water	3%
Barren	Barren	5%
Sparsely Vegetated	Sparsely Vegetated	<1%
	Total	**100%**

This model uses only the current vegetation types to determine the historic fire regime. Native Americans reportedly burned throughout the county on a regular basis. The vegetation types were much different pre-Euro-American settlement than they are today and believed to be a more grassland dominated landscape.

A map depicting the historic fire regime as well as additional explanation of how the historic fire regime data was derived is included in Appendix 1 and 3.

Figure 4.4. Historic Fire Regime for Chelan County.



Fire Regime Condition Class

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning.[22, 23] Coarse scale definitions for historic fire regimes have been developed by Hardy et al[24] and Schmidt et al[25] and interpreted for fire and fuels management by Hann and Bunnell.

A fire regime condition class (FRCC) is a classification of the amount of departure from the historic regime. [26] The three classes are based on low (FRCC 1), moderate (FRCC 2), and high (FRCC 3) departure from the central tendency of the natural (historical) regime.[27,28] The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is within the natural (historical) range of variability, while moderate and high departures are outside.

An analysis of Fire Regime Condition Classes in Chelan County shows that a slight majority of the land in the county is considered moderately departed (37%) from its historic fire regime and associated vegetation and fuel characteristics. Less than one third of the vegetation has a low departure and 23% is considered highly departed.

Table 4.5. Fire Regime Condition Class in Chelan County.

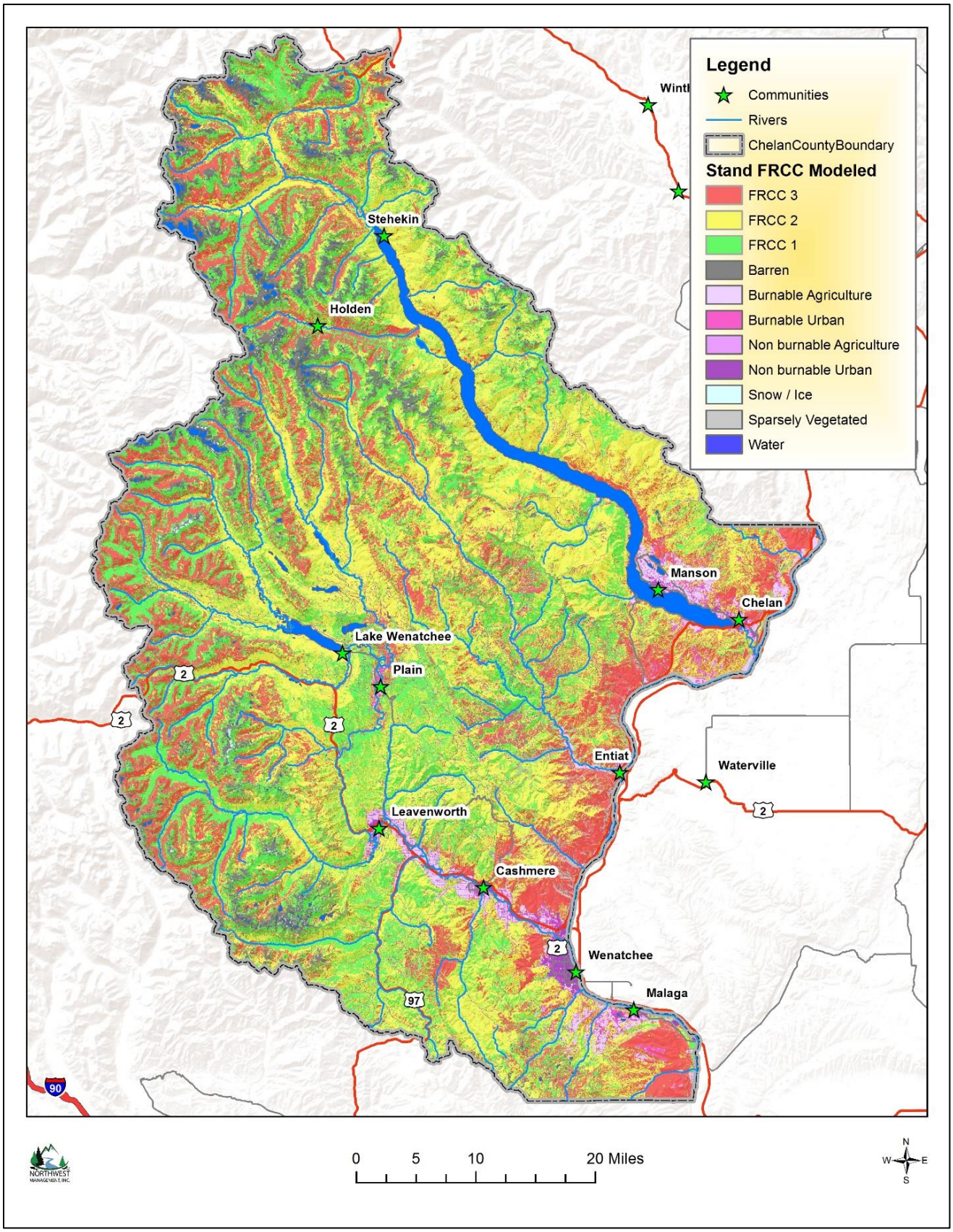
Fire Regime Condition Class	Description	Percent of Total
Condition Class I	Low Vegetation Departure	27%
Condition Class II	Moderate Vegetation Departure	37%
Condition Class III	High Vegetation Departure	23%
Agriculture	Agriculture	<2%
Water	Water	3%
Urban	Urban	3%
Barren & Sparsely Vegetated	Barren & Sparsely Vegetated	5%
	Total	**100%**

[22] Agee, J. K. Fire Ecology of the Pacific Northwest forests. Oregon: Island Press. 1993.
[23] Brown. J. K. "Fire regimes and their relevance to ecosystem management." *Proceedings of Society of American Foresters National Convention*. Society of American Foresters. Washington, D.C. 1995. Pp 171-178.
[24] Hardy, C. C., et al. *"Spatial data for national fire planning and fuel management."* International Journal of Wildland Fire. 2001. Pp 353-372.
[25] Schmidt, K. M., et al. *"Development of coarse scale spatial data for wildland fire and fuel management."* General Technical Report, RMRS-GTR-87. U.S. Department of Agriculture, Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado. 2002.
[26] Hann, W. J. and D. L. Bunnell. "Fire and land management planning and implementation across multiple scales." International Journal of Wildland Fire. 2001. Pp 389-403.
[27] Hardy, C. C., et al. *"Spatial data for national fire planning and fuel management."* International Journal of Wildland Fire. 2001. Pp 353-372.
[28] Schmidt, K. M., et al. *"Development of coarse scale spatial data for wildland fire and fuel management."* General Technical Report, RMRS-GTR-87. U.S. Department of Agriculture, Forest Service. Rocky Mountain Research Station. Fort Collins, Colorado. 2002.

The current Fire Regime Condition Class model shows that there is an even distribution of the Fire Regime Groups throughout the County. The highly departed condition classes occur around the higher concentrations of human development and along the ridges in the more remote western portion of the County. Much of the county is dominated by various pine species with a grass/shrub understory. The current structure and density of the forestlands in many areas makes it susceptible to health issues from competition, insects, and disease. The current fire severity model suggests that a higher severity fire than historical norms would be expected in these areas.

A map depicting Fire Regime Condition Class as well as a more in-depth explanation of FRCC is presented in Appendices 1 and 3.

Figure 4.5. Fire Regime Condition Class.



Chelan County's Wildland-Urban Interface

The wildland-urban interface (WUI) has gained attention through efforts targeted at wildfire mitigation; however, this analysis technique is also useful when considering other hazards because the concept looks at where people and structures are concentrated in any region.

A key component in meeting the underlying need for protection of people and structures is the protection and treatment of hazards in the wildland-urban interface. The wildland-urban interface refers to areas where wildland vegetation meets urban developments or where forest fuels meet urban fuels such as houses. The WUI encompasses not only the interface (areas immediately adjacent to urban development), but also the surrounding vegetation and topography. Reducing the hazard in the wildland-urban interface requires the efforts of federal, state, and local agencies and private individuals.[29] "The role of [most] federal agencies in the wildland-urban interface includes wildland firefighting, hazard fuels reduction, cooperative prevention and education, and technical experience. Structural fire protection [during a wildfire] in the wildland-urban interface is [largely] the responsibility of Tribal, state, and local governments".[30] The role of the federal agencies in Chelan County is and will be much more limited. Property owners share a responsibility to protect their residences and businesses and minimize danger by creating defensible areas around them and taking other measures to minimize the risks to their structures.[31] With treatment, a wildland-urban interface can provide firefighters a defensible area from which to suppress wildland fires or defend communities against other hazard risks. In addition, a wildland-urban interface that is properly treated will be less likely to sustain a crown fire that enters or originates within it. [32]

By reducing hazardous fuel loads and creating new and reinforcing existing defensible space, landowners can protect the wildland-urban interface, the biological resources of the management area, and adjacent property owners by:

- Minimizing the potential of high-severity fires entering or leaving the area;
- Reducing the potential for firebrands (embers carried by the wind in front of the wildfire) impacting the WUI. Research indicates that flying sparks and embers (firebrands) from a

[29] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.
[30] USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: http://www.fs.fed.us/r3/sfe/fire/urbanint.html
[31] USFS. 2001. United States Department of Agriculture, Forest Service. Wildland Urban Interface. Web page. Date accessed: 25 September 2001. Accessed at: http://www.fs.fed.us/r3/sfe/fire/urbanint.html
[32] Norton, P. Bear Valley National Wildlife Refuge Fire Hazard Reduction Project: Final Environmental Assessment. Fish and Wildlife Services, Bear Valley Wildlife Refuge. June 20, 2002.

crown fire can ignite additional wildfires as far as 1¼ miles away during periods of extreme fire weather and fire behavior;[33]

- Improving defensible space in the immediate areas for suppression efforts in the event of wildland fire.

Three wildland-urban interface conditions have been identified (Federal Register 66(3), January 4, 2001) for use in wildfire control efforts. These include the Interface Condition, Intermix Condition, and Occluded Condition. Descriptions of each are as follows:

- **Interface Condition** – a situation where structures abut wildland fuels. There is a clear line of demarcation between the structures and the wildland fuels along roads or back fences. The development density for an interface condition is usually 3+ structures per acre;
- **Intermix Condition** – a situation where structures are scattered throughout a wildland area. There is no clear line of demarcation; the wildland fuels are continuous outside of and within the developed area. The development density in the intermix ranges from structures very close together to one structure per 40 acres; and
- **Occluded Condition** – a situation, normally within a city, where structures abut an island of wildland fuels (park or open space). There is a clear line of demarcation between the structures and the wildland fuels along roads and fences. The development density for an occluded condition is usually similar to that found in the interface condition and the occluded area is usually less than 1,000 acres in size.

In addition to these classifications detailed in the Federal Register, Chelan County has included three additional classifications to augment these categories:

- **Rural Condition** – a situation where the scattered small clusters of structures (ranches, farms, resorts, or summer cabins) are exposed to wildland fuels. There may be miles between these clusters.
- **High Density Urban Areas** – those areas generally identified by the population density consistent with the location of incorporated cities, however, the boundary is not necessarily set by the location of city boundaries or urban growth boundaries; it is set by very high population densities (more than 7-10 structures per acre).
- **Non-WUI Condition** – a situation where the above definitions do not apply because of a lack of structures in an area or the absence of critical infrastructure. This classification is not considered part of the wildland urban interface and does not occur in Chelan County.

Much of the following discussion regarding the WUI in Chelan County was taken from the report generated by the Community Planning and Assistance for Wildfire project conduct in 2017-2018.[19]

[33] McCoy, L. K., et all. Cerro Grand Fire Behavior Narrative. 2001.

A general WUI definition used across all policies, plans and regulations should account for the "set of conditions" where vegetation (wildland fuels) and structures or infrastructure (built fuels) are influenced by weather and topography to allow fire to ignite and spread through the WUI environment. To provide the basis for a true understanding of the risk that Chelan County faces, the WUI should be more accurately defined as:

Any developed area where conditions affecting the combustibility of both wildland and built fuels allow for the ignition and spread of fire through the combined fuel complex.

To provide a spatial reference in defining the WUI, the SILVIS labs approach should be used. The SILVIS lab approach originated in the Federal Register8 report on WUI communities at risk from fire, and Tie and Weatherford's 2000 report to the Council of Western State Foresters on WUI fire risk. This approach focuses on the following inputs:

1. Housing density
2. Landcover9 a)
    a. **WUI Intermix**: Areas with ≥16 houses per square mile and ≥50 percent cover of wildland vegetation
    b. **WUI Interface:** Areas with ≥16 houses per square mile and <50 percent cover of vegetation located <1.5 miles of an area ≥2 square miles in size that is ≥75 percent vegetated
    c. **Non- WUI Vegetated (no housing):** Areas with ≥50 percent cover of wildland vegetation and no houses (e.g., protected areas, steep slopes, mountain tops)
    d. **Non-WUI (very low housing density):** Areas with ≥50 percent cover of wildland vegetation and <16 houses per square mile (e.g., dispersed rural housing outside neighborhoods)
    e. **Non-Vegetated or Agriculture (low and very low housing density)**: Areas with <50 percent cover of wildland vegetation and <128 houses per square mile (e.g., agricultural lands and pasturelands)
    f. **Non-Vegetated or Agriculture (medium and high housing density):** Areas with <50 percent cover of wildland vegetation and ≥128 houses density per square mile (e.g., urban and suburban areas, which may have vegetation, but not dense vegetation**)**

CPAW and the RMRS have modified the above approach by removing the < 1.5 mile reference in b) and considering the entire County as an "ember zone". Due to this outcome and for simplicity, the categories have also been modified into the following categories:

g. **WUI Intermix**: Areas with houses present and ≥50 percent cover of wildland vegetation

h. **WUI Interface**: Areas with ≥16 houses per square mile and <50 percent cover of vegetation.
i. **Non-WUI Vegetated**: Areas with ≥50 percent cover of wildland vegetation and no houses (e.g., protected areas, steep slopes, mountain tops)
j. **Non-Vegetated or Agriculture**: Areas with <50 percent cover of wildland vegetation

The Chelan County CWPP Planning Team determined to utilize the WUI designation that was recommended through the CPAW project. The Planning Team did modify the recommended WUI by adding an Infrastructure WUI category. This additional category includes items like ingress/egress, community water sources, utility lines, etc. The infrastructure WUI is shown on the map in figure 4.6 but is not necessarily all inclusive. There is likely infrastructure that is critical to emergency response/operation, evacuation and local government operations that are not shown on the map. The County reserves the right to determine what is critical infrastructure on a case by case basis and will show justification for such a determination.

In summary, the designation of areas by the Chelan County planning team includes:

- Intermix Condition: WUI
- Interface Condition: WUI
- Infrastructure: WUI
- Non-WUI Vegetated

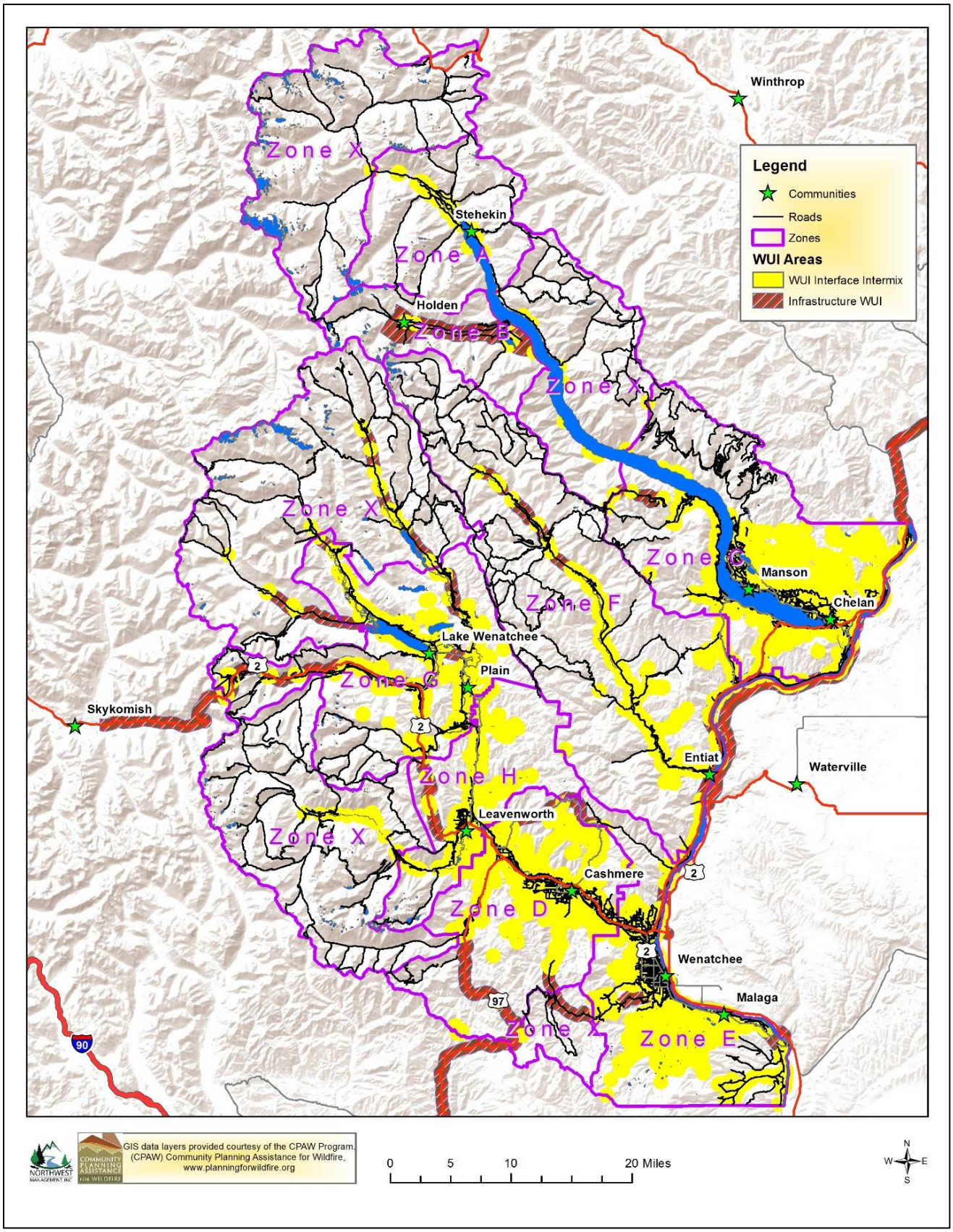
Chelan County's wildland urban interface (WUI) is primarily based on structure density and a structure's location relative to burnable vegetation. Relative population density across the county was estimated using a GIS based kernel density population model that uses object locations to produce, through statistical analysis, concentric rings or areas of consistent density. To graphically identify relative population density across the county, structure locations are used as an estimate of population density. 911 address points were used to identify structure locations in Chelan County. The resulting output identified the extent and level of population density throughout the county.

By evaluating structure density in this way, WUI areas can be identified on maps by using mathematical formulae and population density indexes. The resulting population density indexes create concentric circles showing high density areas, interface, and intermix condition WUI, as well as rural condition WUI (as defined above). This portion of the analysis allows us to "see" where the highest concentrations of structures are located in reference to relatively high-risk landscapes, limiting infrastructure, and other points of concern.

The WUI, as defined here, is unbiased and consistent and most importantly – it addresses all the county, not just federally identified communities at risk. It is a planning tool showing where homes and businesses are located and the density of those structures leading to identified WUI categories. It can be determined again in the future, using the same criteria, to show how the WUI has changed in response to increasing population densities. It uses a repeatable and reliable analysis process that is unbiased.

The Healthy Forests Restoration Act makes a clear designation that the location of the WUI is at the determination of the county or reservation when a formal and adopted Community Wildfire Protection Plan is in place. HFRA further states that the federal agencies are obligated to use this WUI designation for all Healthy Forests Restoration Act purposes. The Chelan County Community Wildfire Protection Plan planning team evaluated a variety of different approaches to determining the WUI for the county and selected this approach and has adopted it for these purposes. In addition to a formal WUI map for use with the federal agencies, it is hoped that it will serve as a planning tool for the county, state and federal agencies, and local Fire Protection Districts. A map depicting the Chelan County WUI is included in Appendix 1.

Figure 4.6. Wildland Urban Interface in Chelan County, Washington.[19]



Potential WUI Treatments

The definition and mapping of the WUI is the creation of a planning tool to identify where structures, people, and infrastructure are located in reference to each other. This analysis tool does not include a component of fuels risk. There are a number of reasons to map and analyze these two components separately (population density vs. fire risk analysis). Primary among these reasons is the fact that population growth often occurs independent from changes in fire risk, fuel loading, and infrastructure development. Thus, making the definition of the WUI dependent on all of them would eliminate populated places with a perceived low level of fire risk today, which may in a year become an area at high risk due to forest health issues or other concerns.

By examining these two tools separately, the planner is able to evaluate these layers of information to see where the combination of population density overlays areas of high current relative fire risk and then take mitigation actions to reduce the fuels, improve readiness, directly address factors of structural ignitability, improve initial attack success, mitigate resistance to control factors, or (more often) a combination of many approaches.

It should not be assumed that just because an area is identified as being within the WUI, that it will therefore receive treatments because of this identification alone. Nor should it be implicit that all WUI treatments will be the application of the same prescription. Instead, each location targeted for treatments must be evaluated on its own merits: factors of structural ignitability, access, resistance to control, population density, resources and capabilities of firefighting personnel, and other site-specific factors.

It should also not be assumed that WUI designation on national or state forest lands automatically equates to a treatment area. The Forest Service, Bureau of Land Management, and Washington Department of Natural Resources are still obligated to manage lands under their control according to the standards and guides listed in their respective forest or resource management plans (or other management plans). The adopted forest plan has legal precedence over the WUI designation until such a time as the forest plan is revised to reflect updated priorities.

Most treatments may begin with a home evaluation, and the implicit factors of structural ignitability (roofing, siding, deck materials) and vegetation within the treatment area of the structure. However, treatments in the low population areas of rural lands (mapped as yellow) may look closely at access (two ways in and out) and communications through means other than land-based telephones. On the other hand, a subdivision with densely packed homes (mapped as brown – interface areas) surrounded by forests and dense underbrush, may receive more time

and effort implementing fuels treatments beyond the immediate home site to reduce the probability of a crown fire entering the subdivision.

Wildfire Hazard Assessments and Mapping

The entire following section was taken from the Community Planning Assistance for Wildfire report. [19]

To provide an effective decision support tool for the county and its partners, RMRS staff developed the following wildfire hazard mapping outputs. Three maps are provided at two scales; the Landscape Level Wildfire Hazard (270 m pixels), Local Wildfire Hazard (30 m pixels which includes ember zones) and Mitigation Potential (30 m). A summary of the methodology used to develop these outputs can be found in Appendix 3.

Landscape Level Wildfire Hazard

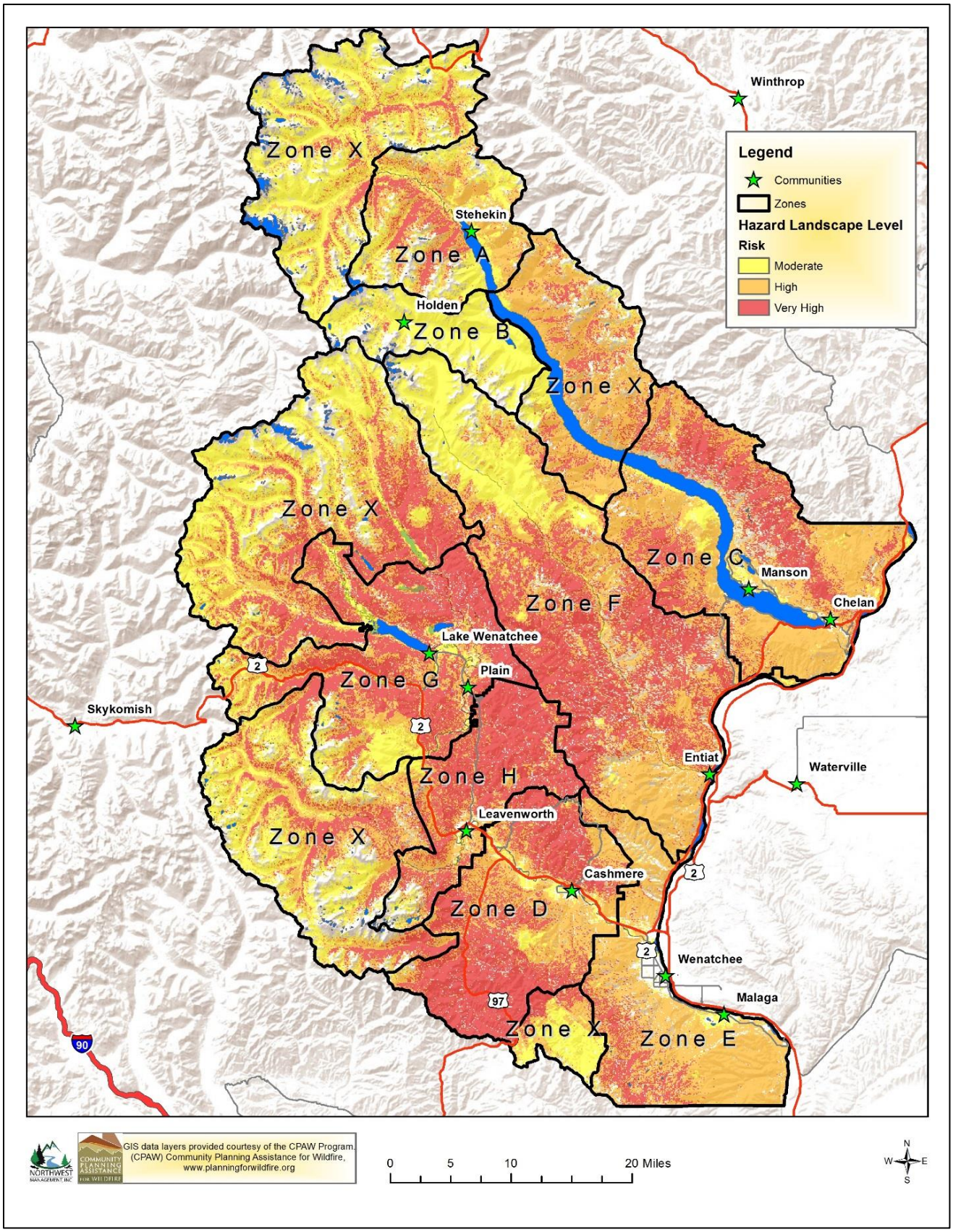
This scale (120 m pixel resolution) represents the likelihood (probability) of a fire occurring and intensity of the fire at the landscape level based on the inherent landscape characteristics including broad existing vegetation, biophysical settings, fire regimes and fire histories. The polygon boundaries are based on the U.S. Geological Survey Hydrological Unit Code (HUC) 12 (subwatershed) boundaries. The subwatersheds range in size from 13 to 75 mi^2, with an average of 36 mi^2. The landscape level hazard assessment is delineated into the following rankings:

- Moderate
- High
- Very High

The factors influencing these rankings can be used to determine the potential landscape level exposure that a development will be subject to. The ranking at this scale is difficult to change at the local/parcel level. Mitigation affecting change at this scale is typically done by large scale disturbances such as insect mortality, fires or landscape level mitigation. Many of the very high ranked polygons are present on federal lands and would require mitigation by federal land management agencies.

Land Use Planning Application: This informs land use planners on the general areas where fires are most likely to occur and collaborative, multi-agency large-scale fire management planning and mitigation is necessary.

Figure 4.7. Landscape Level Wildfire Risk



Local Level Wildfire Hazard

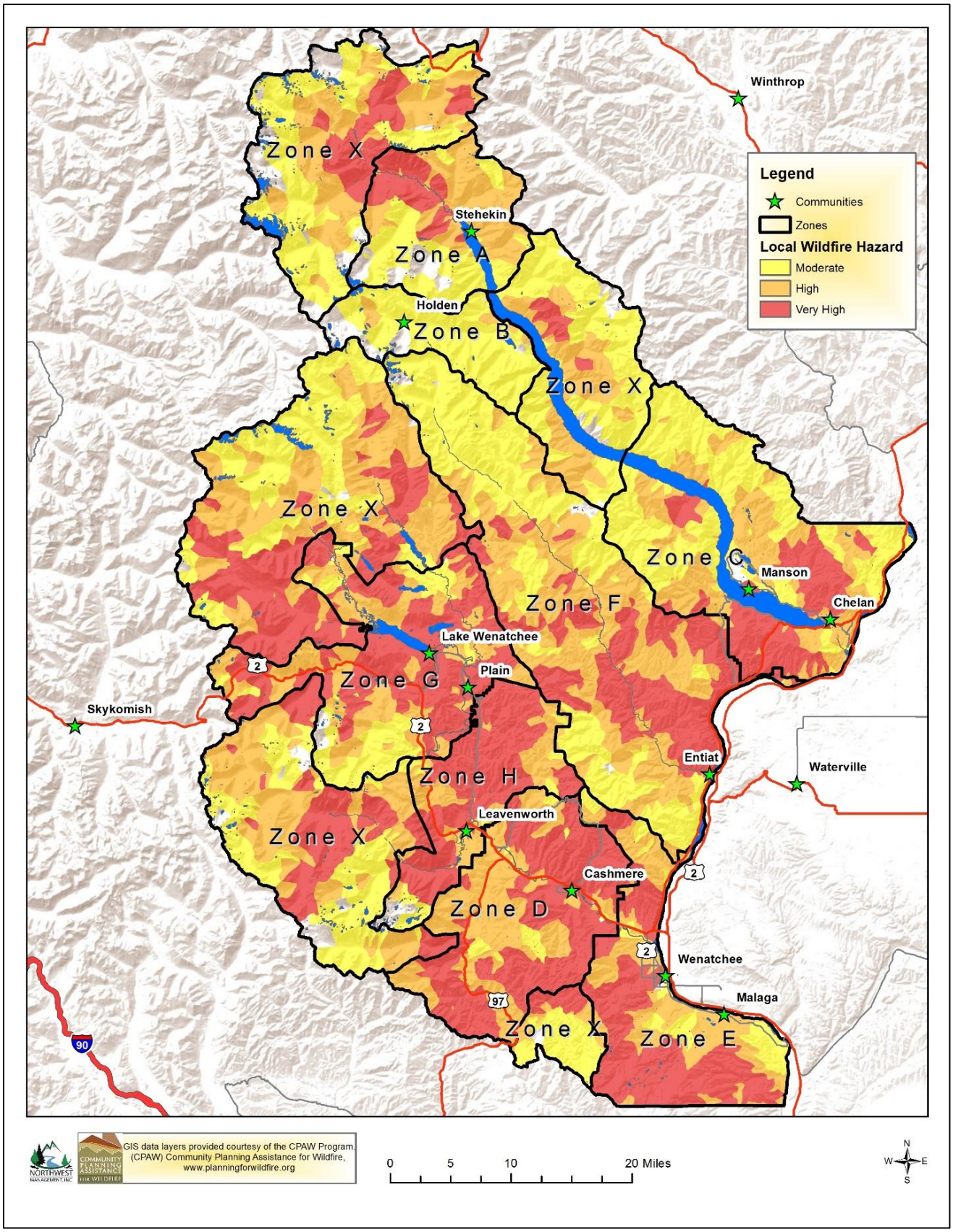
This scale (30 m pixel resolution) is based on an extreme event (worst fire days). The polygon boundaries are based on the catchment boundaries with the HUC 12 boundaries. This does not show the likelihood of a fire occurring but does shows where fires are likely to burn at high intensity. For example, a fire that starts in an area where the local hazard is high can spread fast and burn at high intensity creating significant wildfire exposure to any structures in the area. The same rankings used at the landscape scale are used at this local scale:

- Moderate
- High
- Very High

As part of the wildfire hazard analysis the potential ember transport was assessed using a number of approaches and all outcomes indicated that the entire county is susceptible to ember impingement.

Land Use Planning Application: This informs land use planners on the relative worst-case (hottest, driest, windiest days during a fire season) wildfire exposure (radiant, convective and ember) that can be expected in any given polygon where development exists or is planned for.

Figure 4.8. Local Level Wildfire Risk



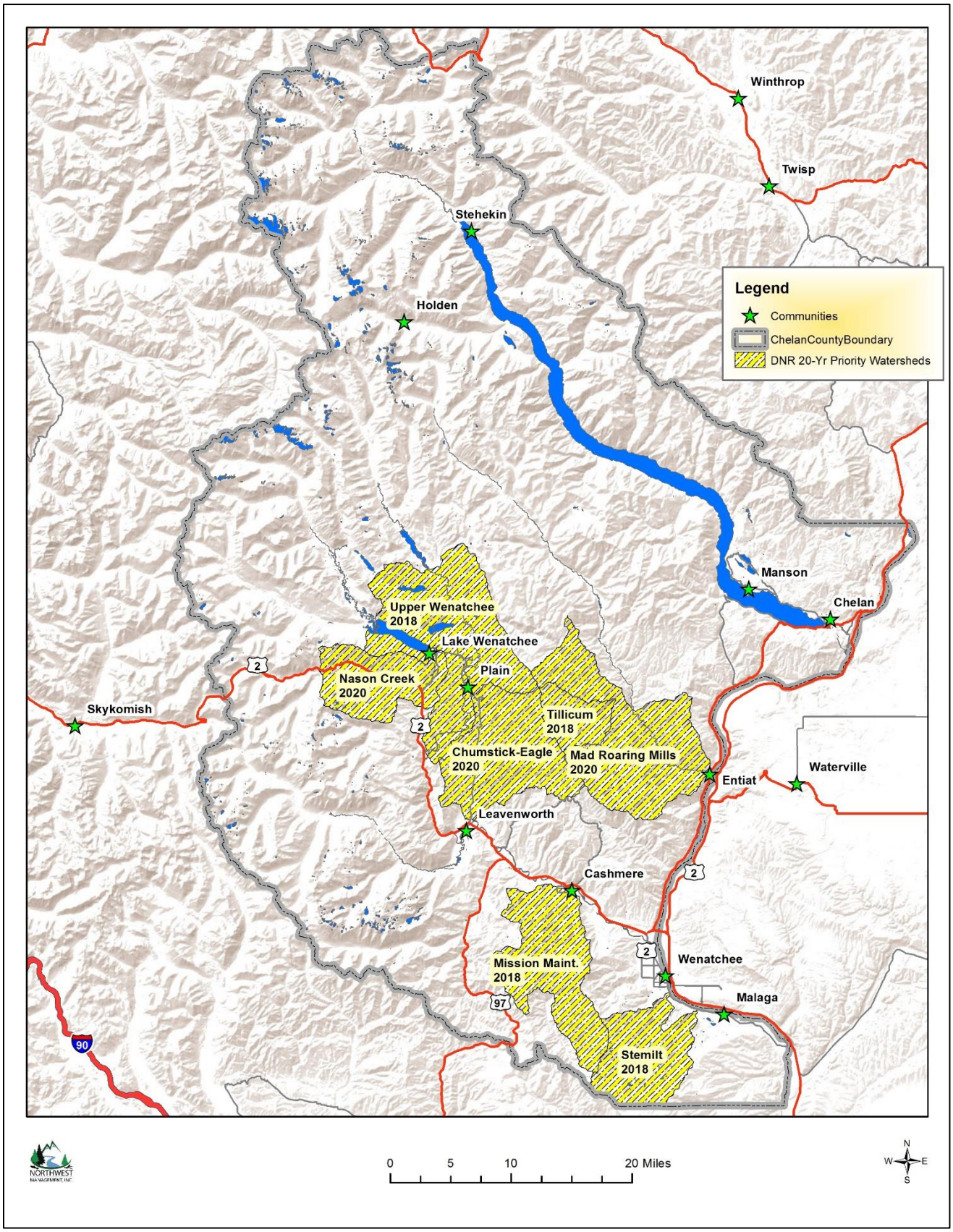
Priority Forest Health Watersheds

As part of the 20-Year Forest Health Strategic Plan, a prioritization process was developed at the HUC 5 watershed level (an average HUC 5 watershed is approximately 150,000 acres) using a variety of available data sets to help describe forest health/wildfire risk and the values at risk.

The forest health landscape prioritization results (figure 4.9) make it clear that high priority treatment areas exist across all of eastern Washington, and that the process to strategically focus investments and treatments will be critical to address those areas with the highest level of relative risk. Areas with high community protection needs and Department of Natural Resources Forest Health Hazard Warning Areas will continue to be priorities for state forest health investments.[34]

[34] Washington Department of Natural Resources. 20-Year Forest Health Strategic Plan Eastern Washington. Available online at: https://www.dnr.wa.gov/ForestHealthPlan. Accessed March 2019.

Figure 4.9. Eastern Washington Forest Health Priority HUC 5 Watersheds [34]

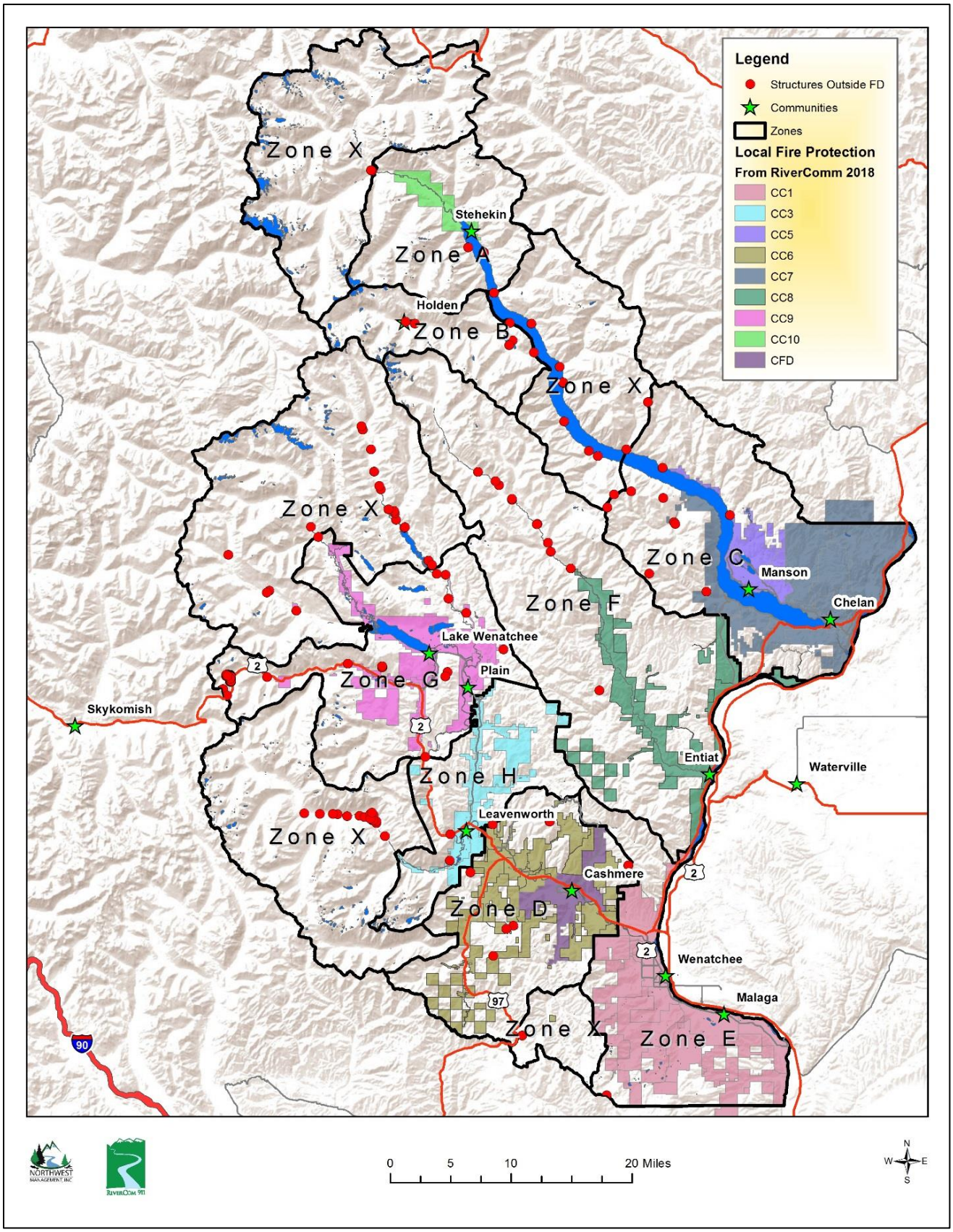


Overview of Fire Protection System

The DOI, United States Forest Service, state, tribes, counties, and local governments maintain operational wildland fire organizations. These are supplemented by volunteer organizations such as volunteer fire departments and rangeland protection associations. In DOI, the operational fire organizations reside in Bureau of Land Management, National Park Service U.S. Fish and Wildlife Service, and Bureau of Indian Affairs. Other organizations such as US Fire Administration and U.S. Geological Survey have fire expertise that supports and partners with the operational fire organizations. The Office of Wildland Fire at DOI provides budget and policy coordination, leadership, and oversight for the operational programs within DOI. Several chartered interagency groups exist to provide coordination and consistency among wildland fire organizations to ensure policy and operational consistency and interoperability.

Most of the County has a local fire protection that covers both structural and wildland fire response.

Figure 4.10. Wildfire Protection Responsibility Map.



Bureau of Land Management

Spokane District Mission Statement: The mission of the Spokane District is to share our unique capability and interest in sustaining the full diversity of natural and cultural landscapes across Washington State and invite their discovery and use. This includes protecting the natural resources, such as water for fish and wildlife; preserving environmental and cultural values on the lands they manage; providing for multiple uses, that include some commercial activities; and enhancing opportunities for safe and enjoyable outdoor recreation. The Spokane District also assesses energy and mineral resources and works to ensure that their development is in the best interest of the public. Another major responsibility is to ensure consideration of Tribal interests and administration the Department of Interior's trust responsibilities for American Indian Reservation communities.

District Summary: Up through the 1970's, BLM's policy was to divest ownership of all federal public (BLM) lands in the state of Washington. But in 1980, at the height of the Sage Brush Rebellion (a social movement to give control over federal lands to the states and local authorities), Washington voted to have the public lands remain under federal ownership and management. In the 1980 general election, the state put a measure on the ballot asking voters if the state constitution should "be amended to provide that the state no longer disclaim all rights to unappropriated federal public lands." Approximately 60% of the people and the majority in every county voted no, signaling to BLM that there was strong support for continued federal management of the public lands in the state.

In response to this vote, the Director of BLM approved a proposal by the District to begin a process of consolidating the scattered BLM lands around the state. Today the Spokane District BLM manages over 425,000 acres across eastern Washington for multiple uses, providing wildfire protection, suppression, support, and training for the BLM managed lands and other federal/state/county agencies.

The Spokane District Fire Management Program currently consists of two type six wildland engines (300 gallons) with two full time Engine Captains, four engine crew members, one ten-person hand crew, one Fuels Technician, Seasonal Dispatcher, Fire Operations Specialist (FOS), Assistant Fire Management Officer (AFMO), and a Fire Management Officer (FMO). The hand crew is stationed in Spokane at the District office and the two Type 6 engines are in Wenatchee at the field office. There are approximately 16 other specialist (staff) from across the district that assist the Fire Management Program in wildland and/or prescribed fire efforts. With the District's scattered ownership pattern, the engines are usually on scene after initial attack forces have

arrived. Our engines and personnel are available for off District and out of state fire assignments that aide in support, training, and experience.

Cooperative Agreements: The Spokane District BLM has Coop agreements with the Colville National Forest, US Fish and Wildlife Service, WA DNR, Spokane County FDs #3, 4, 9, 10, Spokane Valley FD, Benton County FD #1, Chelan County FDs #1, 6, Douglas FDs #2, 4, 5, 15, Franklin County FD #5, Grant County FD #5, Chelan County FDs #1, 7, and Yakima County FDs #4, 5.

US Forest Service Okanogan-Wenatchee National Forest

District Summary: The Okanogan-Wenatchee National Forest encompasses more than 4-million acres in Washington State and stretches north to south from the Canadian border to the Goat Rocks Wilderness - a distance of about 180 miles. The forest lies east of the Cascade Crest, which defines its western boundary. The eastern edge of the forest extends into the Okanogan highlands, then south along the Okanogan and Columbia Rivers, and then to the Yakima River valley.

The Forest Includes 7 Ranger Districts, 3 of which are in Chelan County: Chelan Ranger District, Entiat Ranger District, and Wenatchee River Ranger District.

Issues of Concern:

Residential Growth Continued WUI expansion and development adjacent to jurisdiction increases complexity and risk to responders during incident response due to a change in values at risk to wildfire.

Communications Steep, rugged terrain of the Cascades requires a robust communication network which is critical to safety of responders and the public.

Burn Permit Regulations For the Forest Service, prescribed burning is an important tool in hazardous fuels reduction and forest restoration work. Smoke management is one challenging aspect to work with through the DNR.

Cooperative Agreements: The Okanogan – Wenatchee National Forest has cooperator agreements with fire districts in Chelan county and numerous adjacent counties, with the Washington State DNR, National Park Service, Bureau of Land Management, US Fish and Wildlife Service, and the Bureau of Indian Affairs.

The forest also coordinates with partners when implementing fire restrictions, industrial fire precaution levels, and setting the fire danger adjective class.

Fire Protection Issues

The following sections provide a brief overview of the many difficult issues currently challenging Chelan County in providing wildland fire safety to citizens. These issues were discussed at length both during the planning process and at several of the public meetings. In most cases, the team has developed action items (Chapter 6) that are intended to begin the process of effectively mitigating these issues.

Urban and Suburban Growth

One challenge Chelan County faces is the large number of houses in the urban/rural fringe. Since the 1970s, a segment of Washington's growing population has expanded further into traditional forest or resource lands. The "interface" between urban and suburban areas and the resource lands created by this expansion has produced a significant increase in threats to life and property from fires and has pushed existing fire protection systems beyond original or current design or capability. Currently Chelan County has numerous Firewise Communities and many property owners within the interface are aware of the threats they face or resources available to them. However, human activities increase the incidence of fire ignition and potential damage.

It is one of the goals of the Chelan County CWPP to help educate the public on the ramifications of living in the wildland-urban interface, including their responsibilities as landowners to reduce the fire risk on their property and to provide safe access to their property for all emergency personnel and equipment. Homeowners building in a high fire risk area must understand how to make their properties more fire resistant using proven firesafe construction and landscaping techniques and they must have a realistic understanding of the capability of local fire service organizations to defend their property.

Rural Fire Protection

People moving from mainland urban areas to the more rural parts of Chelan County, frequently have high expectations for structural fire protection services. Often, new residents do not realize that the services provided are not the same as in an urban area. The diversity and amount of equipment and the number of personnel can be substantially limited in rural areas. Fire protection may rely more on the landowner's personal initiative to take measures to protect his or her property. Furthermore, subdivisions on steep slopes and the greater number of homes exceeding 3,000 square feet are also factors challenging fire service organizations. In the future, public education and awareness may play a greater role in rural or interface areas. Great improvements in fire protection techniques are being made to adapt to large, rapidly spreading fires that threaten large numbers of homes in interface areas.

In most western states, state and federal agencies that have wildland fire protection responsibilities have launched a campaign to reiterate to the public that they do not provide structural fire protection. Much of the increasing costs of wildland fires can be directly related to the increasing number of structures in the wildland urban interface. State and federal agencies are trying to make it clear to the public that land and homeowners are responsible for reducing the fire risk on their property and that the agencies are not responsible for or required to provide structural protection.

The CWPP planning team has made several recommendations targeting increased wildland fire awareness and education for residents living in or moving into the wildland urban interface of Chelan County.

Fireworks

Due to Chelan County's proximity to Native American Indian Reservations, fireworks are increasingly available to the public in Chelan County. Even with the existing fireworks ban during periods of high wildland fire risk, the use of fireworks is high. Both the CWPP planning team and local residents have noted fireworks as a high-risk factor for wildfire ignitions. So far, they have not resulted in large fires; however, there are several documented ignitions due to fireworks within Chelan County.

The CWPP planning committee has identified fireworks as a serious threat to Chelan County, and thus, has made recommendations for strict regulations and active enforcement of all fireworks-related restrictions.

Pre-planning in High Risk Areas

Although conducting home, community, and road defensible space projects is a very effective way to reduce the fire risk to communities in Chelan County, recommended projects cannot all occur immediately, and many will take several years to complete. Thus, developing pre-planning guidelines specifying which and how local fire agencies and departments will respond to specific areas is very beneficial. These response plans should include assessments of the structures, topography, fuels, available evacuation routes, available resources, response times, communications, water resource availability, and any other factors specific to an area. Community-based CWPPs often contain pre-planning information useful to fire managers. All these plans should be developed in partnership with the local fire departments as well as dispatch personnel. County with coordination should take place to develop a centralized place to store

pre-planning data, that is available to responders and useful to land managers planning landscape level fuels treatments across boundaries.

One of the main goals of this CWPP is to identify areas with a high risk of experiencing wildland fires and take direct actions to mitigate those risks. However, in areas where mitigation may be difficult or will take a long period of time to implement, pre-disaster and emergency planning measures have been recommended.

Accessibility

Fire chiefs throughout the County have identified home accessibility issues as a primary concern in some parts of Chelan County. Many existing housing developments and private driveways have been constructed without regard to access requirements of large emergency vehicles. Additionally, many of these roads are several miles long and dead end with no warning or plans for future connections to other access roads. The lack of road connectivity and general accessibility in some areas restricts engagement by fire suppression resources. Continued enforcement of Chelan County's current standards regarding road and driveway construction regulations for fire apparatus would prevent accessibility issues in new developments. Wildfire risk can be lessened, and firefighter safety can be improved by keeping vegetation including tall grass, brush, and trees a safe distance from the road right-of-way. This will not only improve accessibility but will also allow the road to serve as a control point for suppression activities.

Additionally, the fire districts have identified several unimproved and unmaintained county roads that could serve as strategic access points for fire suppression activities if they were maintained periodically for this purpose. In some cases, these roads are partially maintained, but are limited by inadequate or nonexistent bridge crossings.

The planning committee involved in the development of this CWPP found accessibility to be one of the primary difficulties with safe emergency ingress and egress. It is a clear goal of this planning process to continue the enforcement and maintenance of the current road standards countywide. As part of this process, the committee has recommended an action item for improvement of existing substandard roads, driveways, and bridges, where necessary, to improve firefighter safety and suppression effectiveness.

Protection of Natural Resources

Protection of native plant communities, especially those requiring fire as essential to ecosystem integrity and diversity, are important to provide ecosystem services that sustain wildlife and create resilient landscapes.

One of the primary challenges to restoring the health of the various ecosystems in Chelan County, is achieving effective long-term restoration and post-fire recovery. Arid ecosystems face many

environmental and site conditions stresses exacerbated by drought, climate change, and spread of invasive species, leading to more frequent and catastrophic fires. While restoration can be successful at the small scale, achieving a landscape approach to effective and sustainable restoration can be difficult. There is a need for natural resource advisors and fire managers, at all levels, to improve communication and continue to coordinate and work collaboratively to identify priority habitats before and throughout the wildfire season to improve fire response and protection of priority habitats. Chelan County strongly recommends that land managers utilize the full spectrum of Fire Adapted Community Best Practices to better protect Chelan County resources.

Fire-Resistant Construction Materials

Due to the multitude of highly publicized wildland-urban interface fires occurring in the western states, there has been an increased level of research, development, and marketing of more fire-resistant construction materials. The CWPP Planning Team would like to advance the CPAW Report's recommendation that the County adopt a Wildland Urban-Interface Code which would establish minimum wildfire safety standards for future development in the County. Information on high risk materials as well as fire-resistant alternatives can be readily found online or through local fire departments.

The planning committee has recommended that additional education regarding wildfire awareness issues and fire-resistant construction materials be provided to those engaged in new construction projects.

Volunteer Firefighter Recruitment

The rural fire departments in Chelan County are predominantly dependent on volunteer firefighters. The trend for several years, in many volunteer fire departments, is that membership has continued to decrease. This can be attributed to several reasons including the need for two wage earners in a house hold to support their family, and the tremendous amount of time spent in training to satisfy the ever-increasing regulations from state and federal agencies. Whether it be job and family commitments combined with hobbies or competition with other volunteer organizations, it comes down to the fact there is very little time left for being a volunteer firefighter. This is exacerbated by the added stress of emergencies and inherent dangers of the job, not to mention that our society is generally less appreciative of the commitment and sacrifices made by volunteer firefighters.

Today's fire departments, career and volunteer, find themselves in a position where there is an increased demand for their services, but are confronted with increasing operational costs and

overall less revenue. In the rural setting where revenue is limited and volunteers are limited, this can add up to a fire service that is stretched very thin. Many departments have difficulty maintaining volunteers available during regular work day hours (8am to 5pm).

Each district spends a considerable amount of time and resources training and equipping each volunteer, with the hope that they will continue to volunteer their services to the department for at least several years. One problem that all volunteer-based departments encounter is the diminishing number of new recruits. As populations continue to rise and more and more people build homes in high fire risk areas, the number of capable volunteers has gone down.

One of the goals of this CWPP is to assist local fire departments and districts with the recruitment of new volunteers and retention of trained firefighters. This is a very difficult task, particularly in small, rural communities that have a limited pool; however, providing departments with funding for training, safety equipment, advertising, and possibly incentive programs will help draw more local citizens into the fire organizations.

Communication

There are several communication issues being addressed in Chelan County. Many of the emergency responders have identified areas of poor reception for both radios and cell phones. The lack of communication between responders as well as with central dispatch significantly impairs responders' ability to effectively and efficiently do their job as well as lessens their safety. The conversion to a narrow band communication system is likely to exacerbate these issues unless numerous additional repeaters are installed.

On a smaller scale, many subdivisions or unincorporated population centers have identified the need to improve emergency communication between residents. In an emergency, there is no existing way of notifying each resident in an area of the potential danger, the need for evacuation, etc. Many groups of homeowners have begun to establish phone trees and contact lists in order to communicate information at the individual scale; however, this is not being done in all the high wildfire risk areas within the County. The Planning Team would also suggest developing more innovative ways to improve communications among emergency responders and Chelan County residents.

Another communication issue that was identified during the public meetings is the ability of wildfire suppression teams to tap the local knowledge of many of the area residents, particularly the larger landowners. There are a handful of local landowners that could be an

Communication is a central issue for the planning committee; thus, numerous recommendations targeting the improvement of communications infrastructure, equipment, and pre-planning have been made.

excellent resource advisor regarding the condition of county and private roads, access points, fuel conditions, etc.

Invasive Species

Cheatgrass (*Bromus tectorum*) contributes to the size and frequency of fires and directly threatens the habitat of the greater sage-grouse and other sagebrush-steppe dependent wildlife. Fire behavior and fire regimes have been altered due to the proliferation of cheatgrass and other invasive species. Cheatgrass invades disturbed open sites and can dominate an area. Cheatgrass ripens and cures much earlier in the season when compared with native species, thus extending the fire season.[35] According to some statistical analysis, cheatgrass dominated ranges are about 500 times more likely to burn than a native species dominated range.[36] Fire return intervals in steppe and shrub-steppe fuel types, pre-European settlement was typically between 32 and 70 years.[37] In certain Great Basin rangelands, the fire return interval is now less than 5 years on rangelands dominated by cheatgrass.[38]

Vegetation management at this scale is complex and requires aggressive and targeted application of both proven techniques and implementation of new practices to control cheatgrass and mitigate habitat impacts from unwanted rangeland fire. Land managers need tools to reduce cheatgrass while simultaneously restoring resilient sagebrush-steppe ecosystems that can withstand fire and resist re-invasion of cheatgrass or other invasive species. Effective strategies developed for early detection and rapid response and implemented in collaboration with a wide range of stakeholders, can help check the rapid expansion of invasive non-native species.

Hazardous Materials

A concern within Chelan County are the hazardous materials stored countywide. Pesticides and fertilizers used in the agriculture industry can cause significant hazards should a location storing such materials burn.

Building and Zoning

County zoning restrictions, in some instances, allow structures to be built within thirty feet of a property line. Therefore, it may be difficult for a homeowner to adhere to the defensible space requirements that are typically advised by organizations such as Firewise.

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[35] Pellant, Mike. 1996. Cheatgrass: The Invader That Won the West. Idaho State Office: Bureau of Land Management. 23p.
[36] Platt, K.; Jackman, E.R. 1946. The cheatgrass problem in Oregon. Extension Bull. 668. Corvallis, OR: Oregon State College. 48 p.
[37] Wright, H.A.; Neuenschwander, L.F.; Britton, C.M. 1979. The role and use of fire in sagebrush and pinyon juniper plant communities: a state-of-the-art review. Gen. Tech. Rep. INT-58. Ogden UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 48 p.
[38] Pellant, Mike. 1990. Unpublished data on file at: U.S. Department of Interior, Bureau of Land Management, Idaho State Office, Boise, ID.

Public Wildfire Awareness

As the potential fire risk in the wildland-urban interface continues to increase, fire service organizations cannot be solely responsible for protection of lives, structures, infrastructure, ecosystems, and all of the intrinsic values that go along with living in rural areas. Public awareness of the wildland fire risks as well as homeowner accountability for the risk on their own property is paramount to protection of all the resources in the wildland-urban interface. Public awareness goes beyond just landowners in Chelan County, but includes all residents, business owners, renters, students and visitors. Everyone has a role, and wildfire education should be strategically and equitably directed toward a broad spectrum of people in Chelan County.

Firewise Communities Program encourages local solutions for safety by involving homeowners in taking individual responsibility for preparing their homes from the risk of wildfire

Fire Adapted Communities incorporates people, buildings, business, infrastructure, cultural resources and natural areas into the effort to prepare for the effects of wildland fire.

Wildfire Community Preparedness Day is an excellent opportunity for neighborhoods and fire agencies to work together to make communities a safer place to live. Efforts raise wildfire awareness and help protect homes, neighborhoods, and entire communities, while increasing safety of wildland firefighter or could lessen current post-fire impacts.

The national **Ready Set Go! Program**, managed by the International Association of Fire Chiefs (IAFC), works to develop and improve dialogue about wildland fire awareness and action between local fire departments and the residents they serve. It is designed to be complimentary and collaborative with Firewise and other wildland fire public education efforts.

NFPA Fire Prevention Week offers information and tools to help public educators teach all audiences about important fire and life safety issues.

FEMA's America's PrepareAthon! Is an opportunity for individuals, organizations, and communities to prepare for specific hazards, including wildfire, through drills, group discussions, and exercises.

The continued development of mechanisms and partnerships to increase public awareness regarding wildfire risks before, during and after the fire and promoting "do it yourself" mitigation actions is a primary goal of the CWPP planning committee as well as many of the individual organizations participating on the committee. Increasing awareness and education to a broad spectrum of residents, landowners, students, visitors, and business owners is essential.

Current Wildfire Mitigation Activities

Public Education Programs

Many of the county's fire departments and agencies are actively working on public education and homeowner responsibility by visiting neighborhoods and schools to explain fire hazards to citizens. Often, they hand deliver informative brochures and encourage homeowners to have their driveways clearly marked with their addresses to ensure more rapid and accurate response to calls and better access. Several youth education programs exist including the Kids in the Forest Program, which should be expanded to be offered county wide. Targeted education efforts should be continued including Firewise Training for Landscape Businesses, Chainsaw training for landowners, engagement at local home show and home tours, operation of Columbia Breaks Fire Interpretive Center, etc.

Mutual Aid Agreements

Currently the cities, towns, fire protection districts, and wildland fire agencies within Chelan County have extensive mutual aid agreements that serve to increase the protection and effectiveness of all Chelan County fire response jurisdictions. The Washington State Fire Services Resource Mobilization Plan provides a mechanism for fire service resources to respond to fires, disasters, or other events that meet the intent of the Mobilization Plan Legislation (**RCW 43.43.961**). Municipal and county fire departments fully provide mutual aid for each other possible. These agreements significantly improve the capabilities and effectiveness of any and all individual fire departments as well as aid the state and federal wildland fire teams. Not only does this improve the safety of Chelan County residents, structures, infrastructure, and lands, but it also facilitates good interdepartmental working relationships.

Other

Many other mitigation activities are underway in Chelan County and should be evaluated at the annual CWPP Update Meeting to discuss effectiveness, need for expansion, and coordination.

Free Dump Days: Provide free dump days for the disposal of hazardous fuels in areas where there are limited options for burning and disposal.

Roving Chipper: Landonwers reduce fuels around their structures, build chipping piles, and a hired chipping crew or local fire district chip the material.

Home Assessments: Local Fire Districts, Cascadia CD, DNR, and other partners provide free Home Ignition Zone Assessments to residents. Efforts are underway to better coordinate these efforts across agencies and build a central data base that informs pre-attack planning and planning efforts.

WA DNR Cost-Share Program: Financial Assistance to landowners to help reduce fuels can be covered through this program administered through the DNR's Landowners Assistance Program.

NRCS EQIP: A portion of landowner's costs can be covered to improve forest health, reduce wildfire threat, and improve fish and wildlife habitat.

Cascadia CD Landowner Assistance: Cascadia CD cost-shares on up to 75% of the cost to do fuels reduction projects that benefit groups of landowner and communities.

Washington Fire Adapted Community Learning Network: A network of fire practitioners exists that provides a platform for shared learning, knowledge exchange, and partnership development. Several organizations in Chelan County are involved in this network.

Forest Health Collaboratives: Several Forest Health Collaboratives exist in Chelan County which include diverse participation from agencies, conservation groups, NGOs, industry etc. These groups have varying scopes but are all working toward strategically planning landscape level forest restoration projects, some of which have a strong WUI protection component.

Firewise Communities: Over 20 Firewise Communities are currently active in Chelan County, many of which have implemented projects to reduce the risk to their community and are interested in actions they can take to be more resilient before, during and after wildfires.

Post-Fire Flooding: The Chelan County Flood Zone Control District, and many partners including Cascadia, Chelan County Public Works, NWS, NRCS, USFS, and DNR work together to respond to watershed threats post-fire. These agencies have worked together to model and identify threats to life and property, communicate these threats to the public, and implement projects to reduce threats.

Prescribed Fire Training: Chumstick Wildfire Stewardship Coalition and the Wenatchee River Ranger District hosted the first TREX (Prescribed Fire Learning Exchange) in WA State.

Washington Prescribed Fire Council has been actively participating in various coalitions and collaboratives in the county.

Local Fire District Seasonal Crews: Several local fire districts have hired seasonal crews to provide wildfire education, home assessments, and implement community fuel reduction projects.

Business Continuity Planning: Several workshops have been held to provide business owners tools for planning in case of a disaster.

Home Hardening: Several fire districts have developed programs using post-fire FEMA funding to provide cost-share assistance to landowners interested in replacing flammable roofs, and other practices to reduce the threat of ember ignitions in the WUI.

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Chapter 5

Zone Risk Assessments

Essential to the success of this plan is to improve efforts to work on a landscape-level and better employ science and technology to target areas of high priority for preventing, suppressing, and restoring fire-impacted landscapes using a risk-based approach.

The CWPP Planning Team recommends that Chelan County continue to advance the three recommendations that were described in the final CPAW Report. The first is to define the Wildland-Urban Interface and implement a WUI risk assessment program. Next is to adopt a Wildland-Urban Interface Code to establish minimum wildfire safety standards for future development and finally, to update the Chelan County Comprehensive Plan with goals and policies to increase support for future wildfire planning and mitigation activities.

A landscape-scale approach to management is one that emphasizes sustainability of entire ecosystems, integrates stakeholder collaboration, and addresses the present and possible future conditions of lands across ownerships. Through application of the "All Hands, All Lands" management, increased collaboration among Federal, state, tribal, and local officials, natural resources managers, and the fire community can improve the efficiency and effectiveness of the overall wildland fire management effort. The increasing frequency and intensity of wildland fires and the potential for stand-replacing fires poses a major threat to wildlife, local communities, and others who live, work and depend on these lands and resources to sustain their livelihoods and quality of life.

Vegetation also varies greatly throughout the county. The high western portion of the county abounds in dense pine, fir, and cedar forests and sometimes larch, whereas the arid eastern portion is covered primarily by sagebrush and native grasses. Areas located in between western and eastern portions of the county are comprised of varying amounts coniferous forests, sagebrush, and native grasses. Deciduous tree species such as cottonwood, willow, red osier dogwood, and aspen are mostly concentrated in stream valleys or along lakes. Additionally, fruit tree orchards are located on irrigable lands along the rivers and stream valley bottoms.

"The geologic history of the North Cascade Range is a complicated puzzle that records over 400 million years of various rocks and terranes that have been scraped off and smashed together, folded and buried, faulted and moved, finally making their way to their present-day position in western Washington. After the chaotic assembly of the various terranes, a chain of volcanoes

grew and erupted, covering the already complex geology with lava and ash. Volcanism continues to this day. Mount Baker and Glacier Peak are the two youngest volcanoes in the Range—they stand out above the rest, reaching to over 10,000 feet."[39]

Cover vegetation and wildland fuels exhibited across the county have been influenced by massive geologic events the most recent of which was the last ice age. "As the ice sheet retreated, massive amounts of water ran off the glacier, eroding the mountains, carving U-shaped valleys, creating lakes, and depositing massive amounts of glacial sediment."[38] In addition to the geological transformation of the land, wildland fuels vary within a localized area based on slope, aspect, elevation, management practices, and past disturbances. Geological events and other factors have created distinct landscapes that exhibit different fuel characteristics and wildfire concerns.

The wide variance of climate on the east slopes of the North Cascades can be attributed to the orographic (rain shadow) effect created by the high peaks of the Cascade Range. Most of the moisture in this region falls during the months between November and March in the form of snow. Subsequently little to no rain will fall during the summer months. Temperatures vary greatly both seasonally and daily. Temperatures and precipitation also vary depending on elevation, higher elevations experience cooler temperatures and more precipitation than lower elevations.

Not every acre can be effectively treated to prevent wildland fires, nor can every acre impacted by fire be restored. Setting priorities for prevention, suppression, and restoration is essential to increase the efficiency of operations and the efficacy of treatments. The use of risk-based, landscape-scale assessments, help prioritize treatment areas to reduce fire risk as well as set priorities to strategically guide the allocation and pre-positioning of resources for fire suppression. To facilitate a mutual understanding of wildfire risks specific to commonly known areas in the county, the landscape-level wildfire risk assessments in the following sections are based on nine Zones that exhibit distinct terrain, wildland fuels and development features. These Zones provide a reasonable division of the County to discuss the wildfire risk at a smaller scale and in more specific terms. For more specific information on many of these Zones refer to the individual Community Wildfire Protection Plans that can be accessed on Washington DNR website.

Overall Fuels Assessment

[39] Washington Department of Natural Resources website available at: https://www.dnr.wa.gov/programs-and-services/geology/explore-popular-geology/geologic-provinces-washington/north-cascades. Accessed October 2018.

The wide valley bottoms and availability of irrigation water throughout portions of eastern Chelan County allows for extensive agricultural operations, particularly fruit orchards. Agricultural fields and orchards infrequently serve to fuel a fire. Warehouses and other facilities serving this industry can, and have, burned during wildfires. Most of the orchards within the valleys are irrigated until late in the fire season, which drastically reduces their likeliness of an ignition. Other agricultural products such as hay tend to burn in much the same manners of low growing grasses. Fires in grass and rangeland fuel types tend to burn at relatively low intensities, with moderate flame lengths and only short-range spotting. Suppression resources are generally quite effective in such fuels provided there is good access for fire apparatus. Homes and other improvements can be easily protected from the direct flame contact and radiant heat through adoption of precautionary measures around the structure. Although fires in these fuels may not present the same control problems as those associated with large, high intensity fires in timber fuel types, they can cause significant damage if precautionary measures have not taken place prior to a fire event. Wind driven fires in short grass fuel types spread rapidly and can be difficult to control. During extreme drought and pushed by high winds, fires in grassland fuel types can exhibit extreme rates of spread, thwarting suppression efforts.

The mid-slope elevations begin as a patch-work of dry Douglas-fir and ponderosa pine forests that, in many areas, have become overstocked, resulting in multistoried conditions with abundant ladder fuels. During pre-settlement times, much of this area was characterized by low intensity fires due to the relatively light fuel loading, which mostly consisted of small diameter fuels. Frequent, low intensity fires generally kept stands open; free of fire intolerant species and maintained seral species such as ponderosa pine as well as larger diameter fire resistant Douglas-fir. In some areas, low intensity fires stimulated shrubs and grasses, maintaining vigorous browse and forage. The shrub layer could either inhibit or contribute to potential fire behavior, depending on weather and live fuel moisture conditions at the time of the burn.

In general, large fires that start in the western portion of the county, start high in elevation and move downhill. As fires move down in elevation, they encounter drier and flashier fuels in the lower elevations. Rolling embers and spot fires are a common method of downhill fire spread. Spot fires ignited on slopes trigger uphill runs that throw more spot fires, expanding the downward fire progression. Modifying fuels to reduce the likelihood of torching and crowning trees will in turn reduce the likelihood of spot fires.

Increased activities by pathogens will continue to increase levels of dead and down fuel, as host trees succumb to insect attack and stand level mortality increases. Overstocked, multi-layered stands and the abundance of ladder fuels lead to horizontal and vertical fuel continuity. These

conditions, combined with an arid and often windy environment, can encourage the development of a stand replacing fire. These fires can burn with very high intensities and generate large flame lengths and fire brands that can be lofted long distances. Such fires present significant control problems for suppression resources, often developing into large, destructive wildland fires.

A probability that needs to be planned for is the likelihood of extended spot fires. Large fires may easily produce spot fires from ½ to 2 miles away from the main fire. How fire suppression forces respond to spot fires is largely dependent upon the fuels in which they ignite. Stands of timber that are managed for fire resilience are much less likely to sustain torching and crowning behavior that produces more spot fires. The objective of fuel reduction thinning is to change the fuels in a way that will moderate potential fire behavior. If fire intensity can be moderated by vegetation treatments, then ground and air firefighting resources can be much more effective.

Areas that have recently burned, such as the Cougar Creek Fire, will be at low risk of wildfires starting and spreading for several years because fine fuels were consumed. However, the overall reduction in hazardous fuels in these areas is minimal, particularly in dry Douglas-fir and ponderosa pine forests which were dense, multi-storied stands prior to wildfire. Dense stands of snags will become heavy dead and down branches and logs within 10-20 years. Fine fuels will return to these sites as understory species re-establish and these fuels combined with the accumulated large fuels will provide the opportunity for severe fire in 20-30 years after the initial wildfire. Examples of these types of fires include the Tyee, Rat Creek and Hatchery Creek fires of 1994.

Overall Prevention Activities

There are many specific actions that will help improve safety in an area; however, there are also many potential mitigation activities that apply to all residents and all fuel types. General mitigation activities that apply to all of Chelan County are discussed below while area-specific mitigation activities are discussed within the individual landscape assessments.

The safest, easiest, and most economical way to mitigate unwanted fires is to stop them before they start. Generally, prevention actions attempt to prevent human-caused fires. Campaigns designed to reduce the number and sources of ignitions can take many forms. Traditional “Smokey Bear” type campaigns that spread the message passively through signage can be quite effective. Signs that remind people of the dangers of careless use of fireworks, burning when windy and leaving unattended campfires have been effective. Fire danger warning signs posted

along access routes remind residents and visitors of the current conditions and other more creative prevention tools utilizing public outreach and education.

Burn Permits: Washington State Department of Natural Resources is the primary agency issuing burn permits in forested areas of Chelan County. The Washington DNR burn permits regulate silvicultural burning. Washington Department of Ecology (DOE) is the primary agency issuing burn permits for improved property and agricultural lands. All DOE burn permits are subject to fire restrictions in place with WA DNR & local Fire Protection Districts. Washington DNR has a general burning period referred to as "Rule Burn" wherein a written burn permit is not required in low to some moderate fire dangers.

The timeframes for the Rule Burn are from October 16th to June 30th. Washington DNR allows for Rule Burns to be ten-foot (10') piles of forest, yard, and garden debris. From July 1st to October 15th if Rule Burns are allowed, they are limited to four-foot (4') piles.

Defensible Space: Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Chelan County must be made aware that home defensibility starts with the homeowner. Once a fire has started and is moving toward a structure or other valued resources, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the home. "Living with Fire, A Guide for the Homeowner" is an excellent tool for educating homeowners as to the steps to take in order to create an effective defensible space. Residents of Chelan County should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations. Beyond the homes, forest management efforts must be considered to slow the approach of a fire that threatens a community.

Evacuation Plans: Development of community evacuation plans are necessary to assure an orderly evacuation in the event of a threatening wildland fire. Designation and posting of escape routes would reduce chaos and escape times for fleeing residents. Community safety zones should also be established in the event of compromised evacuations. Efforts should be made to educate homeowners through existing homeowners associations or creation of such organizations to act as conduits for this information.

Accessibility: Also, of vital importance is the accessibility of the homes to emergency apparatus. If a home cannot be protected safely, firefighting resources will not jeopardize lives to protect a structure. Thus, the fate of the home will largely be determined by homeowner actions prior to

the event. In many cases, homes' survivability can be greatly enhanced by following a few simple guidelines to increase accessibility such as widening or pruning driveways and creating a turnaround area for large vehicles.

Fuels Reduction & Restoration: Reducing fuels, particularly in areas where excessive fuels have built up due to decades of fire suppression or insect or disease, is a critical part of the strategy for reducing future wildland fires and protecting important habitat. It is important that vegetation management and habitat restoration (not simply building firebreaks or applying prescribed fire) be an integral part of the solution. Treating minimal scattered acreage generally will not have a large enough impact on reducing the wildfire threat in the County. Land managers need to work with landowners, other agencies and fire districts to work cooperatively in identifying and implementing landscape level projects to address the build-up of fuels throughout the County.

Better management of shrub-steppe vegetation and reversing the spread of invasive, non-native grasses, such as cheatgrass, is critical to breaking the invasive species-fire cycle that has contributed to the increased frequency and intensity of shrub-steppe fires. By planning projects at the landscape scale to reduce and control invasive species and rapidly restore lands impacted by fire to native vegetation, progress in protecting and restoring Chelan County's unique ecosystems for the benefit of all. Vegetation inventories, treatments, and preventative measures can be used to reduce the risk of shrub-steppe fire such as the appropriate use of herbicides, biological controls, biocides; prescribed fire, greenstripping, and fuel breaks; and the prioritization of efforts to restore fire-impacted landscapes.

Emergency Response: Once a fire has started, how much and how large it burns is often dependent on the availability of suppression resources. In most cases, rural fire departments are the first to respond and have the best opportunity to halt the spread of a wildland fire. For many districts, the ability to reach these suppression objectives is largely dependent on the availability of functional resources and trained individuals. Increasing the capacity of departments through funding and equipment acquisition can improve response times and subsequently reduce the potential for resource loss.

Other Activities: Other specific mitigation activities are likely to include improvement of emergency water supplies, access routes, and management of vegetation along roads and power line right-of-ways. Zoning ordinances that address minimum setback of structures should be revised to increase space between structures and property lines to allow enough space for homeowners to complete enough defensible space around their home without having to rely on neighboring property owners to conduct fuel reduction work on their property. Furthermore,

building codes should be revised to provide for more fire-conscious construction techniques such as using fire resistant siding, roofing, and decking in high risk areas.

Recommend All structures are within a fire district.

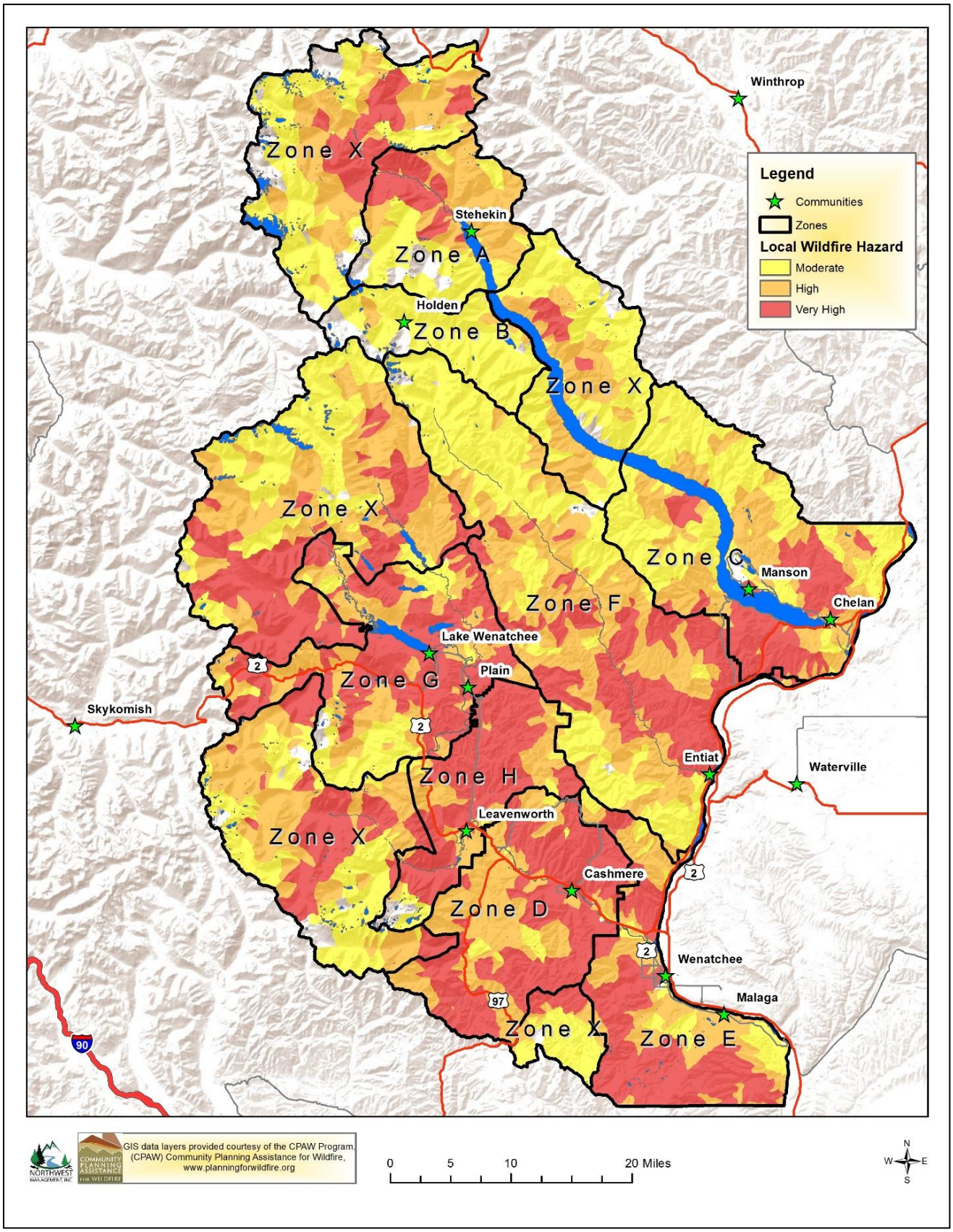
Zone Risk Assessments

The Planning Team dissected the County into Zones to allow for a more localized discussion of wildfire risk. Each Zone was designed to encompass a Fire District by utilizing the watershed(s) (HUC 12) boundary that surround a Fire District. Other parameters that were included in the development of these Zones were ingress/egress, community water sources and where a fire might travel.

These Zones are not intended to identify a responsible entity for completing fire mitigation projects. They simply provide the Planning Team an opportunity to discuss the wildfire risk in Chelan County in more detail.

The following map shows the Zone boundaries within Chelan County. Individual Zone assessments are also included in this section.

Figure 5.1. Chelan County Local Wildfire Hazard.



Zone A - Stehekin

Zone A sits at the north end of Lake Chelan. It is approximately 98,160 acres and includes the lower Stehekin Valley and surrounding area (Figure 5.2). The Zone is surrounded by the Glacier Peak Wilderness, the North Cascades National Park Lake Chelan Recreation Area, and by the Lake Chelan Sawtooth Wilderness. Chelan County Fire District #10 encompasses the Stehekin Valley as well as the lake shore down lake to Lucerne. Zone A largely covers the Stehekin Valley Community Wildfire Protection Plan.

Table 5.1. Zone A Wilderness Summary.

Non-Wilderness	Glacier Peak Wilderness	Lake Chelan-Sawtooth Wilderness
58%	40%	2%

Most of the home sites do not include adequate defensible space although some work has been initiated by individuals and more than 800 acres of fuels treatment, thinning and prescribed fire has been completed by the NPS. Some private lots and other areas within the valley are stocked with heavy fuels.

Table 5.2. Zone A Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
269	348	302	46

Table 5.3. Zone A Ownership Summary.

Owner	Percent
National Park Service	53%
US Forest Service	42%
Water	3%
Private	2%

Private property comprises less than 2% of the Zone. In the Stehekin Valley proper, private property only makes up approximately 350 acres. The National Park Service and the United States Forest Service manage approximately 95%. The school district (3.8 acres) and Chelan County Public Utility District (193 acres) also own land in the Zone. Lake Chelan makes up approximately 3% of the Zone.

Fuel types are primarily overstocked, mixed conifer types with some openings along the arid south slopes. Heavy riparian vegetation exists along streams. A couple small “safe zones” exist within the valley. Citizens are instructed to congregate in the “safe zones” in the event of a fast-moving wildfire.

Wildfire Potential

The eastside Douglas fir cover type that occurs throughout the Stehekin Valley is the most xeric type on the North Cascades Complex and is comparable to the dry Douglas fir mixed conifer of the Rocky Mountains. It is best characterized by a fire regime I of mixed severity where stand replacing events occur infrequently (approximately every 100 years) and low severity fires occur more frequently. A survey of the Stehekin Valley confirmed that large stand replacing events

occur at approximately 90 to 100-year intervals. However, since a long-term fire history study has not been conducted in the Stehekin Valley, the overall fire frequency for low and high severity fire events must be based upon studies in dry Douglas fir forests that have been conducted nearby.

Lodgepole pine (*Pinus contorta*)-dominated sites in the Stehekin Valley are perpetuated by high severity fire events; lodgepole pine is the most likely pioneer following stand replacing events, and its continued dominance is reliant upon these high severity fires reducing competition from more shade tolerant species.

Mountain Pine Beetle (*Dendroctonus ponderosae*) has caused significant mortality in the lodgepole pines of Zone A. This mortality reduces the density of live tree canopies and can increase coarse woody debris (CWD) on the forest floor. One study in Oregon found that approximately 10% of the trees killed in a mountain pine beetle attack fell after 6 years and roughly 80% fell within 12 years post attack.[40] (Keen 1995) One study in Colorado found that individual/group torching and active crown fires were reduced in lodgepole pine stands impacted by mountain pine beetle when compared to non-impacted stands.[41] This of course is dependent on the density of unaffected, or live trees in the stand. Models conducted by this same study show that there would not be a significant increase in surface flame length nor fire intensity once the affected trees fall to the ground.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[42] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*,

[40] Keen, F.P. 1955. The rate of natural falling of beetle-killed ponderosa pine snags. Journal of Forestry 53: 720-723.
[41] Klutsch, Jennifer & Battaglia, Mike & West, Daniel & L. Costello, Sheryl & F. Negrón, José. (2011). Evaluating Potential Fire Behavior in Lodgepole Pine-Dominated Forests after a Mountain Pine Beetle Epidemic in North-Central Colorado. Western Journal of Applied Forestry. 26. 101-109.
[42] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

Wildfire Hazard Assessment [19]

The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

"THIS INFORMS LAND USE PLANNERS ON THE RELATIVE WORST-CASE (HOTTEST, DRIEST, WINDIEST DAYS DURING A FIRE SEASON) WILDFIRE EXPOSURE (RADIANT, CONVECTIVE AND EMBER) THAT CAN BE EXPECTED IN ANY GIVEN POLYGON WHERE DEVELOPMENT EXISTS OR IS PLANNED FOR."

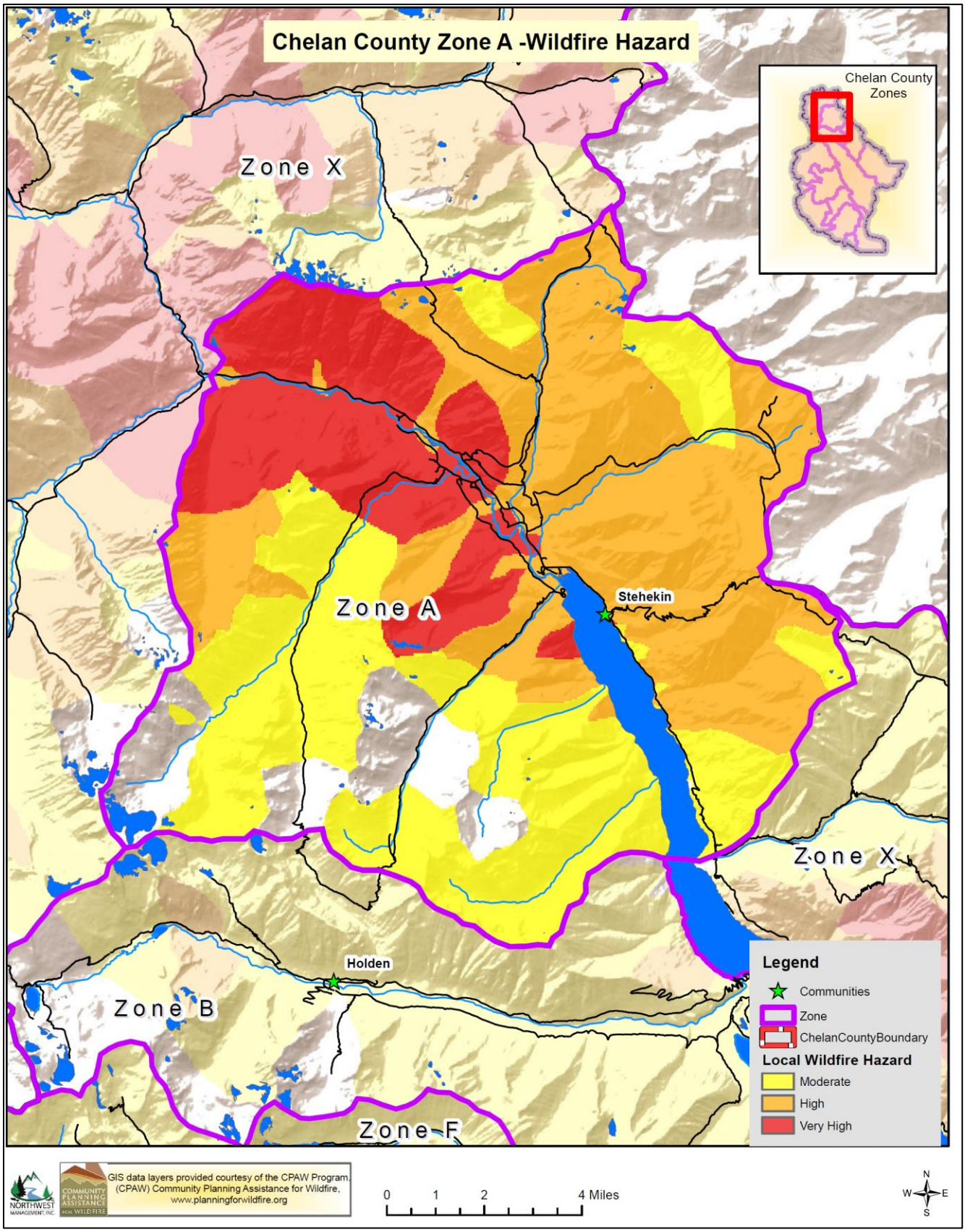
Mowery M, Johnston K, and Yellin B. Chelan County Community Planning Assistance for Wildfire Report. 2018.

Zone A's local wildfire hazard shows that nearly 20% of the area is considered very high wildfire risk.

Table 5.4. Zone A Wildfire Hazard Summary.

Rating	Percent Area
N/R	9%
Moderate	35%
High	38%
Very High	19%

Figure 5.2. Zone A Local Wildfire Hazard Map.



Ingress-Egress

Stehekin is a remote community different from any other in the lower 48 states. It is accessible to outside resources only by air, boat, or foot travel. The shortest trail into the community is approximately 18 miles long. The remoteness of the Stehekin Valley creates issues for timely access of enough firefighting resources and efficiency of Jet A fuel availability. Stehekin abuts the north end of Lake Chelan and is surrounded by contiguous forest in the lower elevations. The area has had several significant wildfires and a history of fire suppression activities which have led to increased fuel loading and arboreal insect and disease issues.

There are only two roads in the Zone, the Stehekin Valley Road and Company Creek Road, provide access within the planning area. All the remaining roads a*re* primarily private along with some park service roads and county roads with varying standards. Most of the roadways can accommodate structural fire vehicles. Most of the terrain in the area is extremely rugged with numerous vertical cliffs and class 5 slopes, or greater than 70%.

Infrastructure

There are a few bridges in Zone A of Chelan County, and most can accommodate firefighting apparatus. Bridge load rating signs are not in place for the existing bridges and could pose a limitation to access for firefighting equipment. Roads and bridges in this Zone are also subject to being washed out every spring if rapid snowmelt occurs.

Power is provided by overhead power lines with only a few overhead connections to structures. Water resources are obtained from private wells, Lake Chelan, and the Stehekin River.

Fire Protection

Chelan County Fire District #10 is responsible for fire protection in the Stehekin Valley and immediate down lake area. The Fire District was formed in 2006. The Washington State Department of Natural Resources has protection responsibility for undeveloped private lands in the valley. Through agreement, the NPS is responsible for protecting lands via state DNR taxes to protect within the Stehekin drainage. As of December 2007, Chelan County Fire District #10 shares this responsibility via the Forestland Fire Protection Agreement. The NPS has protection responsibility for land within Lake Chelan Recreation Area and North Cascades national Park, while the USFS has responsibility for land within the Glacier Peak Wilderness Area and the Chelan-Sawtooth Wilderness Area. Fire District #10 has responsibility for a large and remote area covering approximately 51,116 acres. The District does not have any paid employees, but has 13 motivated volunteers, a type 6 engine, and a fire chief. Since the district is so new, no fire station

exists yet. However, the NPS does have a 20-person fire cache, a type 6 engine and a funded fire suppression program in Stehekin.

Zone B - Holden

Zone B sits at the north end of Lake Chelan. It is approximately 61,504 acres and includes the lower Railroad Creek drainage and surrounding area (Figure 5.3). The Zone is surrounded by the Glacier Peak Wilderness and by Lake Chelan. The Holden Village Fire Brigade provides fire protection for the non-profit organization facilities, staff and guests.

Table 5.5. Zone B Wilderness Summary.

Non-Wilderness	Glacier Peak Wilderness
36%	64%

Lucerne is located at the east end of this Zone and includes campground facilities, barge and ferry docking capabilities. Holden Village is located approximately 10 miles up Railroad Creek where several structures exist. Holden Village is very limited on fire mitigation options because of USFS stipulations.

Table 5.6. Zone B Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
39	5	0	5

Private property comprises less than 1% of the Zone. The United States Forest Service manages approximately 99%.

Table 5.7. Zone B Ownership Summary.

Owner	Percent
US Forest Service	99%
Private	<1%
Water	<1%

Fuel types are primarily overstocked, mixed conifer types with some openings along the arid south slopes. Heavy riparian vegetation exists along streams. Multiple fires have burned through this Zone in the recent past leaving behind numerous snags and opening the canopy allowing for dense undergrowth to occur.

Wildfire Potential

The eastside Douglas fir cover type that occurs throughout the Railroad Creek drainage is the most xeric type on the North Cascades Complex and is comparable to the dry Douglas fir mixed conifer of the Rocky Mountains. It is best characterized by a fire regime I of mixed severity where stand replacing events occur infrequently (approximately every 100 years) and low severity fires occur more frequently. A survey of the nearby Stehekin Valley confirmed that large stand replacing events occur at approximately 90 to 100-year intervals. However, since a long-term fire history study has not been conducted in the Railroad Creek drainage, the overall fire frequency for low and high severity fire events must be based upon studies in dry Douglas fir forests that have been conducted nearby.

Lodgepole pine (*Pinus contorta*)-dominated sites in Zone B are perpetuated by high severity fire events; lodgepole pine is the most likely pioneer following stand replacing events, and its continued dominance is reliant upon these high severity fires reducing competition from more shade tolerant species.

Mountain Pine Beetle (*Dendroctonus ponderosae*) has caused significant mortality in the lodgepole pines of Zone B. This mortality reduces the density of live tree canopies and can increase coarse woody debris (CWD) on the forest floor. One study in Oregon found that approximately 10% of the trees killed in a mountain pine beetle attack fell after 6 years and roughly 80% fell within 12 years post attack.[43] (Keen 1995) One study in Colorado found that individual/group torching and active crown fires were reduced in lodgepole pine stands impacted by mountain pine beetle when compared to non-impacted stands.[44] This of course is dependent on the density of unaffected, or live trees in the stand. Models conducted by this same study show that there would not be a significant increase in surface flame length nor fire intensity once the affected trees fall to the ground. This may not be accurate based on the behavior of the Wolverine Fire (2015) that burned through a burn scar from the Domke Lake Fire (2007) at very high intensity.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[45] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*, subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

[43] Keen, F.P. 1955. The rate of natural falling of beetle-killed ponderosa pine snags. Journal of Forestry 53: 720-723.
[44] Klutsch, Jennifer & Battaglia, Mike & West, Daniel & L. Costello, Sheryl & F. Negrón, José. (2011). Evaluating Potential Fire Behavior in Lodgepole Pine-Dominated Forests after a Mountain Pine Beetle Epidemic in North-Central Colorado. Western Journal of Applied Forestry. 26. 101-109.
[45] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

Wildfire Hazard Assessment [19]

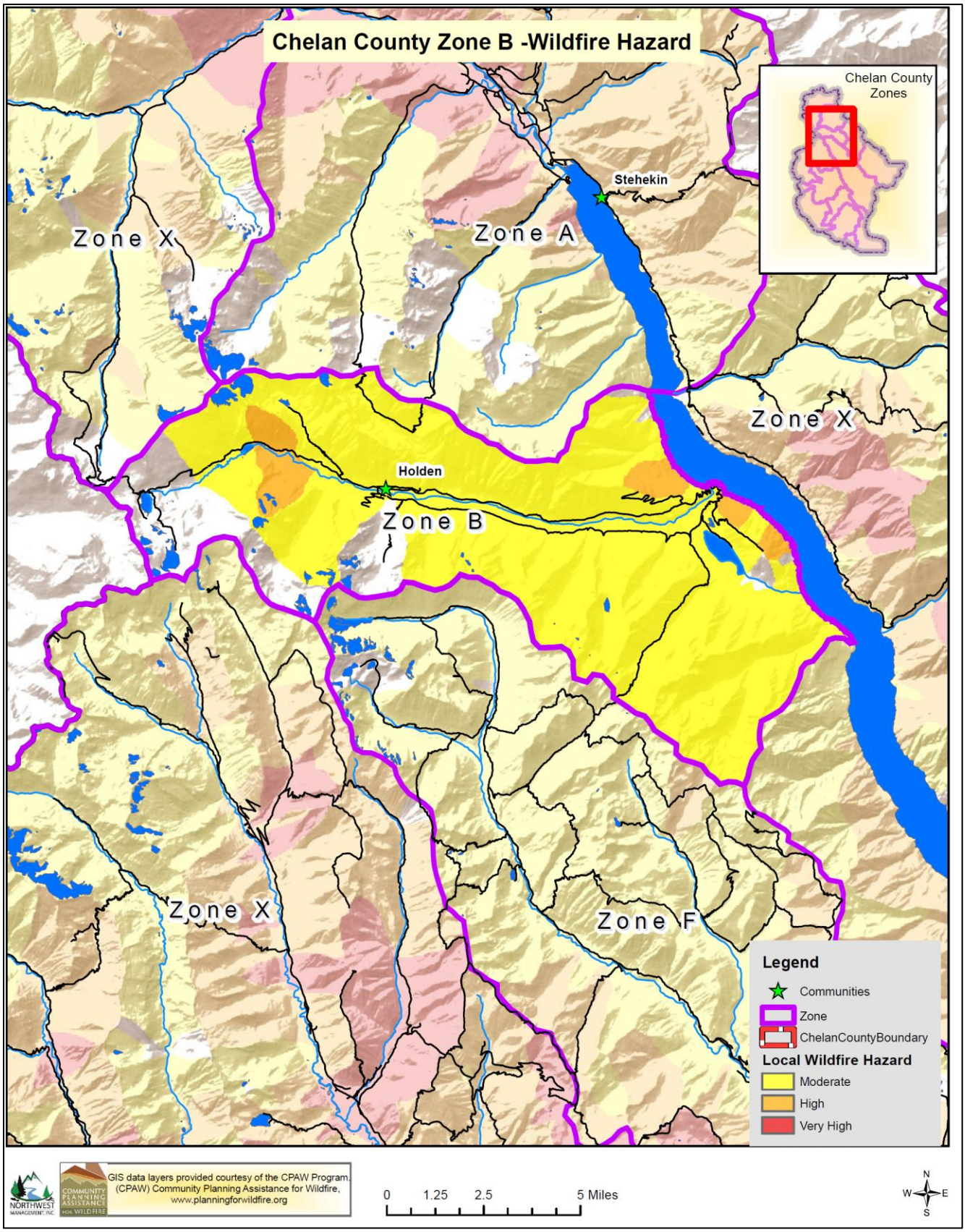
The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

Zone B's local wildfire hazard shows that over 80% of the area is considered moderate wildfire risk. This is likely attributed to the recent fires and subsequent burn scars that have occurred in this Zone.

Table 5.8. Zone B Wildfire Hazard Summary.

Rating	Percent Area
N/R	14%
Moderate	80%
High	6%
Very High	0%

Figure 5.3. Zone B Local Wildfire Hazard Map.



Ingress-Egress

Holden Village is a remote community only accessible by boat, emergency helicopter, or foot. The only road access from Lake Chelan is ten miles up the gravel USFS Road 8301 from the Port of Lucerne. There's also a secondary bypass road that loops around the remediated mine tailings and a few maintenance roads around the legacy Copper Mine Site. Maintaining adjacent forest fuels so they don't become a dense timber stand is a high priority for community.

USFS Road 8301 continues up valley past Holden Village approximately 1.25 miles to a legacy ballpark, and private land owned by Holden. The community has a need to access their property and desires fuels adjacent be maintained so fire suppression crews can use it for access and safe escape route.

Infrastructure

There are a few bridges in Zone B of Chelan County, and most can accommodate firefighting apparatus. Bridge load rating signs are not in place for the existing bridges but mine remediation operations used many of the bridges in this Zone with equipment that far exceeds the weight of typical fire apparatus.

Power is provided by underground power lines. Water resources are obtained from private wells, Lake Chelan, and three vicinity creeks.

Fire Protection

The Holden Village Fire Brigade is established under WAC statute 296-811 to provide an organized group of employees and long-term staff who are knowledgeable, trained and skilled in basic firefighting to safeguard the guests, staff and the privately-owned buildings of the Holden Village Community (a non-profit organization) from the threat of fire.

The Fire Brigade is the only emergency response resource the community can utilize because of its isolation by natural barriers from any rural fire protection district, the land is administered by USFS and Holden operates under a Special Use Permit. The USFS is responsible for all Wildland suppression and is beyond the Fire Brigades capabilities. Rio Tinto Mine Remediation Waste Water Treatment plant does staff a type 6 engine and a type 2 water tender.

Zone C - Chelan/Manson

Zone C sits at the southern end of Lake Chelan. It is approximately 213,251 acres and includes the Chelan, Manson, Union Valley and surrounding area (Figure 5.4). This Zone includes Fire Districts #5 and #7 and encompasses the South Shore Lake Chelan, Union Valley Area and Manson Community Wildfire Protection Plans. Much of the following descriptions were taken from those CWPPs.

Table 5.9. Zone C Wilderness Summary.

Non-Wilderness	Wilderness
100%	0%

The Lake Chelan basin is a glacial U-shaped valley with steep sidewalls. Dominant vegetation includes grass-shrub species, mixed conifer, and open pine forests. Residential development is largely rural in nature and density varies with topography and proximity to the lake. Glacial moraines and alluvial fans constitute most of the buildable land and contain the highest density of development. According to Chelan County records 10,747 individual parcels currently comprise the planning area. Nearly 140 of those parcels are not within a Fire District. Although several parcels remain undeveloped, there are many high value homes greater than 2,000 square feet in size. Numerous residences are second homes that are seasonally or intermittently occupied. The area is a popular recreation destination, particularly during the summer months. Two state parks, Lake Chelan and Twenty-Five Mile, are located within the planning area.

Table 5.10. Zone C Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
9,700	10,747	10,610	137

The Union Valley area is located along the north shore of Lake Chelan. Residential development on private lands within the Union Valley area is rural in nature. Most homes are scattered throughout this portion of Zone C and separated by large areas of open forest, patches of dense forest, and grass, bitter brush and or sagebrush. In many places bitter brush is the primary plant species dominating the landscape.

The Manson area is located on the north shore of Lake Chelan. Residential development on private lands within the Manson area is concentrated in areas along Lake Chelan. The city of Manson contains the highest density of residential development in this portion of Zone C. Most homes outside of Manson are separated by large areas of open grass, sagebrush and scattered trees, patches of dense forest, or a mix of grass or brush and orchard.

Table 5.11. Zone C Ownership Summary.

Owner	Percent
US Forest Service	49%
Private	32%
Water	9%
BLM	5%
State	5%

Private property comprises approximately 32% of the Zone. The United States Forest Service manages nearly 50% and the BLM manages approximately 5% of the Zone. Various state ownership and water comprise the remaining 15%.

The vegetation in the south shore region of Zone C exhibits tremendous diversity, from the divide with the Entiat valley at 7,000 feet elevation to the Columbia River near Chelan Falls at 800 ft., due largely to a variation in annual precipitation of 60 inches at the divide, to only10 inches near Chelan Falls. The lakeshore near First and Twenty-Five Mile Creeks receives about 20 inches annually. In general, forests become less dense, transitioning to shrubs and grass, going from west to east in this area. Ravines and north facing slopes support higher tree and shrub densities. The transition from forest to primarily grassland/shrubland occurs near Bear Mountain, so that to the east of Hwy 97A at Knapps Coulees, trees generally grow only in small groups and ravines.

Natural vegetation in the dry grassland/shrubland ecosystems is primarily bitterbrush, sagebrush, bunchgrasses, balsamroot, wild buckwheats, phlox and other short plants. Small stands of pine, fir and taller shrubs grow where more moisture is available, such as draws, ravines and rocky areas. Fires and prior cultivation have changed patches of vegetation to cheatgrass, mustard, salsify and other weeds. Recent fires on Chelan Butte have reduced the density of shrubs in favor of grasses.

The majority of the CWPP area land in First and Twenty-Five Mile Creeks is undeveloped National Forest with a great variety of vegetation types and structural stages. The upper elevations support subalpine fir forests, along with lodgepole pine, whitebark pine and subalpine larch. These forests transition to lower elevations with primarily ponderosa pine and Douglas fir on south-facing slopes, and Douglas fir, ponderosa pine and lodgepole pine on north-facing slopes. South facing slopes include areas of sparse vegetation, sagebrush, bitterbrush, bunchgrasses and balsamroot. Fires occurring in 1970, 1994, 1998, and 2004 with a variety of burn intensities, have created a patchwork of structural stages, habitats, and vegetation and fuel conditions.

The existing vegetation conditions surrounding the Manson area and Fire District #5 are the result of a long history of fires on the north shore of Lake Chelan. Given this history, much of this portion of Zone C is currently recovering from these fires. Fire return intervals have not changed, but vegetation and fuel conditions have. Vegetation ranges from shrub steppe in the lower elevations to mixed conifer in the upper elevations located on the US Forest Service lands administered by the Chelan Ranger District.

Across the landscape of Fire District #5 and the adjacent Forest Service lands areas of grass, brush, densely stocked trees, and dead fuels contribute to a landscape vegetation pattern that is conducive to large fire growth.

The primary vegetation type for the Union Valley area is ponderosa pine. Ponderosa pine is a shade intolerant species naturally adapted to survive in areas that experience fire on a regular basis. Fire plays a major role in how ponderosa pine is established on the landscape. Regular burning allows P. pine stands to flourish by removing underbrush and smaller competing trees. As the pines mature their bark thickens, which also makes them better adapted to a fire environment. Older, pure ponderosa pine stands often have a wide-open, park-like feel with large tress intermingled among grassy areas. While the benefits of natural fires are debated by experts, many believe that fire also provides benefit by creating a mosaic of microhabitats on the landscape. The resulting increase in vegetation diversity benefits wildlife, as well as forest health and resistance to disease.

Wildfire Potential

The WDNR has classified the Chelan, Union Valley and Manson areas as 'high risk' Wildland Urban Interface communities. This classification is supported by all agencies responsible for fire protection in the Union Valley area of Chelan County. Past activities have altered the normal fire regime, stand species composition and forest health. Dense, overstocked stands of trees are increasing the fire hazard in the Union Valley CWPP area. Many stands of ponderosa pine are dominated by trees less than 18 inches in diameter. Pockets of trees are being affected by low level (~0.3 to 4.5 trees/acre) infestation by mountain pine beetle and/or fir engraver (WDNR GIS; see previous Vegetation map). Trees often have co-mingled crowns, mistletoe and ladder fuels, and continuous tall underbrush also predominates on the landscape. All these variables can create conditions for an intense and fast-moving fire.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[46] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

[46] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*, subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

Wildfire Hazard Assessment [19]

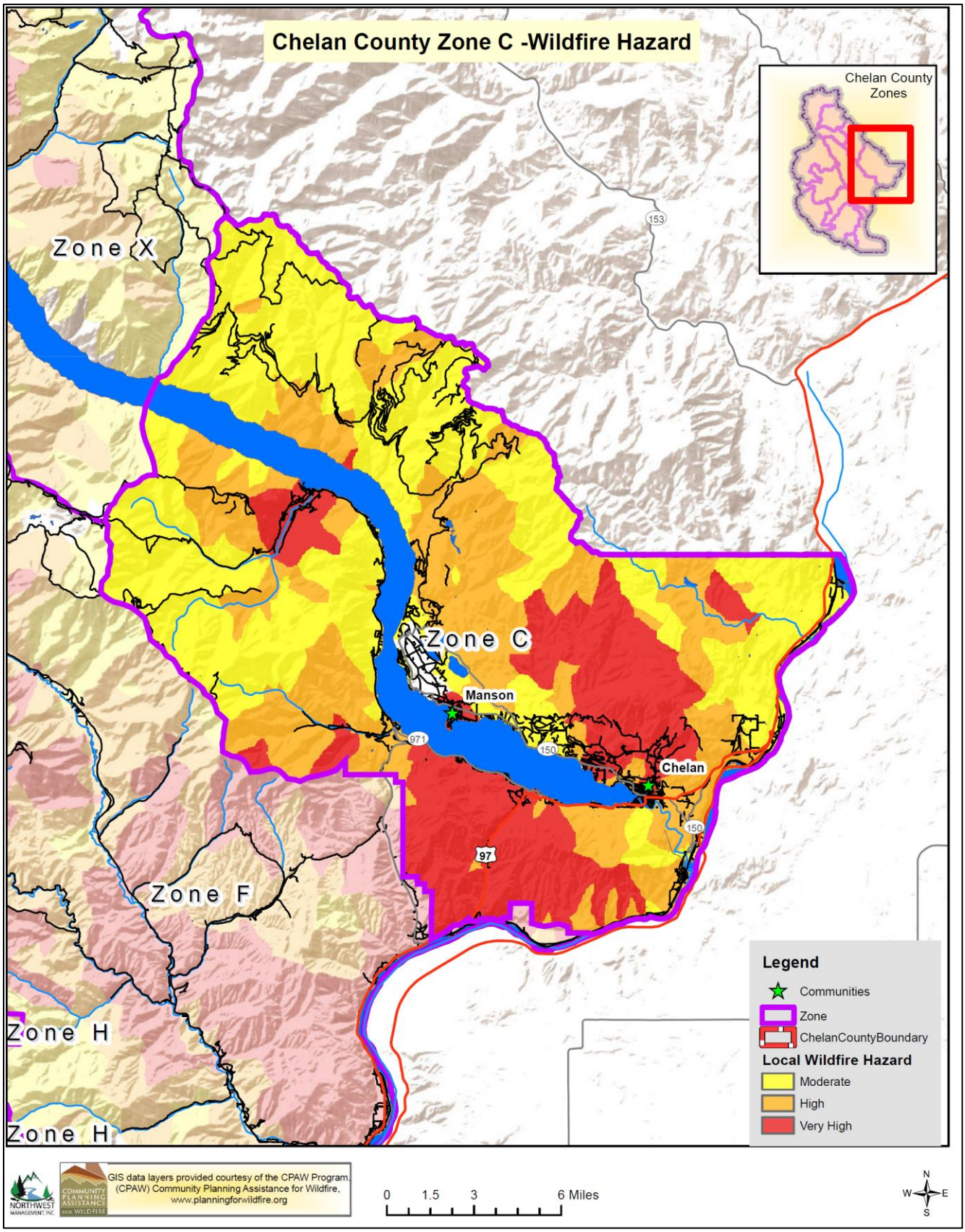
The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

Zone C's local wildfire hazard shows that over 50% of the Zone is considered high to very high wildfire risk. This is likely attributed to the numerous recent fires that have occurred in this Zone which allows invasive species to become established and promotes dense understory in some vegetation types.

Table 5.12. Zone C Wildfire Hazard Summary.

Rating	Percent Area
N/R	<2%
Moderate	45%
High	31%
Very High	23%

Figure 5.4. Zone C Local Wildfire Hazard Map.



Ingress-Egress

There are several main roads that serve as designated emergency evacuation routes for the South Shore of Lake Chelan, including Highway 97A, South Lake Shore Road, Navarre Coulee Road. However, several of the roads that access canyons or valleys are dead end roads. Not all roads in the planning area are paved or in suitable condition for fire equipment. Therefore, road access has been identified as a concern.

The lack of improved roads that could serve for two access roads for emergency evacuations has been identified as a concern in some areas.

Union Valley Road is the only designated emergency evacuation route in the Union Valley area and it is oriented in a north-south direction. Due to the topography of the area, all other main roads are orientated primarily in a north and south direction. Not all roads in the CWPP area are paved or in suitable condition for fire equipment. Therefore, road access has been identified as a concern. The need of improved roads that could serve for emergency evacuations in an east to west direction has been identified as a goal.

State Route 150 is the main emergency evacuation route into and out of the Manson area. This road is oriented in a northwest-southeast direction with outlets in both directions. Secondary roads that provide access include Ivan Morse Road, Grade Creek/Johnson Creek, Emerson Acres, Upper & Lower Joe Creek, Helios Hills/Green's Landing, and Wapato Lake Road. These roads are generally paved two-lane loops (except for Emerson Acres). Primitive one-way dead ends that are unsuitable for fire equipment are scattered throughout the area.

The main secondary roads provide additional access through the Manson area and would be used by homeowners in the event of an evacuation to get people out.

Road access to Emerson Acres has been identified as a potential concern in the event of a wildfire. Roads are limited due to the influence of drainage topography (steep slopes).

Infrastructure

There are a few bridges in Zone C of Chelan County, and most can accommodate firefighting apparatus. Bridge load rating signs are in place for the existing bridges and would not pose a limitation to access for firefighting equipment.

Power is provided by overhead power lines with numerous overhead connections to structures. Water resources are obtained from private wells and city water sources.

Fire Protection

Fire District #7 is a small combination department covering approximately 125 square miles. The District employs three career employees and estimated 25 volunteers. CCFD #7 has one station located at 232 East Wapato Avenue in the city of Chelan. Chelan County Fire District #7 is responsible for protection of private property in the area surrounding the community of Chelan and Union Valley. District boundaries extend from Chelan Falls to 25 Mile Creek State Park. The City of Chelan is part of the fire district.

Chelan County Fire District #5 provides fire protection for about 18 square miles of private lands in the Manson area. They are also responsible for providing initial attack response to state and federal lands in the area per an interagency agreement.

The WDNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. Areas outside the boundaries of the Fire Protection Districts #5 and #7 are not guaranteed fire response from the District. DNR will respond to forest fires however they generally do not have responsibility for structures. The WDNR does collect a "fire tax" from landowners north of Wapato Lake Road and is primarily responsible for responding to structure fires in this area. The District maintains mutual aid agreements with WDNR and all fire districts within Chelan and Douglas Counties.

Zone D - Cashmere

Zone D is located at the southern portion of the County and encompasses approximately 150, 347 acres. Zone D includes the communities of Cashmere, Dryden, Monitor, Peshastin and surrounding area (Figure 5.5). Chelan County Fire District #6 provides the primary fire protection for residents in this Zone. Zone D largely covers the Monitor, Cashmere, Dryden and Peshastin Area Community Wildfire Protection Plan. Much of the following descriptions was taken from that CWPP.

Table 5.13. Zone D Wilderness Summary.

Non-Wilderness	Alpine Lakes Wilderness
99%	<1%

Drainages in the Monitor, Cashmere, Dryden and Peshastin area are primarily glacial U-shaped valleys with steep sidewalls. Dominant vegetation includes mixed conifer and open pine forests. Residential development is largely rural in nature and density varies with topography and proximity to the lake and other scenic areas. There are approximately 5,000 structures in the planning area. The homes in this Zone are valued at several

Table 5.14. Zone D Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
5,125	5,523	5,323	200

hundred million. Many residences are located up the numerous narrow canyons that feed into the Wenatchee River valley. In some cases, the homes are very large (>2,000 sq. ft.) and interface with both agricultural areas as well grass and forest environments. The area is a popular recreation destination, particularly during the summer and winter months. The Peshastin Pinnacles, a Washington State Park, is located within the planning area.

Table 5.15. Zone D Ownership Summary.

Owner	Percent
US Forest Service	48%
Private	47%
State	4%
BLM	<2%

Private property comprises nearly half (47%) of the Zone, while the United States Forest Service manages the other half (48%) of the ownership and the BLM manages less than 2% of the Zone. Various state ownership comprises the remaining 4%.

The CCFPD#6 Monitor, Cashmere, Dryden and Peshastin Community Wildfire Protection Planning area is located towards the eastern edge of the Okanogan-Wenatchee National Forest in north-central Washington. The planning area varies in elevation from points above 4100' (Blag Mountain, Tibbetts Mountain, Eagle Rock and Burch Mountain) to 800' along the Wenatchee River. The annual precipitation ranges from approximately seven inches per year at the east end, south of Burch Mountain. to nearly twenty inches per year (most in the form of snow) as you travel westward to Peshastin. This range of precipitation combined with elevation and aspect provides a vegetation gradient from hot, dry grass and shrub-steppe types to warm, dry forests of predominately ponderosa pine with inclusions of Douglas-fir.

Most of the planning area consists of dry forest stands of predominately ponderosa pine with some small amounts of Douglas-fir. Ponderosa pine stands dominate the landscape covering much of the Zone. More mesic sites (e.g. north slopes and creek beds) have developed stands of Douglas-fir and some deciduous tree species (e.g. aspen and bigleaf maple). Shrub-steppe vegetation, primarily grasses, sagebrush and other shrub species cover the lower slopes of the Zone, mostly on south and west aspects. Private and agricultural lands comprise the remaining portions of the Zone that occur primarily on the flatter, lower elevations along the creek/river corridors.

Wildfire Potential

The WDNR has classified the areas surrounding and including the Monitor, Cashmere, Dryden and Peshastin areas as ranging from moderate to ‘extreme risk’ WUI. The variation is, in part, due to the large planning area. A substantial portion of the planning area is at a high risk of fire danger. Past activities such as logging, grazing, and fire suppression have altered the normal fire regime, stand species composition, and affected forest health. Dense, overstocked stands of trees,

particularly in the Brender and Mission Creek areas are increasing the fire hazard in this CWPP planning area. Many stands of ponderosa pine are dominated by trees less than 18 inches in diameter. Numerous dense pockets of standing and dead fallen trees haven been/or are being affected by low level (~0.3 to 4.5 trees/acre) infestation by mountain pine beetle and/or fir engraver (WDNR GIS; see previous Vegetation map) and root rot (disease). Stands often have contiguous crowns and ladder fuels in the form of young conifers and tall brush species. These variables provide a continuous fuel profile which can create conditions for an intense and fast-moving fire.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[47] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*, subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

Wildfire Hazard Assessment [19]

The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

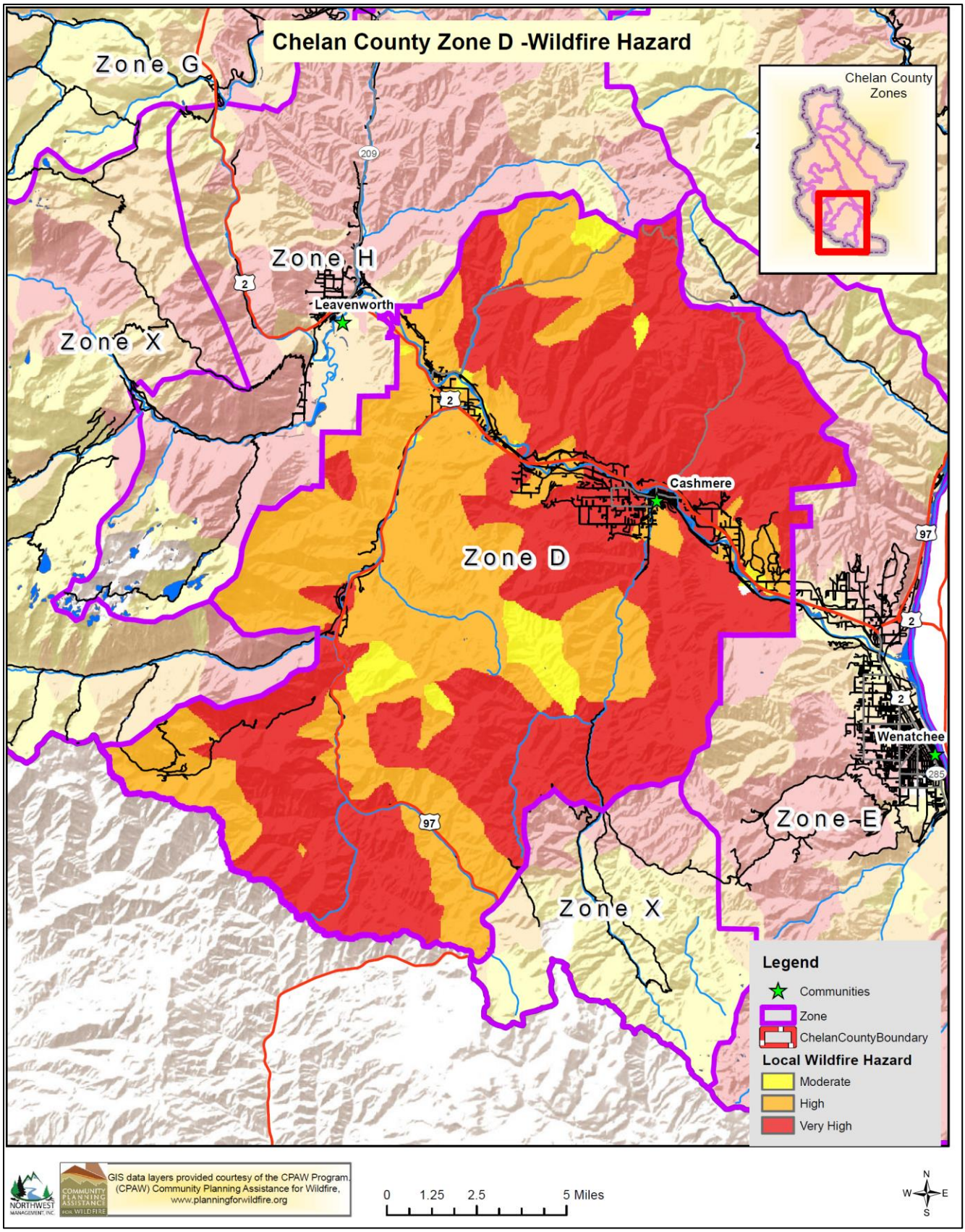
Zone D's local wildfire hazard shows that over 55% of the Zone is considered very high wildfire risk. This is likely attributed to the steep slopes, vegetation types and structure density in the area.

[47] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

Table 5.16. Zone D Wildfire Hazard Summary.

Rating	Percent Area
N/R	<1%
Moderate	3%
High	40%
Very High	56%

Figure 5.5. Zone D Local Wildfire Hazard Map.



Ingress-Egress

There are several main roads that serve as designated emergency evacuation routes. The primary access through the planning area is Highway 2/97 (east/west). Other main roads exist and provide access up the canyons, such as Mission, Brender, Yaksum, Fairview, Hay, Nahahum, Olalla, and Williams. Most of the roads that provide access up the canyons are dead end roads. However, several of the roads that access canyons provide access out of the upper ends, such as Nahahum, Mission. Not all roads in the planning area are paved or in suitable condition for fire equipment. Therefore, road access has been identified as a concern. The lack of improved roads that could serve for two access roads for emergency evacuations has been identified as a concern in some areas.

Infrastructure

There are numerous bridges in Zone D of Chelan County, and most can accommodate firefighting apparatus. Bridge load rating signs are in place for the existing bridges and would not pose a limitation to access for firefighting equipment.

Power is provided by overhead power lines with numerous overhead connections to structures. Water resources are obtained from private wells and city water sources.

Fire Protection

Chelan County Fire District #6 is single departments consisting of five separate stations that are in the communities of Monitor, Cashmere, Dryden, Peshastin and Blewett Pass and are responsible for private property in the area surround those communities as well as the communities themselves. The WDNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. Areas outside the boundaries of the Fire Protection District #6 are not guaranteed fire response from the District. DNR will respond to forest fires; however, they do not have responsibility for structures. The District maintains mutual aid agreements with WDNR and fire districts within Chelan and Douglas Counties.

Fire District #6 is a small volunteer department covering approximately 20 square miles. District boundaries extend from the eastern outskirts of Monitor to the western outskirts of Peshastin and include the bottoms and/or mouths of the canyons to the north (Warm Springs, Nahahum, Hay, Olalla and Williams) and south (Fairview, Brender, Mission and Peshastin). The District has about 60 volunteers based out of five stations (four of which are addressed in this plan). The District contracts with Cashmere Fire Department which has an additional 35 volunteers.

The WDNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. Areas outside the boundaries of the Fire Protection District #6 is not guaranteed fire response from the District. DNR will respond to forest fires however they generally do not have responsibility for structures. The District maintains mutual aid agreements with WDNR and all fire districts within Chelan and Douglas Counties.

Zone E - Wenatchee

Zone E is located at the southeastern portion of the County and encompasses approximately 129,693 acres. Zone E includes the City of Wenatchee and the communities of Sunnyslope, Malaga, Wenatchee Heights and surrounding area (Figure 5.6). Chelan County Fire District #1 provides the primary fire protection for residents in this Zone. This Zone has the highest percentage of private ownership of all the Zones in the County. Contained within Zone E, is the existing Squilchuck Valley Community Wildfire Protection Plan.

Table 5.17. Zone E Wilderness Summary.

Non-Wilderness	Wilderness
100%	0%

Zone E primarily encompasses the lower elevations however the western portion of this Zone does experience higher elevations and steeper slopes. Dominant vegetation includes grass-shrub species, mixed conifer, and open pine forests. There are over 22,000 structures in the planning area, most of which occurs within the City limits. However, much of the land area within the City has been developed it has forced new construction to occur on small percentages of steep parcels, or areas unprotected by the City of Wenatchee's existing Wildland Urban Interface (WUI) building code.

Table 5.18. Zone E Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
22,260	17,670	17,118	492

Private property comprises more than half (60%) of the Zone, while the public land agencies manage over a third (36%) of the ownership of the Zone and the remaining 2% is water.

Table 5.19. Zone E Ownership Summary.

Owner	Percent
Private	60%
State	22%
US Forest Service	13%
BLM	3%
Water	2%

Most of Zone E consists of dry forest stands of predominately ponderosa pine with some small amounts of Douglas-fir. Ponderosa pine stands dominate the landscape covering much of the Zone. More mesic sites (e.g. north slopes and creek beds) have developed stands of Douglas-fir

and some deciduous tree species (e.g. aspen and bigleaf maple). Shrub-steppe vegetation, primarily grasses, sagebrush and other shrub species cover the lower slopes of the Zone, mostly on south and west aspects. Private and agricultural lands comprise the remaining portions of the Zone that occur primarily on the flatter, lower elevations along the creek/river corridors.

A fair amount of difference in the vegetation exists between the lower part of the Squilchuck Valley (Pitcher Canyon, etc.) which is dominated by sagebrush and grass, to areas dominated by orchard trees (Wenatchee Heights) with pockets of trees and sagebrush, to the upper parts of the Valley which are dominated by thick forest.

Currently, the primary vegetation type for the Squilchuck Valley area is ponderosa pine dry forest. Ponderosa pine is a shade intolerant species naturally adapted to survive in areas that experience fire on a regular basis (i.e. frequent fire regime, fire interval every 2-20 years for lower Wenatchee valley). The forest types on the upper slopes and ridges are composed of more shade tolerant species (e.g. true firs) and have fire regimes that experience fire on longer fire return intervals (35-100 years).

Wildfire Potential

The WDNR has classified the areas surrounding Wenatchee and Squilchuck Valley areas as ranging from moderate to 'extreme risk' WUI. The variation is, in part, due to the large planning area. A substantial portion of the planning area is at a high risk of fire danger. Past activities such as logging, grazing, and fire suppression have altered the normal fire regime, stand species composition, and affected forest health. Dense, overstocked stands of trees, particularly in the Squilchuck Valley area is increasing the fire hazard in this CWPP Zone. Many stands of ponderosa pine are dominated by trees less than 18 inches in diameter. Numerous dense pockets of standing and dead fallen trees haven been/or are being affected by low level (~0.3 to 4.5 trees/acre) infestation by mountain pine beetle and/or fir engraver (WDNR GIS; see previous Vegetation map) and root rot (disease). Stands often have contiguous crowns and ladder fuels in the form of young conifers and tall brush species. These variables provide a continuous fuel profile which can create conditions for an intense and fast-moving fire.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[48] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire

[48] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*, subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

Wildfire Hazard Assessment [19]

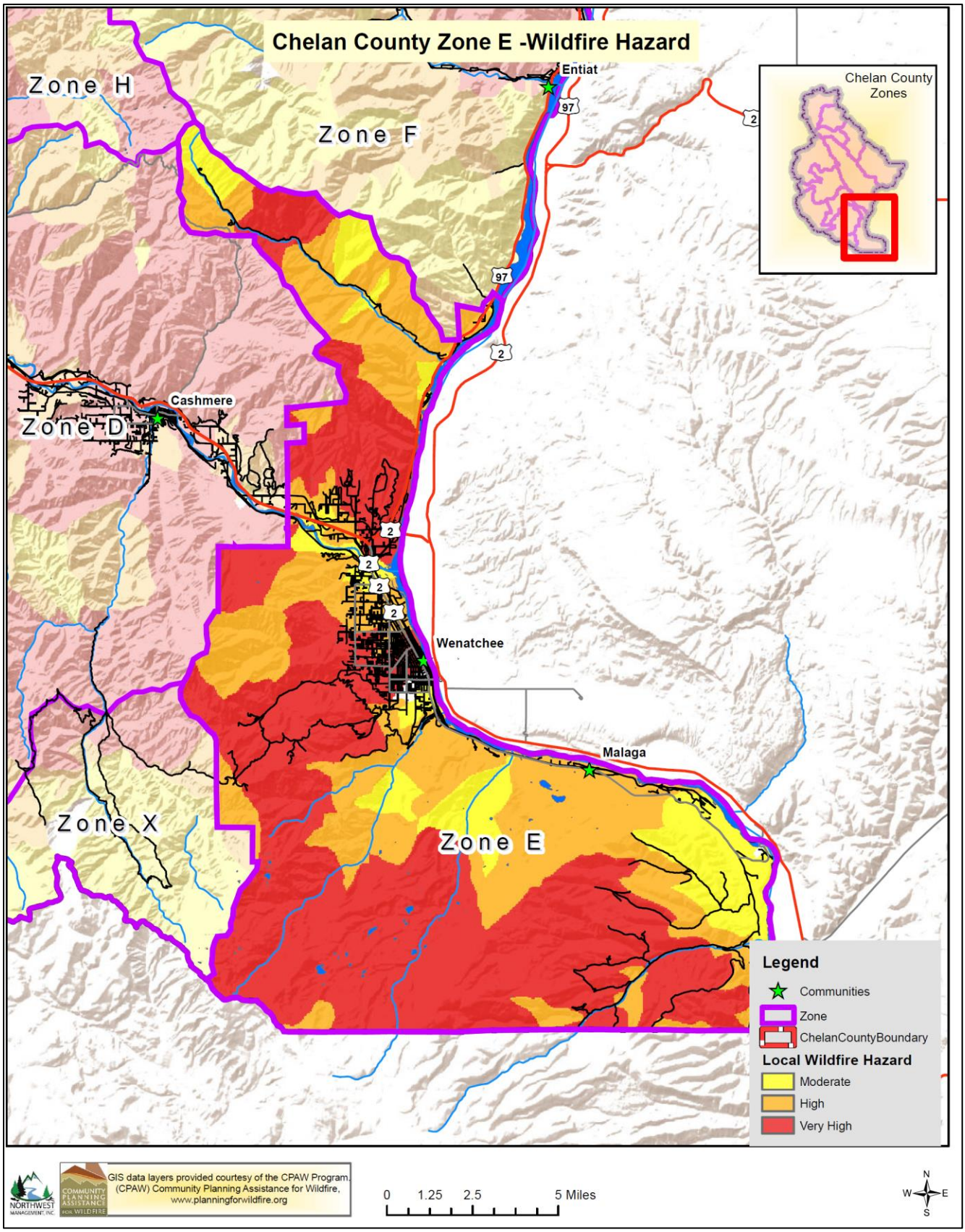
The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

Zone E's local wildfire hazard shows that over 50% of the Zone is considered very high wildfire risk. This is likely attributed to the numerous recent fires that have occurred in this Zone which allows invasive species to become established and promotes dense understory in some vegetation types.

Table 5.20. Zone E Wildfire Hazard Summary.

Rating	Percent Area
N/R	<1%
Moderate	12%
High	35%
Very High	53%

Figure 5.6. Zone E Local Wildfire Hazard Map.



Ingress-Egress

The main east/west route through this Zone is US Highway 2 that follows the Wenatchee River from Leavenworth to the west and passes through Sunnyslope before crossing the Columbia and ultimately exiting the Zone, and County. State Highway 285 crosses the Columbia from Grant County to the east and passes through Wenatchee before connecting to US Highway 2. US Highway 97 Alternate follows the west bank of the Columbia from Sunnyslope to the City of Chelan at the northeast portion of the County.

The Squilchuck Road is a main artery to the areas of Wenatchee Heights, Pitcher Canyon, Halverson Canyon, Forest Ridge subdivision, National Forest lands, and the Mission Ridge ski area. Squilchuck Road extends from Mission Street approximately (8) eight miles southwest of Wenatchee to Mission Ridge Road, and then another four miles to the Mission Ridge ski area. Squilchuck Road is the primary egress from the upper reaches of the valley. Secondary, limited, egress from the upper reaches of the valley is possible via the paved Stemilt Loop road on the southeast side of the valley. Areas in Zone E locally referred to as #1 Canyon and #2 Canyon are highly developed yet have single ingress/egress routes. Limited egress means that residents, particularly in subdivisions may be difficult to evacuate in the event of a fast-moving wild fire.

Infrastructure

There are numerous bridges in Zone E of Chelan County, and most can accommodate firefighting apparatus. Bridge load rating signs are in place for the existing bridges and would not pose a limitation to access for firefighting equipment. Not all bridges have signs posted however, particularly private bridges accessing single residences.

Chelan County PUD transmission and distribution lines depart two hydroelectric power facilities located in Zone E. There is a mixture of overhead and underground power services throughout this Zone. Public domestic water systems serve a majority of Zone E with the remainder being private wells.

Fire Protection

Chelan County Fire District #1 (CCFD1) serves a population of 45,000 residing in the city of Wenatchee, and unincorporated areas of Chelan County. CCFD1 is a combination department employing 45 career staff and retaining an average of 25 volunteers in both combat firefighter and support roles. Department operations are conducted from four, 24-hour staffed stations, and the district also maintains 3 auxiliary stations housing resident firefighters and additional

apparatus. The district responds to roughly 2,600 calls per year including EMS, structure fire, wildland fire, hazardous materials, and technical rescue.

The WADNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. Areas outside the boundaries of Chelan County Fire District #1 are not guaranteed fire response from the District. DNR will respond to forest fires; however, they do not have responsibility for structures. The District maintains mutual aid agreements with WADNR and neighboring County Fire Districts within Chelan, Grant, Kittitas and Douglas Counties.

Zone F - Entiat

Zone F is located along the eastern slopes of the Cascade Mountains in north-central Washington State, Chelan County. The planning area is approximately 301,056 acres and is boarded on the northeast by the Chelan Mountains, to the southeast by the Entiat Mountains and to east by the Columbia River (Figure 5.7). Residential areas, outside the City of Entiat, are intermixed with orchard, open grass, sagebrush, bitterbrush, scattered Ponderosa Pine and Douglas fir forested areas. Zone F largely covers the Entiat Community Wildfire Protection Plan. Much of the following descriptions was taken from that CWPP.

Table 5.21. Zone F Wilderness Summary.

Non-Wilderness	Glacier Peak Wilderness
92%	8%

The City of Entiat lies north and west of the confluence of the Entiat and Columbia Rivers. The City is bisected by Washington State Route 97 Alternate and is located roughly midway between Wenatchee and Chelan. The City covers approximately 2 square miles that are situated in a long narrow alignment, running parallel to the Columbia River for nearly 3 miles. The City has experienced rapid growth over recent years, with numerous new housing areas under development. Vegetation within the city limits consist mostly of grasses and shrubs. The more level sites have been developed into irrigated crop land (orchards).

Table 5.22. Zone F Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
1,616	2,478	2,233	245

Private property comprises over 10% of the Zone, while the United States Forest Service manages over three quarters (82%) of the ownership and the BLM manages approximately 2% of the Zone. Various state ownership comprises nearly 5% and the remaining 1% is water.

Table 5.23. Zone F Ownership Summary.

Owner	Percent
US Forest Service	82%
Private	10%
State	5%
BLM	2%
Water	<1%

Fuel types are primarily overstocked, mixed conifer types with some openings along the arid south slopes. Heavy riparian vegetation exists along streams. Multiple fires have burned through this Zone in the recent past leaving behind numerous snags and opening the canopy allowing for dense undergrowth to occur.

The primary stream flowing through the area is the Entiat River. It flows 43 miles in a southeasterly direction from near the head of the Entiat Valley to its confluence with the Columbia River near the City of Entiat. The Entiat River has two major tributaries: the North Fork Entiat, which joins the main river at river mile 33, and the Mad River, which flows into the main river near Ardenvoir at river mile 10.5. The highest elevation in the planning area is the 9,249-foot summit of Mt. Fernow. The lowest elevation occurs at the Entiat River's mouth, at approximately 713 feet. Precipitation varies from 90 inches in the Alpine ecosystems to 10 inches in the shrub-steppe.

Wildfire Potential

The Washington State Department of Natural Resources has classified the Entiat CWPP area as a "high risk" Wildland/Urban Interface community. The steep grass and brush slopes along the breaks to the Columbia River are conducive to fast wind driven fires that can be an immediate threat to homes and improvements in the area. The mid to lower Entiat Valley once had most of the properties protected by a buffer of agricultural land. This buffer, which was primarily orchards, has quickly diminished in recent years with many homes built up against the steep hillsides. The mid to upper reaches of the Entiat Valley and the area of Navarre Coulee have a direct impact from timber adjacent to many home sites and improvements. Insect infestations, in the upper Entiat Valley areas, are causing large expanses of dead and dying trees that are adding to the fuel load. All these variables provide a continuous fuel profile that can result in large intense wildfire.

Vegetation patterns, topographic features and the geology tell a story of how disturbance historically has shaped the Entiat Valley CWPP landscape. The large stand replacing wildfires of the recent past tells us how fire behaves on this landscape and the devastating impacts on the citizens of the Entiat Valley. Weather, topography and fuels interact to create a recent history of large fires that move rapidly and with great intensity across the landscape. These recent fires are likely to be outside the range of normal intensity in the "typical disturbance regimes". However, large fast-moving fires, with lower intensity, have always occurred in the Entiat Valley.

The existing vegetation conditions in the Entiat Valley and Columbia River Breaks are the result of a long history of large stand replacing wildfire. Given this history, over 70 percent of the Zone is currently recovering from these wildfires. Fire regimes have not changed, but vegetation and fuel conditions have. Vegetation ranges from shrub steppe in the lower elevations to mixed conifer in the upper elevations located on lands administered by the United States Forest Service, Bureau of Land Management, Washington State Department of Fish and Wildlife and Washington State Department of Natural Resources.

Across the landscape of Chelan County Fire District 8 and adjacent United States Forest Service, Washington State Department of Natural Resources and Washington State Department of Fish and Wildlife lands, areas of grass, brush, densely stocked trees, and dead fuels contribute to the landscape vegetation pattern, when mixed with steep slopes that is conducive to rapid rates of spread and large stand replacing wildfires when weather conditions are extreme.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[49] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*, subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

Wildfire Hazard Assessment [19]

The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

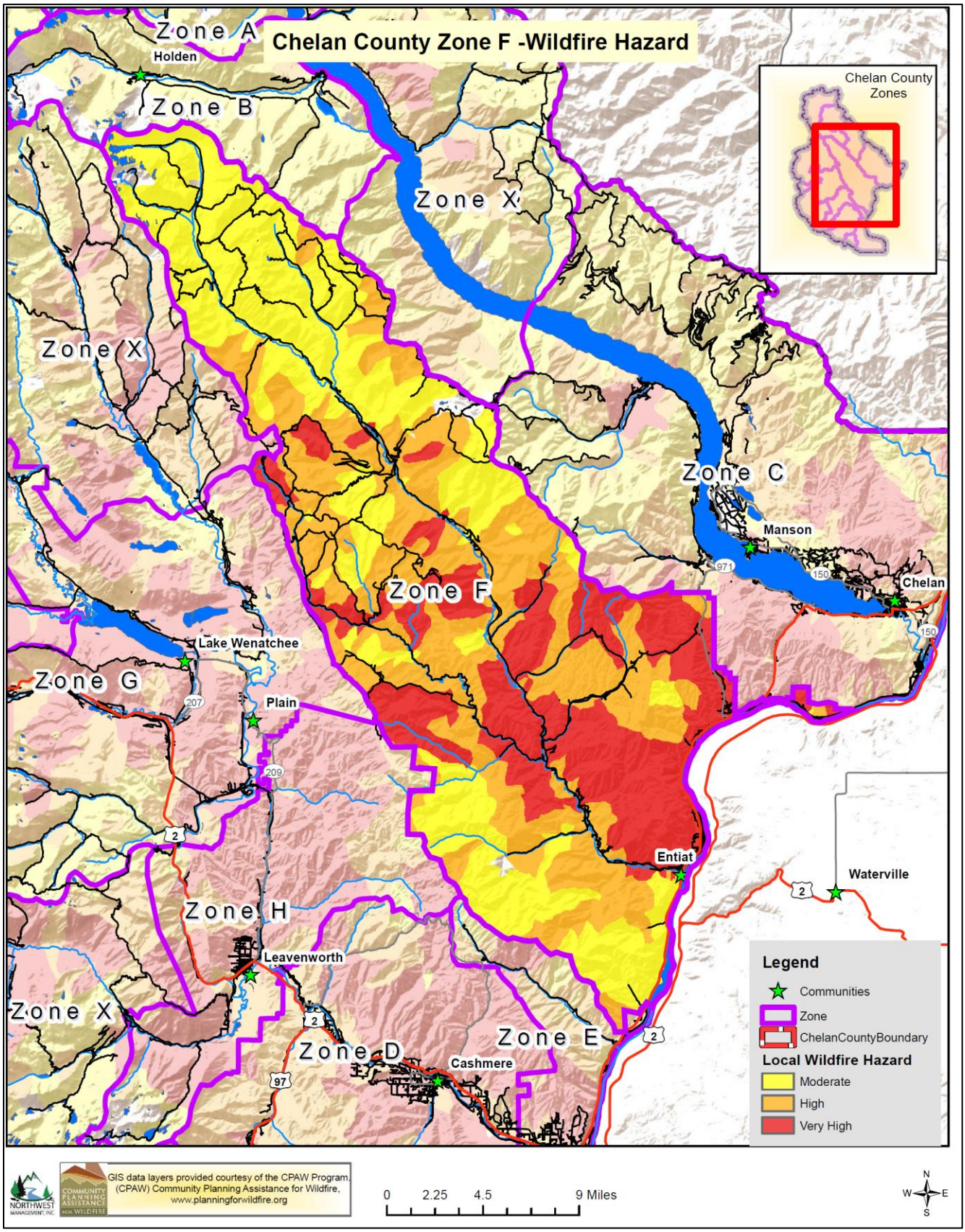
[49] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

Zone F's local wildfire hazard shows that over 60% of the area is considered high to very high wildfire risk. This is likely attributed to the recent fires and subsequent burn scars that have occurred in this Zone.

Table 5.24. Zone F Wildfire Hazard Summary.

Rating	Percent Area
N/R	1%
Moderate	37%
High	36%
Very High	26%

Figure 5.7. Zone F Local Wildfire Hazard Map.



Ingress-Egress

Washington State Highway 97A is the primary artery providing access through the eastern section of the planning area. This highway is a major north/south travel route and a high-speed two-lane highway that travels along the edge of the Columbia River. Chelan County Highway 51 is the primary access to that part of the CWPP located in the Entiat Valley. This highway is a low speed two-lane highway that travels along the edge of the Entiat River for approximately 38 miles. Other main roads in the Zone are State Highway 971 serving the Navarre Coulee and Chelan County Highway 2 serving Stayman Flats. Many neighborhoods are served by a single access route providing residents with only one way in and one way out. Evacuation and defense of such areas have been and will be in the future difficult in the event of fast-moving wildfire. Other critical evacuation routes in the planning area are primarily United States Forest Service and Chelan County roads as follows:

- Mills Canyon (USFS Road 5200)
- Mud Creek (USFS Road 5300)
- Shady Pass (USFS Road 5900)
- Crum Canyon (Chelan County Highway 301)
- Potato Creek (USFS Road 5380)
- Tillicum Creek (USFS 5800)

Infrastructure

The City of Entiat is served by a domestic water and sewage system. Most of the other residents in the Zone are served by private wells and septic systems. Power service is distributed via a mix of overhead and underground lines, provided by the Chelan County Public Utility District.

There are a few bridges in Zone F of Chelan County, and most can accommodate firefighting apparatus. Some bridge load rating signs are not in place for the existing bridges and could pose a limitation to access for firefighting equipment.

Fire Protection

Chelan County Fire District 8 provides fire protection for private lands inside their district boundaries and the City of Entiat. They are responsible for providing initial attack response on state and federal lands within their district boundary and aid through reciprocal agreement to adjacent state and federal lands. The Washington State Department of Natural Resources and United States Forest Service (Entiat Ranger District) are the primary agencies responsible for management of wildland fires on public lands in the Entiat Valley CWPP area. The Washington State Department of Natural Resources has overlapping jurisdictional responsibility for fire protection on timber-lands in the fire district. The department maintains a roster of about forty people. The department is made up of volunteers who can choose the extent of their fire service. The department maintains about 10 qualified emergency medical personnel, 30 qualified

structure firefighters and 35 qualified wildland firefighters. The fire district has 11 fire fighting vehicles that operate from the 4 stations. Cooperative agreements are maintained with the Department of Natural Resources and the U.S. Forest Service whereby resources are utilized and shared between the different jurisdictions. Washington State Department of Fish and Wildlife and Chelan County P.U.D. provide no fire protection on their lands. An agreement is in place with Chelan County Fire District 8 for protection of P.U.D. developed property.

Chelan County Fire District 8 encompasses 38 square miles and the City of Entiat and serves a population of about 3000 residents. The fire protection rating varies between 6 and 8 inside the district boundaries depending on proximity to fire stations and developed water systems. Adjacent, unprotected by any fire district, development has a fire protection rating of 10. The chart below indicates the current capabilities of the district. The fire district has property for an additional fire station at Stayman Flats along the Columbia River and Navarre Coulee.

Zone G - Lake Wenatchee

Zone G is located at the west central portion of the County and encompasses approximately 177,761 acres. Zone G includes areas within Chelan County Lake Wenatchee Fire & Rescue (LWFR), as well as several unincorporated communities, adjacent private, state and federal forestlands (Figure 5.8). Lake Wenatchee Fire and Rescue provides the primary fire protection for residents in this Zone. Zone G largely covers the Lake Wenatchee Area and Ponderosa Community Wildfire Protection Plans. Much of the following descriptions were taken from that CWPP.

Table 5.25. Zone E Wilderness Summary.

Non-Wilderness	Alpine Lakes, Glacier Peak and Henry M. Jackson Wilderness
84%	16%

Zone G primarily encompasses very steep slopes and mid elevations however the western portion of this Zone does experience higher elevations. Dominant vegetation includes mixed conifer and open pine forests. Primary land uses in Zone G consist of forest land, limited agriculture, recreational areas (golf course, campgrounds and State Park), and rural residential. There are over 3,600 structures in the Zone many of which occur intermixed with wildland fuels.

Table 5.26. Zone G Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
3,665	4,723	4,272	451

Table 5.27. Zone G Ownership Summary.

Owner	Percent
US Forest Service	81%
Private	17%
State	1%
Water	1%

Residential development is largely rural in nature and density varies with topography and proximity to the lake and other scenic areas. According to 2010 Chelan County records approximately 2,912 individual private parcels currently have a building assessed value of at or above $150,000 in the Zone. An additional number of properties remain undeveloped. Many residences are second homes that are seasonally or intermittently occupied. In some cases, the homes are very large, but neighbor much smaller recreational cabins. The area is a popular recreation destination, particularly during the summer and winter months. Lake Wenatchee State Park is also located within the Zone.

Zone G varies in elevation from 4056' in the upper reaches of the Nason Creek watershed near Stevens Pass to 1680' at the upper end of Tumwater Canyon. The annual precipitation at the lower end of Lake Wenatchee is approximately 28-30 inches/year and increases to 60 inches/year near the Cascade Crest to the north and west (most in the form of snow). This range of precipitation combined with elevation provides a broad spectrum of forest and vegetation communities.

Most of the Zone consists of dry forest vegetation, predominately Douglas-fir with some ponderosa pine and small amounts of grand fir (*Abies grandis*). Douglas-fir and ponderosa pine stands dominate the landscape covering 40% of the Zone. More mesic sites (e.g. north slopes and creek beds) have developed stands of Douglas-fir and some grand fir on approximately 5%. These drier forest types dominate the landscape south of Fish Lake and east of Lake Wenatchee to Maverick Saddle and Entiat Ridge. Moist vegetation groups and more moist montane meadows exist in higher reaches of drainages such as in the Nason, White River, Little Wenatchee, and upper Chiwawa River with general elevation gain. These include moist grand fir, silver fir (*Abies alba*) and hemlock (*Tsuga mertensiana*), subalpine fir and whitebark pine.

Currently, the primary vegetation type for the Lake Wenatchee/Plain Area is overstocked ponderosa pine forest with large amounts of Douglas-fir regeneration and intrusions of grand fir. Ponderosa pine is a shade intolerant species naturally adapted to survive in areas that experience fire on a regular basis. This frequent fire regime with a fire interval every 2-20 years was standard for the entire lower Wenatchee River valley. North aspect slopes may act as fire refugia and not experience fire on the same interval.

Wildfire Potential

The WDNR has classified the areas surrounding and including the Lake Wenatchee/Plain area as ranging from moderate risk to 'extreme risk' WUI. The variation is, in part, due to the size of the Zone. Past activities such as logging, grazing, and fire suppression have altered the normal fire regime, stand species composition, and affected forest health. Dense, overstocked stands of trees are increasing the fire hazard in the Lake Wenatchee/Plain Area CWPP. Many stands of ponderosa pine are dominated by trees less than 18 inches in diameter. Numerous dense pockets of standing and dead fallen trees have been/or are being affected by low level (~0.3 to 4.5 trees/acre) infestation by mountain pine beetle and/or fir engraver (WDNR GIS; see previous Vegetation map) and root rot (disease). Stands often have contiguous crowns and ladder fuels in the form of young conifers and tall brush species. These variables provide a continuous fuel profile which can create conditions for an intense and fast-moving fire.

Since 1970, over 557 fires have occurred within the Lake Wenatchee/Plain CWPP area (See Fire History map on page 11 for summary and location of fire starts). Fires are started naturally by lightning in the planning area nearly annually and are typically concentrated along ridge tops though random strikes may occur anywhere. In addition, human-caused fire starts are also occurring (and increasing with increased development and recreational use) as a result of other activities, such as dispersed and motorized recreation and debris burning. The Wenatchee River drainage, particularly in the Natapoc area, has seen a very high number of ignitions along the Burlington Northern-Santa Fe Railroad tracks in the past, but that concentration has diminished somewhat with new maintenance practices employed by the railroad. The size of the fires may vary, but typically small fires of a few to several acres occur on a 5 to 10-year cycle. Large fires have been experienced near and within the Zone and conditions are conducive to large, high severity fires. Large fires (>1,000 acres) have occurred in 1994 (Round Mountain Fire, 4,300 acres and Tyee Fire, 120,000 acres), 2003 (Maple Fire, 2,410 acres) 2004 (DirtyFace Fire, 1150 acres), 2014 (Chiwakum Fire, 13,900 acres), 2015 (Wolverine Fire, nearly 39,000 acres), 2016 (Buck Creek Fire, 1,987) and 2018 (Cougar Creek Fire, 45,000). Conditions are still conducive for a large, high severity fire, particularly in the Chiwawa drainage where spruce budworm (a conifer defoliator) activity has expanded from a few acres in 2001 to nearly 70,000 acres.

Weather, topography, and fuels affect wildfire behavior. The Lake Wenatchee/Plain Area, like other areas of Chelan County, is prone to severe weather conditions (hot, dry, and windy) in late summer that can support extreme fire behavior. The terrain is an extremely important aspect of expected fire behavior in this area.

The landscape is dominated by three major west to east drainages (Nason, White, and Little Wenatchee) and two north to south drainages (Chiwawa and Wenatchee). The west/east

oriented drainages funnel frontal winds or afternoon diurnals as the Columbia Basin heats up and develops a strong pressure gradient, drawing in cooler air from the Cascade crest. The Lake Wenatchee area experiences this effect frequently in the summer and is a popular windsurfing area. Remote access weather stations (RAWS) in the area show measurable winds 75% of all days in the year. Historical fire activity has reflected typical wind driven fire behavior. When winds align with slope, extreme fire activity can occur. The most densely populated areas around Lake Wenatchee and Plain have many areas of dense stands dominated by ponderosa pine and thickets of Douglas-fir, with the largest trees primarily less than 18 inches in diameter. Stands in the area are dense and continuous, a perfect setting for large, lethal wildfire. Many stands have closed canopies and abundant ladder fuels. Continuous, tall underbrush also predominates. Insect infestations of western pine beetle and/or fir engraver beetle are becoming more prevalent as are root rot pathogens which kill patches of all ages of trees providing jackpots of fuel.

Areas in the mid to lower portions of the Nason, White, and Little Wenatchee River drainages may not experience fire as often, but the density and stratification of fuels is such that an initially small fire could grow quickly to a large high intensity fire with potential for spotting well ahead of the main fire front. Focused treatments around homes and other improvements to maximize defensible space, incorporating fire resistant building materials, thinning, and easily negotiable emergency access are critical to the protection of these homes and minimize the potential for fatalities of residents and firefighters.

Wildfire Hazard Assessment [19]

The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

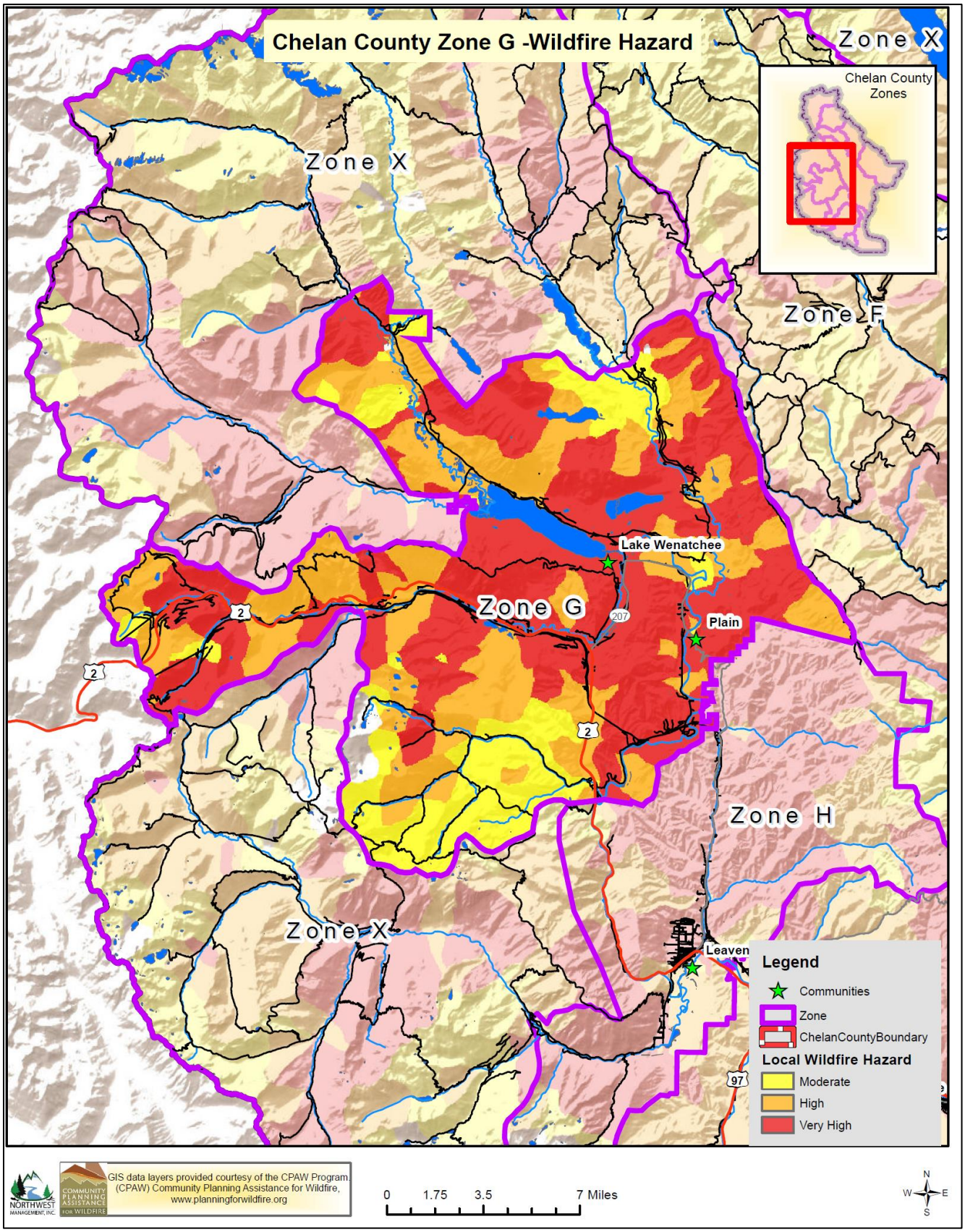
Zone G's local wildfire hazard shows that nearly 50% of the Zone is considered very high wildfire risk. Contributing to the numerous recent fires that have occurred in this Zone are invasive species, dense understory, dead and standing dead timber from disease and beetle infestation, and reduced forest management practices.

Table 5.28. Zone G Wildfire Hazard Summary.

Rating	Percent Area
N/R	1%
Moderate	16%

High	33%
Very High	50%

Figure 5.8. Zone G Local Wildfire Hazard Map.



Ingress-Egress

Highway 2, Lake Wenatchee Highway (highway 207), and the Beaver Valley Road provide the main access roads in and through the planning area. Other primary roads are Forest Roads leading up the Chiwawa, Little Wenatchee, and White Rivers. The Chiwawa and White River roads are one way in and one way out roads. The Little Wenatchee River road allows access to Highway 2 (Stevens Pass) via Rainy Creek. Many areas are served by a single point of access providing only one way in and one way out. Most of these roads are too narrow for fire protection vehicles to easily access and maneuver in.

There is only one access road in and out of the Ponderosa area that is designated as an emergency evacuation route. This is the County Camp 12 Road – a narrow double lane, paved road from Plain through the Ponderosa subdivision, then a one-lane, private, primitive road through the Standing Rock development, which then becomes virtually impassible beyond. This road passes through dense timber with forest canopy overhanging the road. It would not be considered a fire or fuel break. A one-way loop road provides access to a portion of the Ponderosa subdivision, but the remaining roads are narrow with approximately 12 col de sacs.

Infrastructure

There are several main roads that serve as designated emergency evacuation routes including Beaver Valley Road (old Highway 209), State Route 207, Lake Wenatchee Hwy, Highway 2, River Road, etc. However, several of the roads that access canyons or valleys are dead end roads. Not all roads in the planning area are paved or in suitable condition for fire equipment. Therefore, road access has been identified as a concern. The lack of improved roads that could serve for two access roads for emergency evacuations has been identified as a concern in some areas. There are numerous bridges in Zone G of Chelan County, and most can accommodate firefighting apparatus. Bridge load rating signs are not in place for the existing bridges and could pose a limitation to access for firefighting equipment.

There is a mixture of overhead and underground power service and multiple private water purveyors serving Zone G. Chelan County PUD operates a water treatment facility serving the Lake Wenatchee community. In addition, the PUD has 3 substations and multiple transmission lines throughout the area. Major transmission lines serving the Seattle area run across Zone G.

Burlington Northern Santa Fe Railroad operates approximately 40 miles of intercontinental rails through Zone G including the longest tunnel in the United States at the Cascade Crest. Approximately 30 trains pass through Zone G daily.

Fire Protection

Lake Wenatchee Fire & Rescue is responsible for protection of private property in the area surrounding the communities in the Lake Wenatchee and Plain area. The WDNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. Lake Wenatchee Fire and Rescue often provides the Initial Attack on Public Lands due to the distance from, and availability of, DNR and USFS firefighting forces. Areas outside the boundaries of LWFR are not guaranteed fire response from the District. DNR will respond to forest fires; however, they do not have responsibility for structures. The District maintains mutual aid agreements with WDNR and fire districts within Chelan and Douglas Counties.

LWFR is a small volunteer department and is responsible for protection of private property in the area surrounding Plain and Lake Wenatchee area covering approximately 54 square miles. District boundaries extend from the top of Beaver Hill and mile post 90 on Highway 2 to approximately mile post 67 near the summit of Stevens Pass. The District employs a part-time Fire Chief, two part-time administrative staff and 3 part-time mechanics and has an estimated 30 volunteers. LWFR has four stations; the main station is located at 21696 Lake Wenatchee Hwy, Leavenworth, WA. District boundaries extend from the top of Stevens Pass on the west to Tall Timbers Ranch up the White River on the north to top of Tumwater Canyon on the south and Plain to the east.

Zone H - Leavenworth

Zone H is located at the southern portion of the County and encompasses approximately 92,953 acres. Zone H includes the City of Leavenworth, Chumstick watershed and surrounding area (Figure 5.9). Also located in the Zone are the Leavenworth National Fish Hatchery and the Icicle and Cascade Orchards irrigation diversion head works and canals. Chelan County Fire District District #3 provides the primary fire protection for residents in this Zone. Zone H largely covers the Leavenworth Area Community Wildfire Protection Plan. Much of the following descriptions was taken from that CWPP.

Table 5.29. Zone H Wilderness Summary.

Non-Wilderness	Alpine Lakes Wilderness
89%	11%

Drainages in the Monitor, Cashmere, Dryden and Peshastin area are primarily glacial U-shaped valleys with steep sidewalls. Dominant vegetation includes mixed conifer and open pine forests. Residential development is largely rural in nature and density varies with topography and proximity to the lake and other scenic areas. There are approximately 5,000 structures in the planning area. The homes in this Zone are valued at several hundred million. Many residences are located up the numerous narrow canyons that feed into the Wenatchee River valley. In some cases, the homes are very large (>2,000 sq. ft.) and interface with both agricultural areas as well grass and forest environments. The area is a popular recreation destination, particularly during the summer and winter months. The Peshastin Pinnacles, a Washington State Park, is located within the planning area.

Table 5.30. Zone H Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
3,665	4,114	3,945	169

Table 5.31. Zone H Ownership Summary.

Owner	Percent
US Forest Service	64%
Private	32%
State	<3%
US Fish & Wildlife	<1%

Private property comprises nearly one third (32%) of the Zone, while the United States Forest Service manages the nearly two thirds (64%) of the ownership and the US Fish and Wildlife Service manages less than 1% of the Zone. State ownership comprises the remaining 3%.

Zone H varies in elevation from 3800' in the upper reaches of Chumstick Creek near French Creek to 1000' just southeast of Leavenworth near Hwy 2. Most of the planning area (80%) is of dry forest vegetation of predominately ponderosa pine with some Douglas-fir and small amounts of grand fir. Ponderosa pine stands dominate the landscape covering nearly three quarters (74%) of the Zone. More mesic sites (e.g. north slopes and creek beds) have developed stands of Douglas-fir and some grand fir on 6% of the Zone. More moist vegetation groups such as moist grand fir and more moist montane meadows exist in higher reaches of side drainages such as in the Icicle and upper Chumstick drainages with general elevation gain.

Currently, the primary vegetation type for the area covered by Zone H is overstocked ponderosa pine forest with large amounts of Douglas-fir regeneration and intrusions of grand fir. Ponderosa pine is a shade intolerant species naturally adapted to survive in areas that experience fire on a regular basis. This frequent fire regime with a fire return interval of 2-20 years was standard for the entire lower Wenatchee River valley, however north aspects may act as fire refugia and not experience fire on the same interval.

Wildfire Potential

The WDNR has classified the area surrounding Leavenworth as a 'high risk' WUI community. Past activities such as logging, grazing and fire suppression have altered the normal fire regime, stand species composition and affected forest health. Dense, overstocked stands of trees are increasing the fire hazard in the Leavenworth CWPP. Many stands of ponderosa pine are dominated by trees less than 18 inches in diameter. Pockets of trees are being affected by low level (~0.3 to 4.5 trees/acre) infestation by mountain pine beetle and/or fir engraver (WDNR GIS; see previous Vegetation map) and root rot (disease) is also a problem. Stands often have contiguous crowns and ladder fuels in the form of young conifers and tall brush species. All of these variables provide a continuous fuel profile which can create conditions for an intense and fast-moving fire.

Since 1970, over two hundred fires have occurred within the Leavenworth CWPP area (See Fire History map on page 12 for summary and location of fire starts). Fires are started naturally by lightning in the Leavenworth CWPP area nearly annually and are typically concentrated along ridge tops though random strikes may occur anywhere. In addition, human caused fire starts are also occurring (and increasing) because of other activities, such as recreation (campfires) and debris burning. The Chumstick Valley has seen a very high number of ignitions along the Burlington Northern-Santa Fe Railroad tracks in the past, but that concentration has diminished somewhat with new maintenance practices employed by the railroad. The size of the fires may vary, but typically small fires of a few to several acres occur on a 5 to 10-year interval. Large fires (those greater than 1000 acres) have occurred in 1994 (Rat-Hatchery Creek Fire, 43,000 acres), 2001 (Icicle Complex Fire, 6,400 acres), 2004 (Fischer Fire, 16,439 acres), 2014 (Chiwakum Fire, 13,900 acres) and 2015 (Wolverine Fire, nearly 39,000 acres). Conditions are still conducive for a large, high severity fire, particularly in the Chumstick drainage. Large fires have been experienced near the planning area and conditions are conducive to large, high severity fires.

Weather, topography, and fuels affect wildfire behavior. Zone H, like other areas of Chelan County, is prone to severe weather conditions in late summer that can support extreme fire behavior. The terrain is an extremely important aspect of expected fire behavior in this area. Chumstick Creek runs generally north and south but has varied topographic conditions and side drainages that funnel the winds across the Chumstick Creek watershed where the velocity increases as air is forced into the confined area. This influence on fire behavior was observed in 1994 when the Rat-Hatchery Creek fire came out of the Icicle drainage and burned over Mill Creek to the east. The Fischer Fire in 2004 had potential to burn north up the Chumstick valley with typical up valley and upslope winds but an unusual northwest flow during the duration of the fire upheld its advance.

The landscape has many valleys with steep slopes and dense stands dominated by ponderosa pine and thickets of Douglas-fir, with the largest trees primarily less than 18 inches in diameter. Stands in the area are dense and continuous, a perfect setting for large, lethal wildfire. Many stands have closed canopies and abundant ladder fuels. Continuous, tall underbrush also predominates. Insect infestations of western pine beetle and/or fir engraver beetle are becoming more prevalent.

Chumstick Creek watershed residences are adjacent to areas of grass, brush and thick pine fuels on the lower slopes. The mid to upper slopes are more heavily forested. Fire may move rapidly through these common areas with the potential for spotting highest in the adjacent forested areas and could be difficult to manage if wind is a factor. These brush and dense forest fuel types could produce fast moving fires especially in areas of steep slopes or with sustained winds. The threat would soon be in all areas of the communities with fire potential to involve all adjacent structures.

Wildfire Hazard Assessment [19]

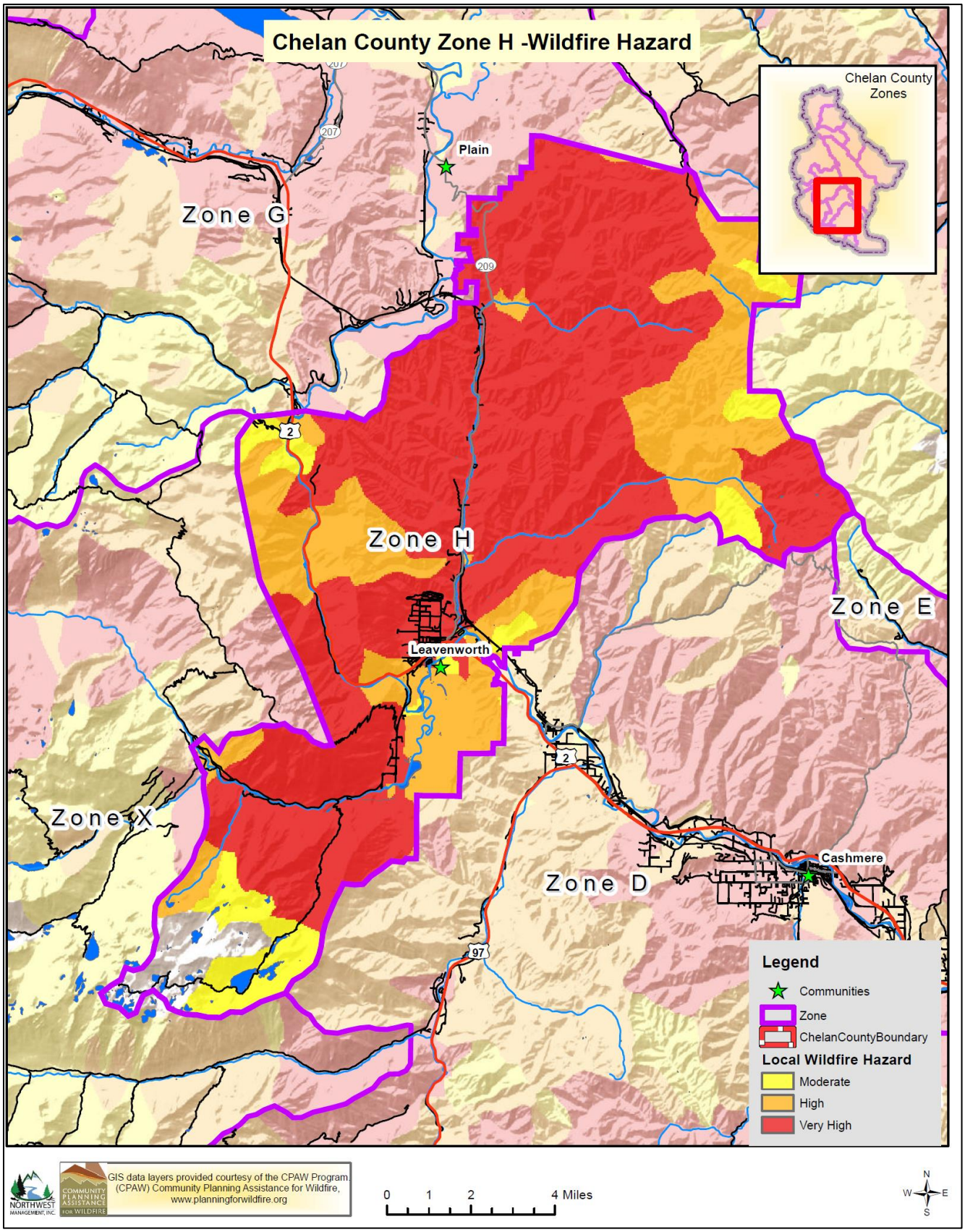
The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

Zone H's local wildfire hazard shows that 65% of the Zone is considered very high wildfire risk. This is likely attributed to the numerous recent fires that have occurred in this Zone which allows invasive species to become established and promotes dense understory in some vegetation types.

Table 5.32. Zone H Wildfire Hazard Summary.

Rating	Percent Area
N/R	3%
Moderate	7%
High	25%
Very High	65%

Figure 5.9. Zone H Local Wildfire Hazard Map.



Ingress-Egress

There are several main roads that serve as designated emergency evacuation routes including Chumstick Highway, North Road, Highway 2, Ski Hill Drive, Mountain Home Road and Icicle Road. However, several of the roads that access canyons or valleys are dead end roads. Not all roads in the planning area are paved or in suitable condition for fire equipment. Therefore, road access has been identified as a concern. The lack of improved roads that could serve for two access roads for emergency evacuations has been identified as a concern in some areas.

Chumstick Highway is the main artery to the areas of the Chumstick Valley (including all canyons off the main Chumstick). Icicle Road provides the main access for the Icicle Valley, and North Road and Mountain Home Road provides the main access for those areas.

Infrastructure

Infrastructure consists of overhead and underground power service, irrigation systems and a public domestic water system that serves part of the Icicle Valley. The Icicle Creek watershed is the source of domestic water for the town of Leavenworth. The Burlington Northern-Santa Fe Railroad runs through the majority of the Chumstick valley. This has been a source of frequent small fires. Recent means of mitigating for these small fires is in the form of bulldozing a “fire line” parallel to the tracks to bare earth.

Fire Protection

Chelan County Fire District #3 is responsible for protection of private property in the area surrounding the community of Leavenworth. District boundaries include the Chumstick Creek watershed, Ski Hill Drive, Icicle Road, East Leavenworth Road, and Highway 2. The City of Leavenworth is not part of the fire district however the district provides fire protection to the City through a contract. The WDNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. Areas outside the boundaries of the Fire Protection District #3 are not guaranteed fire response from the District. DNR will respond to forest fires however they do not have responsibility for structures. The District maintains mutual aid agreements with WDNR and all fire districts within Chelan and Douglas Counties.

The District is a small combination department covering approximately 30 square miles. The District employs three career employees and estimated 26-30 volunteers. CCFD #3 has two stations with the primary station being at 228 Chumstick Road just off Highway 2 and the second being 7 miles north along Chumstick Road.

Zone X - State and Federal Lands

Zone X is largely located along the most remote western portions of the County. It is approximately 691,706 acres and includes much of the publicly owned land in the County (Figure 5.10). The Zone is bounded by the Snohomish and King Counties to the west, Okanogan County to the north, and Kittitas County to the south.

Table 5.33. Zone X Wilderness Summary.

Non-Wilderness	Alpine Lakes Wilderness	Glacier Peak Wilderness	Henry M. Jackson Wilderness	Lake Chelan-Sawtooth Wilderness
42%	20%	27%	<4%	8%

Most of the structures locate in this Zone are likely facilities associated with campgrounds and other recreation sites. However, if residences do occur, it is likely that the home sites do not include adequate defensible space. It would be expected that private lots and other areas within this Zone are stocked with, or within proximity to, heavy fuels.

Table 5.34. Zone X Parcel Summary.

#of Structures	# of Parcels	# of Parcels in Fire District	# parcels not in Fire District
50	395	11	384

Table 5.35. Zone X Ownership Summary.

Owner	Percent
National Park Service	12%
US Forest Service	86%
Water	<2%
Private	<1%

Private property comprises less than 1% of the Zone, while federal agencies manage the rest that is not water (USFS - 86% and NPS - 12%).

Fuel types are primarily high elevation, mixed conifer types with some openings along the arid south slopes. Heavy riparian vegetation exists along streams.

Wildfire Potential

The eastside Douglas fir cover type that occurs throughout the Zone is the most xeric type on the North Cascades Complex and is comparable to the dry Douglas fir mixed conifer of the Rocky Mountains. It is best characterized by a fire regime I of mixed severity where stand replacing events occur infrequently (approximately every 100 years) and low severity fires occur more frequently.

Common fuel models in this area include Scott and Burgan standard fire behavior fuel models[50] GR3, GS3, SH3, TU (1 & 5) and TL (1, 3, 4, 5 & 7). Grass and sedge dominated meadows would fall under fuel model GR3 (short grass) where fire spread is carried by the fine herbaceous fuels that

[50] Scott, Joe H.;Burgan, Robert E. 2005. Standard fire behavior fuel models: a comprehensive set for use with Rothermel's surface fire spread model. Gen. Tech. Rep. RMRS-GTR-153. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 72p.

have cured. Shrub-dominated meadows would be fuel model GS3 or SH3 (short brush) where fire is carried by litter cast and other fine fuels associated with this type. These sites likely burn infrequently due to their mesic nature and would burn with low intensity because of the lack of heavy (100 hour) fuels.

The timber litter and timber understory fuel models will have low to moderate fire activity under average summer weather conditions. These fuel models would include the lodgepole pine/mixed conifer stands at the lower elevations and the mountain hemlock (*Tsuga mertensiana)*, subalpine-fir (*Abies lasiocarpa)*, whitebark pine (*Pinus albicaulis)* and western larch (*Larix occidentalis*) found at the higher elevations.

Wildfire Hazard Assessment [19]

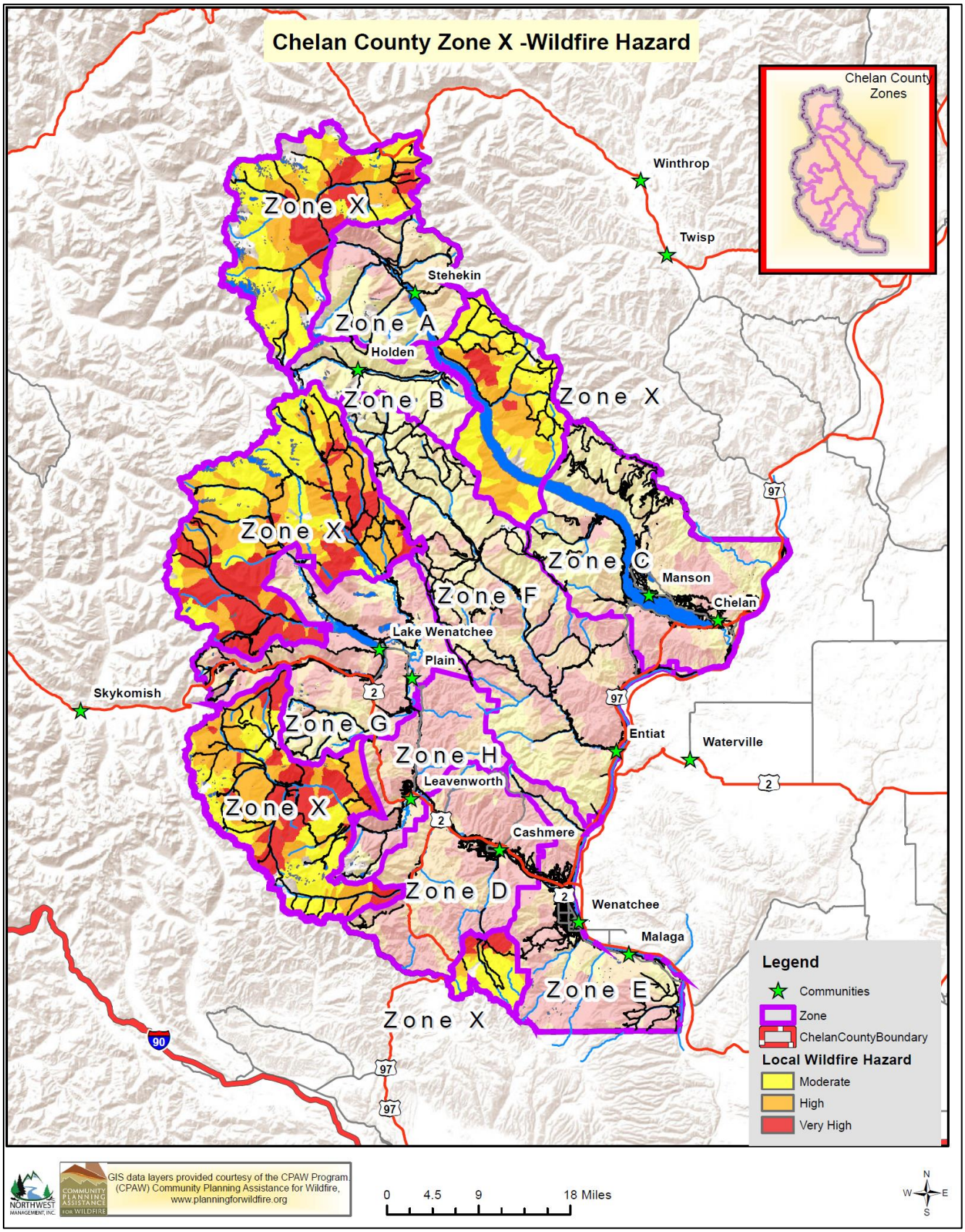
The following map and associated statistics were developed and provided by the Chelan County CPAW project. Their in-depth analysis produced this information utilizing a variety of GIS tools, models, interviews and field assessments. This information is based on extreme fire weather and does not indicate the likelihood of an ignition but rather where a fire could burn at high intensity. Through this same process, it was determined that the entire County is susceptible to ember cast.

Zone X's local wildfire hazard shows that over 50% of the area is considered high to very high wildfire risk.

Table 5.36. Zone X Wildfire Hazard Summary.

Rating	Percent Area
N/R	5%
Moderate	39%
High	33%
Very High	22%

Figure 5.10. Zone X Local Wildfire Hazard Map.



Ingress-Egress

There are numerous roads (Forest, County, private and state) that access this Zone. Some provide primary or secondary evacuation routes for residents and visitors during a wildland fire. There is also a vast network of foot trails that can be used to reroute the many hikers that visit Chelan County every summer.

Infrastructure

There are numerous bridges in Zone X of Chelan County, and some can accommodate firefighting apparatus. Many bridges do not have posted load rating signs which could pose a limitation to access for firefighting equipment. Roads and bridges in this Zone are also subject to being washed out every spring if rapid snowmelt occurs.

Power is provided by overhead power lines with only a few overhead connections to structures. Water resources are obtained from private wells, spring fed or other local water sources.

Fire Protection

The NPS has protection responsibility for land within Lake Chelan Recreation Area and North Cascades national Park, while the USFS has responsibility for land under their ownership. The WDNR is the primary agency responsible for fire protection on forested private and state lands while the USFS is the primary agency responsible for management of fires on federal land. DNR will respond to forest fires; however, they do not have responsibility for structures.

Chapter 6

Mitigation Recommendations

Critical to implementation of this Community Wildfire Protection Plan are the identification and implementation of an integrated schedule of action items targeted at achieving a reduction in the number of human caused fires and the impact of wildland fires in Chelan County. This section of the plan identifies and prioritizes potential mitigation actions, including treatments that can be implemented in the county to pursue that goal. As there are many land management agencies and thousands of private landowners in Chelan County, it is reasonable to expect that differing schedules of adoption will be made and varying degrees of compliance will be observed across various ownerships.

The land management agencies in Chelan County, including the Washington Department of Natural Resources and the BLM, are participants in the planning process and have contributed to this plan's development. Where available, their schedule of land treatments has been considered in the planning process to improve the correlation between their identified planning efforts and the efforts of Chelan County.

Chelan County encourages the building of disaster resilience in normal day-to-day operations. By implementing plan activities through existing programs and resources; the cost of mitigation is often a small portion of the overall cost of a project's implementation.

All risk assessments were made based on the conditions existing during 2015. Therefore, the recommendations in this section have been made in light of those conditions. However, the components of risk and the preparedness of the county's resources are not static. It will be necessary to fine-tune this plan's recommendations regularly to adjust for changes in the components of risk, population density changes, infrastructure modifications, and other factors.

Maintenance and Monitoring

A commitment to monitoring changes in resource conditions to evaluate the effectiveness of different management strategies will improve learning and, through adaptive management, increase the success of wildfire mitigation activities. Monitoring to evaluate the effectiveness of management actions must occur to determine the success of fire prevention, suppression, and restoration actions. Lessons learned from self-evaluation can be shared and inform changes to correct for ineffective management prescriptions, respond to changes in resource conditions, guide new science and research needs and address changes in management policy and direction. Monitoring and evaluation is an essential part of adaptive management and depends upon timely information, analysis and learning. Strategic application of new management techniques, improved use of risk analysis to set management priorities, and the translation of science and research findings into tools for easy use on the ground to prioritize prevention, suppression, and restoration efforts can help improve the efficacy and efficiency of rangeland and forest fire management. Without careful monitoring and evaluation of management efforts we cannot be certain we are achieving desired outcomes.

The Chelan County Wildfire Protection Plan will be reviewed at least annually at meetings convened by the Cascadia Conservation District, open to the public and involving all municipalities/jurisdictions, where action items, priorities, budgets, and modifications can be made or confirmed. Amendments to the plan should be documented and attached to the formal plan as an amendment. Re-evaluation of this plan should be made on the 5th anniversary of its acceptance, and every five years following.

Prioritization of Mitigation Activities

Each individual Zone convened during the summer of 2018 to discuss Zone specific action items and to develop their own Mitigation Action Plan. Each Zone's Mitigation Action Plan recommended in this chapter were prioritized by the individual Zone. Countywide funding would be prioritized more broadly when available. The action items in Tables 6.1 – 6.5 are ranked as "High", "Moderate", or "Low" priorities for Chelan County as a whole. The CWPP team does not want to restrict funding to only those projects that are high priority because what may be a high priority for a specific community may not be a high priority at the county level. Regardless, the project may be just what the community needs to mitigate disaster. The flexibility to fund a variety of diverse projects based on varying criteria is a necessity for a functional mitigation program at the county and community level.

Mitigation Action Plans

Zone A - Stehekin

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.1. Zone A Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Contingency lines identification and improvement.	Map existing contingency lines on both sides of the valley in GIS to identify property ownerships and develop Scope of work and maintenance schedule.		NPS	Chelan Co Fire Dist 10, Stehekin private residences or contractors.	High	Before
Safety zone planning and improvement.	Identify and map safety zones, asses improvements needed and update FMP for any further compliance needed. This includes mowing and burning the Buckner Orchard and develops a plan for use of the Stehekin Airstrip as a safety zone.		NPS	Chelan Co Fire Dist 10/ Stehekin private residences' or contractors.	High	Before
Evacuation Plan updating.	Evaluate current plans for needed updates, including mapping, descriptions and content.		NPS/CCFD 10	NPS/CCFD 10/ Chelan Co Sherriff.	Med	Before

Table 6.1. Zone A Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Risk Assessment surveys	Data collection and map integration of private residences risk and fire protection resources (pumps, sprinklers, generators, etc.).		CCFD 10	NPS/CCFD 10/ Private residences	Med	Before
Stehekin Valley roads fuels reduction.	Remove mistletoe brooms from trees within 100' of roads, maintain and improve shaded fuel breaks along roads to include tree removal and brush clearing.		NPS	CCFD 10, Stehekin private residences.	Med	Before

Zone B - Holden

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.2. Zone B Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Educate guests about the role and risks regarding wildfire	Erect informational bulletin boards throughout the village and develop pamphlets to be handed out to visitors with maps and educational material. Consider holding annual wildfire workshop that educates visitors about how to be fire safe and protect their property when they return home.		Holden Village Fire Brigade (HVFB)	USFS		Before, during and after
Pursue Firewise Community status	Network with Cascadia and USFS Develop risk assessment and action plan specific for Holden Village Contact State Firewise representative	Firewise status by 2021	Holden Village Fire Brigade (HVFB)	USFS, Cascadia Conservation District		Before, during and after
Participate in Forest Service and State Management policy issues during amendment processes to	Identify opportunities for input: Forest Plan revision, DNR 20-Year Strategic Plan		Holden Village Fire Brigade (HVFB)			

Table 6.2. Zone B Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
provide input to insure local land/home owner interest are considered.						
Conduct risk assessments of individual structures and essential infrastructure for the entire planning area and implement identified recommendations.	Secure funding Identify assessors Train assessors if needed Assess and compile Implement	35 Holden structures, 4 IMCO and approximately 20 structures in Lucerne	Holden Village Fire Brigade (HVFB)	WA DNR?		

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.3. Zone B Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Maintain & Improve shaded fuel breaks across valley on both sides of the community	Remove small trees and ladder fuels and accumulation of down material.	40 Acres Treated	USFS	Holden Community, HVFB, USFS	High	Before
Maintain road accessibility for ingress/egress for wildfire responders and evacuation	Remove small trees, brush, and down logs adjacent to existing road systems.	Develop Plan and implement strategy for 350 acres	USFS	Holden Community, HVFB, USFS	Low	Before
Removal of large diameter fuels resulting from the 2015 Wolverine fire along FS8301 road to ensure escape route viability for Holden staff, guests, and fire response personnel	Felling hazard trees, mechanized pile creation, pile burning	350 acres Treated	USFS	Holden Community, IMCO/Rio Tinto, USFS	High	Before, During
Insect/Disease infestation management plan to conserve remaining trees near community	Remove competing trees and mistletoe brooms. Treat key trees with insecticide and/or pheromone.	Develop Plan. Treat ~ 100 Acres	USFS	Holden Community, USFS	High	Before

Table 6.3. Zone B Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Make homes and structures more fire resilient	Rebuild existing structure skirting and include concrete curbing, flame resistant backer and intumescent paint.	1500' of replaced skirt	Holden Facilities	USFS, Chelan County Building Dept, HVFB	High	Before
Provide alternative to burning debris from defensible space & Escape Route maintenance	Purchase wood chipper with large limb capacity and auto feed	Reduce reliance on annual burn piles	HVFB	WA DOE	High	Before
Coordinate resilient landscape work among agencies, across jurisdictions and ownership	Develop agreements/ understanding/ policy so that private property owners, and community groups may conduct fuel reduction work on adjacent public land.		ALL	All		
Reduce accumulations of coarse woody debris on forest floor.	Support landscape scale fuels reduction activities by the USFS Create strategic fuel breaks that will enhance local fire suppression efforts and utilize natural / existing fuel breaks where feasible	Lower fire intensity along only escape route & community.	USFS, HVFB	USFS, IMCO/Rio Tinto	High	Before

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.4. Zone B Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Weather monitoring equipment to improve fire behavior predictions	Add wind, & RH Instruments to build historical data base of typical valley weather.	Daily reporting to USFS and/or NOAA	Holden Operations	USFS, NOAA and Holden Operations	High	Before, during and after
Develop planning area “pre-attack” plan.	Work with USFS, WA DNR, HVFB to gather existing data, integrate into GIS system, produce and vet a plan, have available to IC teams	Develop a plan	USFS	Chelan Co Emergency Management, DNR, USFS, HVFB	High	Before
Develop Holden Wildfire Contingency Plan	Create informational document on how community will react to imminent wildfire threat.	Develop a plan	HVFB	Chelan Co Emergency Management, USFS, HVFB	High	Before
Develop backup raw water supply for wildland defense Sprinklers	Install pump in historical pump house connected to underground raw water grid and electrical distribution	2,000 gpm drafting capability	Holden Village Fire Brigade (HVFB)	USFS,	High	Before

Table 6.4. Zone B Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Before, During or After the Fire
Harden Diversion Dam serving Holden Community against ignitions, slope failure, and debris flows.	Rebuild shelter to resist threats	Completed new 500 Sq'. shelter	Holden Operations & Facilities	USFS, Chelan County Building Dept, HVFB	High	Before
Improve radio communications	Identify & Install equipment to ensure emergency responders can utilize assigned frequencies.	Eliminate dead areas in lower and upper RR Creek Basin	HVFB	USFS	High	Before, & During

Zone C - Chelan/Manson

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.5. Zone C Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
Encourage adjacent landowners and agencies to perform complementary treatments on their land.	Inform landowners how to be more involved in the public planning process and invite neighboring private landowners to participate in "FireWise" workshops and "Fire Adaptive Communities"						
Implement landowner education programs.	Educate homeowners to the hazards of highly flammable landscape plant types and encourage landowners to remove such high-risk plants.						
Conduct risk assessments of individual structures and essential infrastructure.	Identify recommendations for implementation and provide information to landowners.						
Compile essential "FireWise" information and distribute it to landowners.	Information presented should cover landowner responsibilities and residential security options (i.e. creating defensible spaces and fire breaks, "FireWise" construction materials, etc.), and						

Table 6.5. Zone C Fire Adapted Communities.							
Objective	**Key Activities**	**Measure**	**Coordinator**	**Partners**	**Priority**	**Action Taken**	**Before, During or After Fire**
	individual preparedness (i.e. how to create a Personal Emergency Action Plan, what to do and what not to do in the case of a wildfire, etc).						

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.6. Zone C Fire Resilient Landscapes.							
Objective	**Key Activities**	**Measure**	**Coordinator**	**Partners**	**Priority**	**Action Taken**	**Before, During or After the Fire**
Implement "Fire Adaptive Community" recommendations within 200 feet of all private homes, egress roads and essential infrastructure.		-					
Create 200 foot wide shaded canopy fuel breaks							

Table 6.6. Zone C Fire Resilient Landscapes.							
Objective	**Key Activities**	**Measure**	**Coordinator**	**Partners**	**Priority**	**Action Taken**	**Before, During or After the Fire**
on private land adjacent to publicly managed lands.							
Solicit the Forest Service to continue current fuels reduction activities and encourage similar activities on private ownership within the CWPP area as risk assessment and prioritization process continues.							

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.7. Zone C Response.							
Objective	**Key Activities**	**Measure**	**Coordinator**	**Partners**	**Priority**	**Action Taken**	**Before, During or After the Fire**
Develop and maintain additional safe areas,							

Table 6.7. Zone C Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
shelters, and staging locations as identified.							

Zone D - Cashmere

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.5. Zone D Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
Circulate fuels reduction and fire precaution pamphlet yearly that includes essential FireWise information.	Content Development Landowner responsibilities and residential security options Individual preparedness Home hardening Distribution Annually to landowners in and adjacent to the Monitor, Cashmere, Dryden and Peshastin CWPP area.	Timeline for completing updates Number of pamphlets distributed	CCFD 6				Before
Provide up-to-date fire-related information on existing and new billboards	Identify Locations Existing billboards on main roads New billboards on other roads Content Development Fire Danger Level Burn-ban regulations Actions to take if smoke or fire detected Describe penalties	Number of main roads with signage Number of other roads with signage Total number of signs	CCFD 6				Before / During
Encourage coordination across State, Federal, and private land ownership	Identify opportunities for joint projects Incorporate landscape fuels reduction strategies into state owned area management objectives and fuels reduction projects	Number of cross boundary projects	CCFD 6	DNR USFS			Before

Table 6.5. Zone D Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
Provide FireWise building materials information to developers and home builders during the permitting process.	Work with the County planning department to develop contact list and for timely permit information	Number of developers/ builders provided information	CCFD 6	CC Comm. Dvlp. CC Fire Marshal			Before
Home risk assessments	Develop strategy for generating home assessment requests Conduct individual, detailed home assessments Conduct rapid (sidewalk) home assessments Develop a central database for storing, accessing and sharing home assessment information Establish timeframe for re-visiting homes	Number of assessments conducted Dvlpmt of a data server	CCFD 6	Cascadia DNR		Two years into 4 year goal of assessing all homes in CCFD 6	Before
Identify critical infrastructure within planning area boundary	Identify infrastructure, conduct assessment and document Create plan for mitigating risk and response	All critical infrastructure documented and with a plan	CCFD 6	CPUD			

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.6. Zone D Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Implement FireWise recommendations within 200 feet of private homes and essential infrastructure.	Establish defensible space Provide adequate turnaround space for emergency equipment Post clear and consistent address signs	Number of homes with: - 200 ft. of treatment - turnaround space - signage	CCFD 6	landowners			Before
Reduce the potential of a wildfire moving from public to private lands and vice versa across the landscape	Implement fuels reduction on strategically located areas that will have the greatest benefit for the entire project area. Prioritize USFS, industrial forest lands, and private property in Derby and Anderson Canyons Identify other priority areas	Number of priority areas with implemented fuels reduction projects	CCFD 6	USFS DNR landowners			Before
Improve site access for fire fighting	Identify priority sites and roads Treat vegetation along roads and driveways Implement shaded canopy defensible space on both sides of the roads	Number of sites and roads with treatment	CCFD 6	CC Public Works WSDOT DNR USFS			Before
Restore low-intensity fire regime to landscape	Support landscape scale fuels reduction activities by the USFS Create strategic fuel breaks that will enhance local fire suppression efforts and utilize natural / existing fuel breaks where feasible	Number of acres treated within CWPP and within County	CCFD 6	USFS DNR			Before

Table 6.6. Zone D Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Encourage similar activities on other National Forest lands adjacent to private ownership within the CWPP						
Reduce risk of fire starts from homeowner burning	Encourage chipping of fuels instead of burning Support efforts to coordinate shared small mobile chipper for use in the CWPP area		CCFD 6	CCFD 1			Before

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.7. Zone D Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Re-establish addresses in a logical fashion for all roads/homes.	Determine resource needs Support implementation	Percent of homes with corrected addresses	CCFD 6	CC Public Works		Effort underway	Before
Maintain updated emergency evacuation plans and routes	Work with Chelan County Emergency Management (CCEM) to obtain current plans Make information readily available to the public		CCFD 6	CCEM			Before

Table 6.7. Zone D Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Update plan or provide input as appropriate						
Develop Emergency Communication Strategy and safe escape routes	Mark exit routes on maps Make directional emergency exit signs Coordination with KOMO and KPQ for emergency info	Number of routes posted	CCFD 6	Chelan County WSDOT CCEM			Before / During
Complete fuel reduction and maintenance along County roadways to improve equipment access and evacuation.	Prioritize Nahahum and Brender Creek roads for implementation Prioritize additional roadways for fuel reduction actions and maintenance needs in order to keep certain critical roads passable Encourage neighbors to organize their own clearing projects Work with Chelan County and private landowners on roadway projects	Number of priority roads with completed maintenance Landowner support	CCFD 6	Chelan County			Before
Complete fuel reduction along primitive roadways.	Identify rural roads classified as primitive Identify subset with conditions which limit responder access Identify potential resources for addressing needs		CCFD 6	Chelan County			Before
Improve Fire District 6 Facilities	Proceed with planning efforts for facilities upgrade that would increase apparatus storage capacity and meet other resource needs	Adequately sized and located facilities	CCFD 6	WSDOT			Before

Zone E - Wenatchee

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.8. Zone E Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Post signs to raise fire hazard awareness.	Identify and post signs along roadways and at intersections. Identify and post signs at areas used by recreationalists (trailheads, ORV areas, campgrounds, etc.)	Number of sings posted.	Chelan County NRD	USFS, DNR, CCFD1, CDLT, City of Wenatchee	M	3 signs currently ordered and will be placed.	Before
Decrease human ignitions of wildfires	Conduct analysis of human ignitions Identify activities that lead to ignition Develop management strategies to reduce human ignitions for each activity	Human Ignitions decreased	All	All	M		Before
Encourage and support participation in the *FirewiseUSA* Program	Distribute landscaping and construction information Attend community meetings Hold workshops on relevant *Firewise* subjects Support local *FirewiseUSA* community initiatives Maintain relationships with existing *FirewiseUSA* Communities Follow up with community event participants Use local media outlets to market and highlight activities	Number of meetings attended Number of workshops hosted	DNR, CCFD1, Cascadia	NFPA, USFS, BLM, Chelan County, City of Wenatchee, WSU Extension, Local media	H	In progress	Before

Table 6.8. Zone E Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Provide opportunities for residents, communities and agencies to provide input on wildfire mitigation programs, and forest health projects	Schedule public meetings, Provide alternative means for gathering feedback (mail, online, etc)	Number of meetings number of comments received	ALL	ALL	M		Ongoing
Emphasize responsibilities of residents, recreational users, agriculture, industry of lands within the CWPP regarding wildfire concerns.	Identify key responsibilities of these groups Raise awareness through outreach to each group		ALL	All	M		Before
Encourage and support individual evacuation preparedness through the Ready, Set, Go! program	Distribute Ready, Set, Go! information and materials at public events and meetings Edit materials to incorporate relevant Local information	Number of events reported in AMS	CCFD1, Cascadia, CCDEM	USFS, DNR, City of Wenatchee, Chelan County NRD	H	Coordinating with Emergency Management	Before

Table 6.8. Zone E Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Produce/ acquire education and outreach materials to address local needs	Produce local materials to meet education and awareness needs of various populations Plant guides, evacuation materials, translation, smoke impacts, public safety during wildfires, human ignition prevention and others as needed		ALL	ALL	H	Collaborating with partners	Ongoing
Smoke management	Conduct public outreach on prescribed burning plans, and likelihood of smoke Conduct public outreach during wildfire season/ smoke events to educate and inform general public of wildfire status, smoke conditions, air quality and associated human health issues Provide face to face opportunities for public to ask questions, and have conversations with local fire managers and authorities Use best management practices to prevent/ limit smoke impacts from ag-burning	Number of outreach events Information published Announcements posted	Agency responsible for/ managing wildfire, prescribed fire or permitting authority	USFS, DNR, BLM, WDFW, Dept. of Ecology CCFD1, Incident Management team, Cascadia, Chelan County NRD, City of Wenatchee,	M		During

Table 6.8. Zone E Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Community outreach	Assess needs of ESL populations Develop outreach strategies targeting ESL communities Develop a strategy for engaging vacation property owners, and visiting populations Produce wildfire safety resources for visitors Provide public health information to smoke sensitive populations Encourage participation in the County Sheriff's special needs registry Encourage registration in the AlertSense Notification System		All	All	H		Ongoing
Youth wildfire education	Partner with local school districts Develop a field sites to serve as outdoor classrooms Incorporate wildfire education into the local education curriculum Attend events aimed at engaging youth Engage local youth organizations in experiential learning and volunteer opportunities	Number of events Adoption of wildfire curriculum	Local Schools	All	H	The program has begun on a small scale	Ongoing
Home risk assessments	Develop strategy for generating home assessment requests Conduct individual, detailed home assessments Conduct rapid (sidewalk) home assessments	Number of assessments conducted Development of a data server	CCFD1, Cascadia, DNR	All	H	In progress	Before

Table 6.8. Zone E Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Develop a central database for storing, accessing and sharing home assessment information Host home assessment training for practitioners						
Coordinate prevention and outreach efforts among agencies.	Improve sharing information and resources across agencies Partner with different jurisdictions to create consistent massaging		ALL	All	M		Before
Support and participate in FAC efforts of other planning areas in CWPP area, and across the state	Participate in Washington Fire Adapted Communities Learning Network (WAFAC) Share successes, information, and assist other areas with similar interests to help accelerate FAC work locally and statewide. Attend workshops, seminars, and events to develop practitioner skills and resources.	Maintain affiliate member status	CCFD1	ALL	L		Ongoing
Local CWPPs	Incorporate existing CPWWs into planning processes Develop local CWPPs within planning area for specific geographical, and protection needs.	CWPPs developed	Planning area Community	Cascadia, CCFD1, City of Wenatchee, Squilchuck,	H	Planning process started for sub-planning areas	Before

Table 6.8. Zone E Fire Adapted Communities.							
Objective	**Key Activities**	**Measure**	**Coordinator**	**Partners**	**Priority**	**Action Taken**	**Before, During or After the Fire**
Annually update and distribute community emergency phone trees for residents	Establish means of obtaining information and assign task	Annually updated phone tree	Planning area community	CCFD1, Rivercom 911, CCDEM, Chelan County, City of Wenatchee, Red Cross	H	Historically has occurred; however, needs Q&A review	Ongoing

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.9. Zone E Fire Resilient Landscapes.							
Objective	**Key Activities**	**Measure**	**Coordinator**	**Partners**	**Priority**	**Action Taken**	**Before, During or After the Fire**
Encourage adoption and/or updates of future and/or existing Wildland-Urban Interface (WUI) codes	Conduct outreach to partners, communities, local leadership, and all other associated parties Obtain lessons learned from areas that have adopted WUI code	Code adoption and/or update	Chelan County, City of Wenatchee	Cascadia, DNR CCFD1, builders, residents	H	In progress	Before

Table 6.9. Zone E Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Adopt/ amend/ update WUI codes						
Coordinate resilient landscape work among agencies, across jurisdictions and ownership	Develop agreements/ understanding/ policy so that private property owners, and community groups may conduct defensible space work on adjacent public land. Coordinate with adjacent property owners to increase project effectiveness and scope where appropriate Promote RX Fire use in planning area, and collaboratively among jurisdictions		ALL	All	H	In progress	Before
Encourage and assist planning area residents to implement defensible space/ fuels reduction	Utilize existing community assistance programs Develop new assistance programs as needs and capacity develop Coordinate volunteer opportunities Conduct site visits	Number of structures treated, Number of volunteer hours tracked	CCFD1, DNR, Cascadia	City of Wenatchee, Chelan County NRD, USFS,	H	In progress	Before

Table 6.9. Zone E Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Mitigate potential losses of critical infrastructure to wildfire	Identify and map vulnerable infrastructure Develop mitigation strategies	Planning area map and strategy	CCPUD	All	H		Before
Promote native and fire-resistant plants	Provide resources and consultation for landowners Develop a mitigation strategy for invasive annual grass species in the Wenatchee Foothills Develop demonstration areas, and gardens to educate residents Develop post-fire landscape restoration planting program Develop nursery partnerships		CDLT, WSU Extension, Cascadia, Weed Board	All	H		Before, After
Improve fuel condition and emergency ingress/egress along ROW and road easements in high risk areas.	Identify high risk areas and associated ROW and road easements Establish timeline for addressing concerns Reduce fuels along ROW and road easements	Areas treated (acres, feet, miles etc.)	Chelan County, City of Wenatchee	DNR, USFS, CCFD1	H		Before
Create firewood cutting permit areas	Identify new firewood cutting areas to reduce forest fuels Provide permits, and information to firewood harvesters	Firewood harvested	USFS		L		Before

Table 6.9. Zone E Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Forest (type) fuels reduction	Identify and map existing fuel breaks Develop fuel breaks in forested areas using appropriate methods (mechanical thinning, RX fire, grazing, etc) to slow the spread of wildfire Maintain existing fuel reduction projects in planning area	Acres treated Fuel breaks mapped. Fuel breaks identified Areas maintained	USFS, DNR, Chelan County NRD, Landowner, State park	All	H		Before
Rangeland (type) fuels reduction	Accommodate diverse management objectives Promote native plant populations Develop appropriate fuels reduction strategies for the Wenatchee Foothills including the use of bulldozers, disk plow, handline, RX fire, herbicide application, mechanical treatment, grazing, and native plantings to slow the spread of fire and control invasive species Conduct outreach of best practices for shrub-steppe fuels management	Acres treated	CDLT, WSU Extension, City of Wenatchee, Landowner Chelan County NRD, CCPUD	BLM, DNR, USFS, CCFD1, Cascadia	L	None. Minimal rangeland in Zone E	Before

Table 6.9. Zone E Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Community weed plan	Develop priorities Address boundary issues Address funding issues Develop improved communication strategy		CCNWB	CDLT, WSU Extension, Cascadia	L		Before
Implement fuels reduction work in the Stemilt Basin on County and WDFW ownership, including treatments on 600+ acres and broadcast burning on 100+ acres	Plan and implement through contract work and agency partnerships	Acres treated	Chelan County NRD	WDFW, DNR, USFS, Landowners, Cascadia,	H		Before
Plan and implement priority treatment areas under the DNR 20-year Forest Health Plan in the Stemilt-Squilchuck watershed	Use landscape-scale evaluation to prioritize treatment areas Coordinate with stakeholders to implement treatment	Acres treated	Chelan County NRD	DNR, WDFW, USFS, WA State Parks, Mission Ridge, Private Landowners, Conservation Science Institute	H		Before
Replace undersized culverts in fire-affected areas	Identify, design, and contract for culvert replacement with fish-passable crossings that can handle possible debris or flow issues caused by fire	Number of culverts replaced	Chelan County NRD, CCFEG, Cascadia	Landowners, agencies, project funders	M		Before, after
Biomass disposal and harvest	Explore and employ methods to recycle or dispose of biomass from fuel reduction project waste, construction waste and other wood		City of Wenatchee, Chelan County,	Private Business, Landowners	M	In progres s	Before

Table 6.9. Zone E Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	products (drop site, burn day, free dump day, etc.) Continue dialogue about slash disposal planning and timing Support efforts for small diameter thinning, and saw mill opportunity in Central Washington Work with elected officials and regulatory authorities to develop burning opportunities for vegetative fuels in the urban growth boundary of Wenatchee.		Dept. of Ecology				
Encourage and assist adjacent private and agency landowners to map and assess fire behavior and risk across the landscape, and consequently perform fuel reduction strategically across the landscape to minimize the movement and intensity of fire across the landscape to residential and agricultural areas.	Identify existing risk and fire behavior information and data gaps Establish plan and timeline for filling data gaps and for strategic approach to fuel reduction	Fire risk lowered and projected fire behavior less volatile	Cascadia; USFS; NRCS; DNR	All	H	In planning process	Before, after

Table 6.9. Zone E Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Seek out funding sources from different entities to help support fuel reduction efforts and fuel reduction waste disposal.	Maintain list of funding sources; partner coordination, and list of priority actions	Increased funding to support fuel reduction and fuel reduction waste disposal	All	All	H	Ongoing	Before, after

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.10. Zone E Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Increase staffing available for wildfire response	Sustain funding for seasonal wildland firefighters Secure funding to hire a full-time volunteer (firefighter) coordinator	Recruitment and retention rate Staffing	CCFD1,	All	H	Seasonal crew hiring in process	Before
Apparatus procurement and replacement	Replace fire apparatus nearing end of service life Acquire new apparatus to accommodate additional staffing, and suppression needs	New equipment acquired Equipment in service	CCFD1	All	H	In progress	Before

Table 6.10. Zone E Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Training	Pursue wildfire training and skill development compliant with NFPA and NWCG standards	Training hours	CCFD1	All	H	Continuous	Before
Water Supply outside UGAs	Work outside UGAs to identify/ map areas unprotected by hydrants Develop strategies for improving water supply to identified areas	Plan to improve water supply	Chelan County	CCFD1	H		Before
Access	Locate, inventory and post weight limits on all unmarked bridges in planning area Post signs on all unmarked roadways (street name, road number, etc) Promote blue address signs in WUI areas	Number of new postings	Chelan County, City of Wenatchee	CCFD1, Rivercom911,	H	In progress	Before
Emergency Egress	Identify emergency evacuation routes for WUI communities in planning area Post evacuation route signs Develop evacuation plans for WUI areas	Signs posted Plans developed	CCDEM	Rivercom911, CCFD1, Chelan County, City of Wenatchee	H		Before

Table 6.10. Zone E Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Distribute evacuation plans to residents						
Emergency response mapping	Identify safety zone, water supply, staging area, potential containment line and other critical emergency response locations Triage structures in WUI areas Make information available in electronic map format	Emergency response data	CCFD1	Rivercom911, Chelan County, City of Wenatchee, CCDEM, DNR, USFS	H	In planning	Before
Pre-fire strategic groundwork	Construct pre-fire containment lines around WUI areas using bull dozers, disc plow, handline, green strips, and other methods appropriate for topography and land management objectives.	Pre-fire containment line constructed	ALL	ALL	H	In planning	Before
Review and support improvements to the cell phone towers serving the CWPP area.	Identify towers needing improvement and cost estimates	Towers improved	Chelan County		H		Before
Develop secondary fire apparatus road in the Wenatchee foothills	Identify secondary access route Establish timeline for construction	Roadway constructed	City of Wenatchee, CDLT, CCPUD	Chelan County, CCFD1	H	Pending development	Before

Table 6.10. Zone E Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Construct fire apparatus roads in identified areas						
Recreation emergency location sites	Posts signs with maps, and emergency location information in local recreation areas “you are here” signs	Signs posted	CDLT, USFS, DNR, City of Wenatchee, State Park	All	M		Before

Zone F - Entiat

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.11. Zone F Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Expand awareness with community members for prevention and early detection of wildland fires.	Annual agency meeting to discuss upcoming wildland fire season Develop radio public service announcements specifically tailored to wildland fires that occur in the Entiat Valley	Annual Meeting Number of Announcements	Columbia River Division Fire Operations Specialist and Information Assistant	USFS, CCFD8, DNR			
Post signs to raise fire hazard awareness.	Annually review and update prevention signing program, including the use of highway electronic reader boards (appropriate message)	Number of sings posted.	Columbia River Division Fire Operations Specialist and Information Assistant	USFS, DNR, CCFD8, City of Entiat			Before
Decrease human ignitions of wildfires	Conduct analysis of human ignitions Identify activities that lead to ignition Develop management strategies to reduce human ignitions for each activity	Human Ignitions decreased	All	All			Before

Table 6.11. Zone F Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Encourage and support participation in the *FirewiseUSA* Program	Distribute landscaping and construction information Hold workshops on relevant *Firewise* subjects Support local *FirewiseUSA* community initiatives	Number of Firewise Communities	DNR, CCFD8, Cascadia	NFPA, USFS, BLM, Chelan County, City of Entiat, WSU Extension, Local media			Before
Encourage and support individual evacuation preparedness through the Ready, Set, Go! program	Distribute Ready, Set, Go! information and materials at public events and meetings Edit materials to incorporate relevant Local information	Number of events reported in AMS	CCFD8, Cascadia, CCDEM	USFS, DNR, City of Entiat			Before
Produce/ acquire education and outreach materials to address local needs	Annual newsletter to community members informing them of upcoming wildland fire season issues and ongoing cooperative agency/landowner projects.		ALL	ALL			Ongoing
Youth wildfire education	Partner with local school Work with Columbia Breaks Fire interpretive Center Incorporate wildfire education into the local education curriculum Attend events aimed at engaging youth	Number of events Adoption of wildfire curriculum	Local School	All			Ongoing

Table 6.11. Zone F Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Home risk assessments	Develop strategy for generating home assessment requests Develop a central database for storing, accessing and sharing home assessment information Host home assessment training for practitioners	Number of assessments conducted Development of a data server	CCFD8, Cascadia, DNR	All			Before
Local CWPP	Develop local CWPPs within planning area for specific geographical, and protection needs.	CWPPs developed	Planning area Community	Cascadia, CCFD8, City of Entiat, Entiat River Valley			Before
Annually update and distribute community emergency phone trees for residents	Establish means of obtaining information and assign task	Annually updated phone tree	Planning area community	CCFD8, Rivercom911, CCDEM, Chelan County, City of Entiat, Red Cross			Ongoing

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.12. Zone F Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Support Hazardous Fuel Treatment Projects Within the Wildland Urban Interface	Provide landowners with training pertaining to fuels management methods and techniques, forestry skills and utilization of wood products. Focus on defensible space program Secure matching grants to provide financial assistance to those private landowners in need for reducing fire risk on their properties Secure grant funding to purchase community chipper. Develop hourly use rates to cover replacement cost and yearly maintenance cost	Acres	Collaborative effort between Fire District 8, WDNR, USFS, Forest Land stakeholders, and private land owners	Cascadia, builders, residents			Before
Coordinate resilient landscape work among agencies, across jurisdictions and ownership	Concentrate USFS, WDNR, WDFW and BLM vegetation management work in areas adjacent to private landowners. Work cooperatively starting in greatest hazard areas		ALL	All			Before

Table 6.12. Zone F Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Coordinate with adjacent property owners to increase project effectiveness and scope where appropriate Promote RX Fire use in planning area, and collaboratively among jurisdictions						
Encourage and assist planning area residents to implement defensible space/ fuels reduction	Utilize existing community assistance programs Develop a list of hazardous fuel treatment contractors and forestry consultants Coordinate volunteer opportunities Enhance agency outreach efforts for effective public involvement in proposed vegetation treatment analysis areas	Number of structures treated, Number of volunteer hours tracked	CCFD8, DNR, Cascadia	City of Entiat, USFS,			Before
Mitigate potential losses of critical infrastructure to wildfire	Identify and map vulnerable infrastructure Develop mitigation strategies	Planning area map and strategy	CCPUD	All			Before

Table 6.12. Zone F Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Coordinate hazardous fuel treatment projects between private landowners, state and federal land managers	Coordinate, at a minimum, annual discussion regarding hazardous fuel treatment programs with Forest Service, WDNR, and Fire District 8, landowners where appropriate on cross boundary projects Create a wildland urban interface fuels reduction zone from Potato Creek to the United States Forest Service Boundary at mile marker 26. Treat fuels along Chelan County Road 51 and all residences creating a 150 foot fuels reduction zone. Chelan County Fire District 8, United States Forest Service, Washington State Department of Natural Resources and private land owners should work cooperatively to maximize available resources. Engage volunteer firefighters and WUI Assessment Zone leaders in identifying		Fire District Commissioners, Chelan Douglas Land Trust	USFS, DNR, WDFW, CCFD8, Cascadia,			

Table 6.12. Zone F Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	desirable cross-boundary projects						

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.13. Zone F Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Improve Fire District 8 Facilities	Update Stations 2, 3, and 4 in Fire District 8 located in the Entiat Valley.	Recruitment and retention rate Staffing	CCFD8 Commissioners and Officers	All			Before
Identify adequate Staging and Safety Zone Locations in the Entiat Valley	Identify possible locations for emergency response resources to stage during large wildland fire incidents and pre-identify possible safety zones.		Fire District 8 Chief and Officers				
Develop Emergency Water Storage	Identify possible locations for emergency water		CCFD8	All			Before

Table 6.13. Zone F Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	storage every five miles in the Entiat Valley						
Recruitment of Volunteer Firefighters	Do community outreach by planning, advertising and staging a public meeting with expressed purpose of increasing fire district membership.	Public Meeting	District 8 Commissioners, Chief and Asst. Chief				
Interagency Fire Training	Pursue wildfire training and skill development compliant with NFPA and NWCG standards Develop joint initial and extended attack exercise, with emphasis placed on unified command that utilizes resources from all three firefighting agencies	Training hours	CCFD8	Fire District 8 Chief and Asst Chief. USFS Columbia River Division Chief, WDNR Local Area Manager			Before
Increased Mapping Capability	GIS Data Layer needs to be developed in a cooperative effort with USFS and Chelan County Assessor's Office to utilize data from NFPA 1144 forms	Mapping Database Forms	CCFD8, USFS, Chelan County Assessor	All			Before
Develop Mobile Mapping Capability	Seek funding for computer and/or hard copy mapping capability for use in the field on wildland fires.	Equipment App	Fire District 8 Commissioners and Officers				

Table 6.13. Zone F Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Identify and Maintain Address Signs	Seek funding for and maintain address signage to identify residences.	Number of new address signs	Fire District 8 Commissioners and Officers in collaboration with private land owners.				
Management of Evacuation Routes	Reduce down fuels to less than 4 tons per acre within 100 feet of evacuation routes and manage standing vegetation to not support crown fire Post signs on all unmarked roadways (street name, road number, etc) All critical evacuation routes should remain open and maintained for safe travel by emergency response vehicles and by passenger cars evacuation the area.	Number of new postings	Chelan County, City of Entiat	CCFD8, Rivercom911, USFS, BLM, DNR, Longview Fibre			Before

Zone G - Lake Wenatchee

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.14. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
During non-emergent conditions, provide personnel that can assist in home assessments, fuel reduction, response planning and community outreach.	Secure funding for seasonal emergency response personnel during periods of increased response demands caused by wildfires	# Seasons Implemented	LWFR	WA DNR, Cascaida, LWFR Auxilary, Chelan CO	High		Before, During
Improve key evacuation routes	Improve and make available during emergencies a secondary egress route on Camp 12 Road that would serve over 400 residences. Assess and improve other evacuation routes as needed.	# of new egress routes opened	DNR, LWFR	Chelan Co, LWFAC, CWSC	High		Before
Improve early warning systems and notification platforms to advise both responders and the public to impending hazards or current situational updates.	Increase use of AlertSense, identify warning systems for emergencies including post-fire flooding	# of citizens signed up for AlertSense	Chelan Co EM	LWFR, Chelan Co Public Works, NWS, NRCS, Cascaida	High		Before, During, After

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.15. Zone G Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority Low, Medium, High	Action Taken	Before, During or After the Fire
Encourage a collaborative effort by both public and private entities to reduce fuels in the drainages above the Lake Wenatchee/Plain area.	Develop and coordinate a partnership group or extension of existing FAC or NCWFHC groups focused on All Lands, All Hands projects in the planning area	Acres Treated, Acres planned, funding secured	LWFR/Cascadia	NCWFHC, DNR, USFS, LWFAC, Firewise Communities, HOAs, Irrigation District, etc.	High		Before

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.16. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority Low, Medium, High	Action Taken	Before, During or After the Fire
Improve centrally located emergency operations center with apparatus and administrative facilities. This complex will also serve as a refuge for those citizens impacted by disasters.	Seek funding and acquire land to expand our Plain Area Station	% compete	LWFR	LWFR Auxiliary, Chelan County EM	High		Before, During, After

Table 6.16. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority Low, Medium, High	Action Taken	Before, During or After the Fire
Develop a collect, store, and share GIS Layered Map identifying water sources, evacuation routes, response zones and response plans with pre-identified areas of responsibilities.	Develop central database and data management system. Complete surveys and maintain data.	Complete/ Not complete	LWFR	Cascadia, Chelan CO, other Fire Districts, USFS, DNR, RiverComm , Chelan County EM	High		Before
Improve safe travel conditions imperative during evacuations and emergency response.	Reduce fuels within 100' of evacuation routes (dead standing, down vegetation, and thinning	# of road miles thinned	LWFR	Chelan CO Public Works, DOT, Cascaida, CWSC, Chelan County EM	High		Before
Increase capacity during emergencies	Institute a CERT like training program to involve local teams and citizens in assisting their local communities and neighborhoods during emergencies.	# of trained volunteers	LWFR	LWFR Auxiliary, LWFAC	High		Before, During
Improve reliability of power sources during emergencies	Provide alternate power sources to critical infrastructure during emergencies (fire stations, water distribution points and water treatment facilities.	% critical infrastructure with back-up power source	LWFR	Chelan Co EM, WA State EM, FEMA	High		Before

Table 6.16. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority Low, Medium, High	Action Taken	Before, During or After the Fire
Sustain and improve Rivercom Infastructure	Continue the buildout of the RiverCom infrastructure to ensure communications with emergency responders.		River Com, Chiefs Association	LWFR, Fire Districts, Fire Marshal	High		Before, During

Zone H- Leavenworth

Goal 1: Fire Adapted Communities

Utilize outreach, communication, and education to create a more resilient, fire adapted community.

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
Compile essential Firewise information and distribute it to landowners and businesses in and adjacent to the Leavenworth CWPP area. Target: • Residents • Second homes • Vacation rentals • Real estate agents • New homeowners	Compile information: Firewise Defensible Space Ready, Set, Go! Ember awareness Emergency Planning What to do in case of fire Develop targeted messaging. Identify funding Secure mailing list Mail	Number of landowners reached	CWSC	CWSC Cascadia CD WA DNR USFS Chamber BVBA Real estate Insurance Companies CCFD3	H		Before
Provide wildfire information to homeowners' association meetings.	Identify HOAs Determine Contacts Determine Schedule Provide information	Number of HOAs reached	CWSC, Cascadia CD	CCFD3 CWSC WA DNR NRCS	H		Before
Hold an annual Firewise workshop for all interested residents.	Network with Cascadia, WSU Extension, DNR Identify funding Recruit participants	Number of participants	CWSC	CWSC Cascadia CD NRCS WA DNR	H		Before

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
	Plan workshop Present workshop			WSU Extension CCFD3			
Maintain Firewise Community status in the Chumstick.	Hold Firewise Day Track in-kind contributions Report annually	Annual renewal	CWSC	Cascadia CD, WA DNR	H		Before
Pursue Firewise Community status in other neighborhoods within the CWPP.	Network with Cascadia Recruit neighborhood sparkplugs. Consider workshop introducing process.	Number of Firewise Communities recognized in Leavenworth CWPP area.	Landowner sparkplugs	Cascadia CD CWSC WA DNR	H		Before
Utilize Ready, Set, Go! Program materials in the CWPP area.	Report RSG! participation in AMS system. Consider applying for RSG! grant. Produce one publication for Chelan County as described in outreach meeting. Acquire additional materials for distribution.	Number RSG! guides distributed.	CCFD3	CWSC, CCFD3, WA DNR, Chelan County EMD	H		Before

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
	Encourage use of RSG! within Chelan County.						
Encourage homeowners to display addressing on visible signage.	Mail address order forms to all landowners within the Leavenworth Area CWPP.	Address signs ordered.	CCFD3	CCFD3, CWSC	H		Before
Conduct risk assessments of individual structures and essential infrastructure for the entire planning area and implement identified recommendations.	Secure funding, Identify assessors, Train assessors if needed Assess and compile Implement	# Structures Assessed.	TBD	CCFD3, CWSC, Cascadia WA DNR	H		Before
Provide prescribed and wildfire information at recreation stores and to the Chamber/BVBA in Leavenworth for seasonal visitors.	Develop distribution network, outreach strategy and messages. Partner with outdoor retailers (including those west of the Cascades) and recreation sites (Stevens Pass, Lake Wenatchee State Park) to share prescribed fire information.	Number of stores participating.	CWSC	Chamber, BVBA, CWSC, USFS, Cascadia CD, Recreational Clubs, CCFD3	H		Before

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
Convene discussion of burn bans, campfire closures, burning decision makers in order to explore options for consistency and ease of use.	Meet with USFS, DNR, Chelan County Fire protection districts. Determine feasibility of incorporated/unified closures.		Fire Chiefs	USFS, DNR, CCFDs, WA Dept. Ecology	M		Before
Annual emergency planning workshop for businesses.	Utilize FEMA curriculum. Recruit businesses. Hold workshop.	Number of attendees.	CWSC	Chamber, BVBA, CWSC Chelan Co. DEM, Insurance Companies, WA EMD, Business Owners, NCW EDD, NGO's, WA Dept. of Commerce	H		Before
Implement mitigation measures from Business Resilience Framework in Appendix A.	See Appendix A		TBD	Chamber, BVBA, CWSC Chelan Co. DEM, Insurance Companies,	H		Before

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
				WA EMD, Business Owners, NCW EDD, NGO's, WA Dept. of Commerce			
Participate in Forest Service and State Management policy issues during amendment processes to provide input to insure local land/home owner interest are considered.	Identify opportunities for input: Forest Plan revision, DNR 20-Year Strategic Plan		NCW Forest Health Collaborative CWSC	Cascadia CD, WA DNR, USFS	L		Before
Produce emergency evacuation route maps and provide that information to landowners.	Identify funding. Develop emergency evacuation route maps. Include emergency contact information. Consider evacuation drill. Mail.	Routes identified.	Chelan County DEM CCFD3	Chelan Co. Sheriff Chelan Co. DEM CCFD3	M		Before
Utilize media as a tool to promote forest restoration and community preparedness work.	Develop outreach strategy and messages. Share and promote the work of partners and homeowners. Partner with media outlets.	Press releases, PSA's, social media posts, TV	CWSC	CCFD3 NCW Forest Health Collaborative Cascadia CD	H		Before

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
				Washington Prescribed Fire Council DNR, USFS City of Leavenworth			
Work with the County planning department to get Firewise building materials information provided to developers and home builders during the permitting process.	Contact County. Produce information sheet. Acquire additional building materials information sheets. Distribute.	Agreement with County.	Chelan County Fire Marshall	CWSC, Forest Ridge, CCFD3, Fire Chiefs, Firewise Communities City and County Planners	M		Before
Develop burning regulation decision-tree for landowners to demystify current burning regulations.	Convene CCFD3, DNR, Ecology Develop outreach materials Distribute	Completed decision tree.	CWSC	USFS, WA DNR, Ecology, Cascadia CD, NRCS, CCFD3	M		Before
Encourage those with special needs to complete the Chelan County Special Needs Registry (a voluntary registration to provide extra assistance	Incorporate registry information into any available mailing.	Number of registrants.	Chelan Co DEM	USFS, WA DNR, CWSC, Cascadia CD, CCFD3	L		Before

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
during the event of an evacuation).							
Work with local businesses to promote availability of Firewise purchases (1/8" screening, Class A roofing, Firewise landscaping, etc).	Contact businesses. Publicize.	Number incentives offered.	CWSC	Chamber, BVBA, CWSC	L		Before
Provide prescribed fire information to business owners for distribution to visitors.	Develop distribution network, outreach strategy and messages. Create prescribed fire information card; place information cards in business core during prescribed burns. Encourage networking with Chamber and BVBA during prescribed burning. Partner with outdoor retailers (including those west of the Cascades) and recreation sites (Stevens Pass, Lake Wenatchee State	Number of businesses contacted.	IMT	CWSC, Chamber, USFS, BVBA, Cascadia CD, Civic Clubs, Recreational Clubs, Chelan-Douglas Health District, Cascade Medical Center, Firewise	H		During

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
	Park) to share prescribed fire information.			Communities, CCFD3			
Discourage the prevalence of inaccurate media reporting during an incident.	Develop key business messages for distribution to incoming Incident Management Teams. Discourage use of file footage during a current incident.	Messages developed and vetted.	Chamber, EMD	IMT, CWSC, Chamber, BVBA, CCFD3	H		During
Utilize existing billboard on highway and/or AM radio station to provide fire-related information such as fire danger level, burn ban regulations, prescribed fire notifications, informational messages or reminders (i.e. “No campfires”), and/or what to do if smoke or a fire is detected (i.e. “report signs of smoke or fire immediately Call 911”)	Contact WSDOT Determine costs/protocols Schedule billboard and/or Contact DOT re: possibility of AM station	Days in place	TBD	WA DOT, CWSC, USFS, WA DNR, Ecology, CCFD3	L		During

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
Implement mitigation measures from Business Resilience Framework in Appendix A.			TBD	See Before the Fire	H		During
Provide post-fire recovery information to residents, landowners and businesses.	Complete After the Fire toolkit Develop Community After the Fire Resource Guide. Distribute as necessary.	Toolkit completed.	CWSC	CWSC, NRCS, Cascadia, WAFAC, WA EMD, Chelan County DEM, NGO's, Firewise Communities, Neighborhood sparkplugs, Cascade Medical Center, CCFD3	H		Pre-Planning for Post-Recovery
Utilize a post-fire recovery strategy to encourage return of tourism.	Develop radio spots, Woody Goomsba ad and press releases pre-fire. Develop "menu" of post-fire options (e.g. "fire sale" on lodging or materials, community party for		Chamber	CWSC, Chamber, BVBA	M		Pre-Planning for Post-Recovery

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
	firefighters, etc.). Identify post-fire advertising sources.						
Implement mitigation measures from Business Resilience Framework in Appendix A.			TBD	See Before the Fire	H		Pre-Planning for Post-Recover y
Develop community and neighborhood long-term recovery strategies/plans.	Develop key partnerships with those who will serve on a long-term recovery group. Develop a community long-term recovery plan. Work with neighborhoods and Firewise communities to map assets and resources within their neighborhoods. Determine key leaders from neighborhoods who will be able to work with long-term recovery needs to serve as a conduit of information between leaders and	Long-term Recovery Plan is created. Long-term Recovery Group is formed. Community Organizations	TBD	WA EMD, Chelan County DEM, NGO's City of Leavenworth, Chelan County (Public Works and Planning), Firewise Communities, Churches, VOADs Community Foundation of NCW	H		Pre-Planning for Post-Recover y

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
	community members and share community needs with long-term recovery groups.			Cascade School District, Health related organizations WA Dept.Commerce NCW EDD, City and County Managers Elected Officials			
Develop and review business continuity and community infrastructure plans.	Develop key partnerships with community leaders, infrastructure mangers, key business owners. Develop and review continuity plans and resources.	Businesses have created continuity plans. Community leaders are familiar with and reviewed plans. Community leaders	TBD	Elected officials Government entities, Infrastructure managers, CWSC, NGO's, Businesses, WA EMD, Chelan County			Pre-Planning for Post-Recovery

Table 6.17. Zone G Fire Adapted Communities.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After Fire
		understand their role in post-fire recovery.		DEM, Housing Authority, NCW EDD, WA Dept. of Commerce, Business Owners, Cascade School District, Health related organizations			

Goal 2: Fire Resilient Landscapes

Create fire resilient landscapes through collaboration, fuel reduction, strategic fuels breaks and other treatments on public and private lands.

Table 6.18. Zone G Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Implement "Firewise" recommendations within 200 feet of all private homes and essential infrastructure.	Secure cost-share funding for landowners. Recruit landowner participation. Implement.	Acres treated	Landowner	CWSC, Cascadia, NRCS, WA DNR, CCFD3	H		Before
Create 200-foot wide fuel breaks on strategically located areas (such as the CWPP high priority areas) that will have the greatest benefit for the entire project area.	Identify priority areas. Secure funding. Recruit landowner participation. Implement.	Acres treated	USFS	USFS, CWSC, CCFD3	H		Before
Identify extreme hazard sites and work with landowners to reduce fuel loads of these sites to improve safety for an entire area (mouth of Spromberg Canyon).	Identify sites Prioritize sites Acquire funding Mitigate hazards	Number of sites mitigated	CWSC	USFS, WA DNR, CWSC, NRCS, Landowner, CCFD3	H		Before
Encourage the USFS to complete fuels reduction activities at the landscape scale with an emphasis of	Work with USFS to identify project areas. Facilitate collaboration during the planning process.	Acres treated	CWSC		H		Before

Table 6.18. Zone G Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
creating strategic fuel breaks that will enhance local fire suppression efforts and utilize "natural" fuel breaks where feasible (such as orchards, ridge tops, highways, rocky outcrops and irrigated pastures).	Facilitate landowner involvement. On a broader scale, work with USFS to incorporate socio-economic concerns into the Forest Restoration Strategy EMDS runs.						
Encourage the USFS to link future treatment areas (such as the lower Chiwawa area) to the area treated through the Chumstick Hazardous Fuel Reduction Environmental Assessment.	Work with USFS to identify project areas. Facilitate collaboration during the planning process. Facilitate landowner involvement.	Acres treated	CWSC	Plain community, CWSC, WA DNR, USFS, CCFD3, CCFD6/CCFD9	H		Before
Identify, develop and maintain safe areas, shelters, and staging locations.	Identify funding. Prioritize locations. Determine maintenance responsibilities and schedules.	Number of areas in place.	TBD	USFS, WA DNR, CCFD3, CWSC	H		Before
Investigate biomass conversion technology for opportunities to implement biomass utilization technology			Biomass Collaborative	Biomass Collaborative	H		Before

Table 6.18. Zone G Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
in the CWPP area and County wide as part of fuel reduction projects.							
Encourage residents in the CWPP area to dispose of brush generated through fuels reduction efforts via chipping.	Contact County Solid Waste Identify funds Schedule chipper and/or Work with DNR Landowner Assistance Recruit participants Distribute hourly tracking sheets Schedule chipper	Acres treated/participants in chipping program	CWSC	CWSC, WA DNR, NRCS, Cascadia, CCFD3	M		Before
Encourage the USFS to continue permitting sheep grazing allotments in the Chumstick Creek watershed and align grazing routes with strategic fuel breaks (such as ridge tops).	Contact USFS. Identify current grazing permits. Comment when/if necessary.	Acres of strategic importance grazed.	CWSC		M		Before
Request a waiver or special standard be established for fuel management in riparian setbacks.	Contact County and DNR. Identify areas for field review.	Process in place for landowners.	TBD		L		Before

Table 6.18. Zone G Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Work to determine viable solution.						
Work with Chelan County to modify Shoreline/Riparian restrictions to allow establishing defensible spaces around structures and along ingress/egress routes by trimming of shrubs, pruning ladder fuels and generally reducing the fuels loads.	Consider requesting that the County adopt WDNR Forest Practice Standards for fuels reduction projects in Shoreline/Riparian designated areas.	Standards in place	TBD		L		Before
Collaborate with USFS, NCWFHC, and scientists to determine a plan for post fire harvest	Identify researchers and partners who will be working on a post fire landscape and their roles. Understand the policy and framework in which all entities can work in a post fire environment. Identify key issues and barriers to post fire harvest. Identify areas where post fire harvest could be feasible.	Where feasible, harvest occurs following a fire.	TBD	TNC, USFS, WA DNR, NCWFHC, CWSC, Contractors	H		Pre-Planning for Post-Recover y

Table 6.18. Zone G Fire Resilient Landscapes.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Have agreements in place. --Considerations: flooding, soils, controlling sediment, aquatics/fish habitat projects, road stabilization (avoid building new road for restoration activities						
Work with private landowners to determine a plan for their lands in a post fire environment.	Identify strategies to help stabilize and recover the landscape. Incorporate strategies into individual forest and landscape management plans. Identify and share technical and financial assistance resources.		TBD	Cascadia CD, WA DNR, NRCS, CWSC	H		Pre-Planning for Post-Recovery

Goal 3: Response

Improve the response capabilities within the planning area.

Table 6.19. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
Provide wildfire information to business owners for distribution to visitors during wildfire season and wildfire incidents.	Create wildfire information card. Place IIO in business core during wildfire incidents. Encourage networking with Chamber and BVBA during prescribed burning.	Number of businesses contacted.	IMT	CWSC, Chamber, USFS, BVBA	H		Before
Address coordination needs to occur in a logical, sequential way (e.g. Eagle, Chumstick Creek, Mountain Home properties).	Standardize location of address signs. Contact person at Chelan County responsible for assigning addresses to assist and verify correct information. Standardize appearance of signs	Miles of roadway renumbered.	Chelan Co.	Chelan Co, CCFD3 Chelan DEM	H		Before
Develop evacuation warning systems and safe escape routes.	Mark exit routes on maps. Procure and install warning signs.	Evacuation routes marked/Contingency	Chelan Co DEM	CWSC, Chelan DEM, CCFD3, Chelan Co. Sherriff	H		Before

Table 6.19. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Contact radio station for possible help with emergency information. Make signs saying in case of emergency, tune your radio to KOHO.	communication plan in place.					
Complete fuel reduction along County roadways.	Prioritize roadways for fuel reduction activities (for better ingress/egress). Recruit landowners to participate in neighborhood ingress/egress projects (e.g. Icicle Island Club). Collaborate with County and landowners to implement. Work to maintain residential sense of place, aesthetics, privacy needs while allowing appropriate ingress/egress.	Miles of roadway treated.	TBD – Cascadia Conservation District?	CWSC, WA DNR, Chelan County Public Works, Landowners, CCFD3, Chelan Co. PUD	H		Before
Complete fuel reduction along primitive roadways. Many of the rural roads in the County and District are classified as primitive. These	Identify and prioritize primitive roadways for fuel reduction. Acquire funding.	Miles fuel reduction completed.		Cascadia Conservation District, Chelan County Public Works,	H		Before

Table 6.19. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
primitive roads can be steep, narrow, dead-ended, and seasonal or in some other way limit access to firefighting equipment.	Work with landowners and County to complete fuel reduction.			CWSC, Landowners, CCFD3, Chelan Co. PUD, USFS, WA DNR			
Develop evacuation plan for the downtown core.	Develop plan. Distribute plan. Practice plan.	Evacuation plan in place for downtown core.	TBD	City Chamber, BVBA, Chelan Co. DEM, CCFD3, Business owners	H		Before
Develop area "pre-attack plan."	Work with USFS/CCFD3/DNR to gather existing data. Acquire GIS funding. Produce and vet plan.	Complete	CCFD3	CWSC, USFS, WA DNR Chelan County DEM	H		Before
Develop water sources for firefighting efforts.	Use USFS Fire Atlas to identify water sources in the CWPP planning area. Locate sites to install 5,000 to 10,000 gallon water storage tanks to provide additional water.	Gallons capacity added.	CCFD3	CCFD3, WA DNR, USFS, CWSC, Landowners	M		Before

Table 6.19. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
	Improve additional drafting sites. Pursue funding for sites previously identified: Eagle Creek (2 sites), Merry Canyon (2 sites) and Chumstick (3 sites). Locate additional site(s) on Mountain Home Road.						
Inform the residents on the level of service they should expect.	Identify landowners in "no man's land." Notify landowners of location and expected service.	Landowners contacted.	CCFD3	CCFD3, CWSC, Cascadia Conservation District, USFS, DNR	M		Before
Work to accommodate the many special circumstances found on primitive roads in the Leavenworth area including seasonal contracts.	Contact landowners on primitive roadways. Identify options for fire service (e.g. seasonal contracts, safe zones, turnarounds).	Landowners contacted.	CCFD3	CCFD3, Landowners	L		Before
Develop uniformity of all road signs and install signs (evacuation route, road names/numbers, Fire danger,	Work with County and USFS to identify needs. Prioritize signs for replacement/installation	Road signs installed.	TBD	Chelan Co, CCFD3, CWSC	L		Before

Table 6.19. Zone G Response.

Objective	Key Activities	Measure	Coordinator	Partners	Priority	Action Taken	Before, During or After the Fire
etc.) at strategic location. Sign design will meet County and State (if appropriate) requirements.							
Develop a plan for neighborhoods outside the Fire District.	Develop clear, well defined procedure for neighborhoods in outside the Fire District to apply for inclusion. Distribute.	Plan completed.	CCFD3	CCFD3, CWSC, WA DNR, Cascadia Conservation District	L		Before
Identify draft points during an incident and communicate those locations to the City of Leavenworth to ensure consistent water monitoring.	Identify points. Determine point of contact.	Locations identified.	IMT/City	City, CCFD3, IMT, USFS, WA DNR	L		During

Zone X - State and Federal

To maximize the efficiency of fuels reduction work on private land, it is desirable for complimentary projects to take place on adjacent federally managed lands. This will be accomplished by identifying areas of concern to private landowners in the Zone and providing feedback to the federal partners. The CWPP is recognized as the instrument necessary to organize, educate and assist the public with the identification of projects that address wildfire concerns.

There are three main categories of mitigation actions identified by the community. Categories include fuels reduction, education and outreach, and fire prevention and suppression in the planning area. Recommendations are organized into categories and are listed in order of priority.

Fuels Reduction

- Reduce fuel loads and hazard trees at a minimum of 100' from center line of all roads and driveways so that they can serve as emergency evacuation routes.
- Continue to encourage homeowners to reduce fuels and implement FireWise recommendations 200 feet around homes and structures.
- Encourage the federal agencies to continue current fuels reduction activities at the landscape scale with an emphasis of restoration of a low intensity fire regime and the creation and maintenance of strategic fuel breaks that will enhance local fire suppression efforts and utilize "natural" fuel breaks where feasible (such as ridge tops, rock outcrops and roads).
- Remove old unoccupied, unused federal shacks/buildings in the Zone.

Education and Outreach

- Participate with federal agencies fuels reduction efforts. Community members will work with the agencies to pursue fuels treatments on lands federally managed that complement fuels reduction efforts on adjacent private lands. Public lands nearest to private property should have the highest priority for fuels reduction efforts.
- Opportunities to incorporate cooperative agreements should be pursued.

Improving Protection Capabilities/Human Safety

- Reopen and maintain critical roads for access during fuels reduction, initial attack and suppression, and/or emergency evacuation.
- Secure and make available structure fire protection materials to homeowners. Including, but not limited to foam and/or house wrap.
- Encourage property owners outside of a Fire Protection District to explore being annexed into existing FPD.

- Coordinate with local contractors for the transportation of personnel and equipment during major fire events. Inventory location of local private and public resources and document compatibility for use during fire events.
- Work cooperatively with the federal agencies and Chelan County Sheriff's Department to establish an evacuation and structure protection plan and make available to landowners and visitors.
- Evaluate opportunities of re-establishing access into historic and surveyed roads for safety and firefighting purposes.

Potential Project Areas

In addition to the individual Zone Mitigation Action Plans, the following project areas were identified using the Risk Assessment data developed by the CPAW project and the WUI designation developed by the Planning Team. Project areas were selected in WUI areas that had a 'Very High' classification of the risk assessment. Priority was given to areas with high density improvements/structures. The entire potential project areas identified on the potential project map may not need treated, they are merely a starting point for land managers on where to focus. These identified potential project areas will be assessed at a smaller scale once funding becomes available. Treatments within the identified potential project areas will be site specific, but will likely include homeowner education, creation of a wildfire defensible space around structures, fuels reduction, and access corridor improvements. All work on private property would be performed with consent of, and in cooperation with the property owners. Specific site conditions may call for other types of fuels reduction and fire mitigation techniques as well. Defensible space projects may include but are not limited to commercial or pre-commercial thinning, pruning, brush removal, chipping, prescribed burning, installation of greenbelts or shaded fuel breaks, and general forest and range health improvements.

The planning team does not want to restrict funding to only those projects that are high priority because what may be a high priority for a specific community may not be a high priority at the county or agency level. Regardless, the project may be just what the community needs to mitigate disaster. The flexibility to fund a variety of diverse projects based on varying criteria, landowner participation, and available dollars is a necessity for a functional mitigation program at the county and community level.

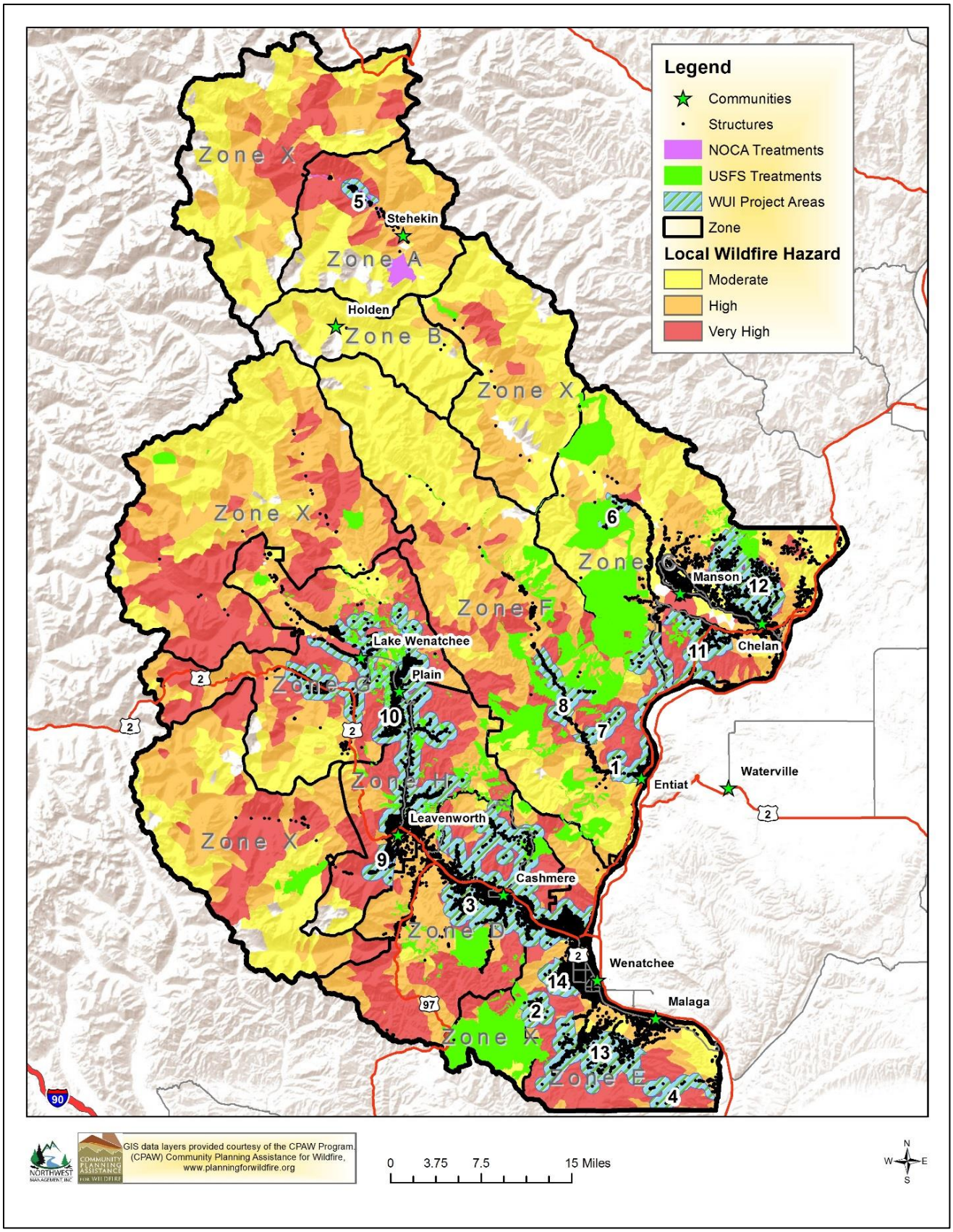
The Washington Department of Natural Resources, Bureau of Land Management, Conservation District, and/or individual Fire Protection Agencies may take the lead on implementation of many of these projects; however, project boundaries were purposely drawn without regard to land ownership in order to capture the full breadth of the potential wildland fire risk. Coordination and participation by numerous landowners will be required for the successful implementation of the identified projects. A map of the Potential Project Areas is included in Appendix 1.

Table 6.20. Potential 5- Year Project Areas.

Map Id#	Zone	Project Name	Project Type	Structures	Acres	Priority Ranking
1	F	Entiat	Defensible Space, Hazardous Fuel Reduction	755	5,517	Very High
2	E	Number 1/Number 2 Canyons	Defensible Space	36	4,345	Very High
3	D	Mission Creek/Nahahum Canyon	Defensible Space, Hazardous Fuels Reduction	5,661	48,372	Very High
4	E	Colockum Creek	Defensible Space	25	5,957	Very High
5	A	Upper Stehekin	Defensible Space, Hazardous Fuel Reduction	94	2,690	Very High
6	C	Twenty-five Mile Creek	Defensible Space, Access Improvement	75	3,418	Very High
7	F	Crum Canyon	Defensible Space, Access Improvement and Fuel Breaks	63	3,900	Very High
8	F	Mud Creek/Potato Creek	Defensible Space, Access Improvement and Fuel Breaks	202	8,369	Very High
9	H	Icicle Road	Defensible Space	439	3,859	Very High
10	G/H	Lake Wenatchee/Chumstick	Defensible Space	5,553	59,540	Very High
11	C	South Shore	Defensible Space, Access Improvement and Fuel Breaks	802	19,202	Very High
12	C	Grade Creek/Ivan Mores Road	Defensible Space, Access Improvement and Fuel Breaks	1,769	19,151	Very High
13	E	Wenatchee Heights/Squilchuck	Defensible Space and Fuel Breaks	614	19,705	Very High
14	E	Upper Canyon	Defensible Space, Access Improvement	1,429	4,683	Very High

An overall map of these project areas is depicted in figure 6.1. Individual Zone projects can be found in Appendix 1.

Figure 6.1. Map of Proposed Projects.



Regional Land Management Recommendations

Wildfires will continue to ignite and burn depending on the weather conditions and other factors enumerated earlier. However, active land management that modifies fuels, promotes healthy shrubland and grassland conditions, and promotes the use of natural resources (consumptive and non-consumptive) will ensure that these lands have value to society and the local region. The Washington DNR, Washington Department of Fish and Wildlife Service, BLM, USFS, private forest landowners, and all other landowners in the region should be encouraged to actively manage their wildland-urban interface lands in a manner consistent with reducing fuels and wildfire risks.

Control Invasive Weeds

Non-native or invasive plants have been spreading across the western United States since Euro-Americans began settling the region. With the aid of grazing livestock and human disturbance, some non-native species have spread over vast areas and can out-compete many native species. This change in vegetation regime often comes with secondary impacts such as an increase fire frequency or fire intensity, as well as many other impacts.

There are many methods that can be utilized to control non-native species from spreading. The size of the outbreak and the species involved will determine the most effective method to control the outbreak. Small outbreaks of non-native plants can often be pulled by hand and disposed of before the plant goes to seed. Mowing, spraying, and even biological (insect) methods can be employed to control larger outbreaks. Regardless of the method, timing is often very important, and a quality plan will ensure the treatment is successful.

Control Insects and Disease

Insects and diseases have been a common occurrence within forests and shrublands throughout the western U.S. for millennia. In the past, these impacts generally occurred in specific locations and would eventually 'run their course', often benefiting the ecosystem by creating natural openings in the forest. Currently, our forests are unhealthy due to a variety of reasons and are subject to outbreaks of insect and/or disease over much larger areas than historically normal. These large outbreaks lead to severe impacts because it leaves the forest susceptible to stand replacing wildland fires.

Having a healthy forest or shrubland is the first, and most effective, step in combating the effect of insect or disease outbreaks. Insecticide can be sprayed over affected areas to eradicate

harmful insects. Pheromones can be used, on a smaller scale, to deter certain species of insects from attacking an individual tree.

Thin Shrublands

Many of the shrublands throughout the western U.S. have become overstocked and stagnant. There are numerous reasons to explain why this is, but regardless of the reason, it is widely accepted that some management is required. Overstocking leads to numerous other health issues including susceptibility to insects, disease, and drought.

A suitable spacing for shrubs is selected to reduce the ability of fire to spread between shrubs. The shrubs are cut by hand or with a machine and mulched or piled for burning. The result is a stand of shrubs that is less dense which allows the remaining shrubs to have access to more resources (water, sunlight, and nutrients) than there was pre-thinning, creating a healthier ecosystem that is more resistant to insect and disease outbreaks.

Reintroduce Fire to the Ecosystem

Fire has been removed from the system for several decades because it was once seen as destroyer of our nation's natural resources.[51] This exclusion has resulted in an unnatural build-up of fuel that, when fire does occur, has higher potential to be a stand replacing event.[52] The lack of wildland fires has also changed the species composition that historically occurred in many areas by allowing fire intolerant species to dominate or co-dominate the canopy.

Reintroducing wildland fire can be accomplished in multiple ways. The first and most obvious is to simply conduct prescribed burns. Another way is to manually collect downed woody debris and either removing it from the site or to pile it for burning. Chipping or mulching is yet another method that mimics the effects of fire by reducing large amounts of fuel into small chips that decompose more rapidly than a large diameter log would. These are just a few suggestions of how to reintroduce fire or mimic the effects of fire.

Targeted Livestock Grazing

Livestock grazing, particularly cattle, has been a long-standing tradition in the rangelands of central Washington. Historically, ranchers were able to make agreements with state and federal land managers to expand their grazing operations on public ground for mutual benefit. In the last 30 years, this practice has been limited due to liability issues, environmental concerns, and

[51] Pyne SJ (1982) Fire in America: A cultural History of Wildland and Rural Fire (Cycle of Fire). Seattle: University of Washington Press.
[52] Dennis C. Odion, Et. Al. 2014. Examining Historical and Current Mixed-Severity Fire Regimes in Ponderosa Pine and Mixed-Conifer Forests of Western North America. DOI: 10.1371/journal.pone.0087852.

"Today, livestock grazing is being rediscovered and honed as a viable and effective tool to address contemporary vegetation management challenges, like controlling invasive exotic weeds, reducing fire risk in the wildland-urban interface, and finding chemical-free ways to control weeds in organic agriculture." [43]

litigation. Additionally, where federal grazing allotments are still available, the restrictions on timing are often inappropriate and/or too inflexible for the objectives of reducing fuel loads (i.e. wildfire risk), eradicating noxious and invasive species, and restoring native grass and sagebrush communities.

Most rangeland ecologists agree that in ***site-specific*** situations, livestock can be used as a tool to lower fire risk by reducing the amount, height, and distribution of fuel. Livestock can also be used to manage invasive weeds in some cases and even to improve wildlife habitat.

Targeted grazing can indeed reduce the amount, height, and distribution of fuel on a specific rangeland area, potentially decreasing the spread and size of wildfires under normal burning conditions. By definition, "Targeted grazing is the application of a specific kind of livestock at a determined season, duration, and intensity to accomplish defined vegetation or landscape goals."[53]

There are many factors to consider regarding the use of livestock for reducing the amount, height, and continuity of herbaceous cover (especially cheatgrass) in site-specific situations:

- During the spring, cheatgrass is palatable and high in nutritional value before the seed hardens. Repeated intensive grazing (two or three times) at select locations during early growth can reduce the seed crop that year, as well as the standing biomass. In areas where desirable perennial species are also present, the intensive grazing of cheatgrass must be balanced with the growth needs of desired plants that managers and producers want to increase.

- Late fall or winter grazing of cheatgrass-dominated areas, complemented with protein supplement for livestock, should also be considered. After the unpalatable seeds have all dropped, cheatgrass is a suitable source of energy, but low in protein. Strategic intensive

[53] Karen Launchbaugh, Walker, J. Targeted Grazing – A New Paradigm for Livestock Management. University of Idaho. Accessed online October, 2014 at: http://www.webpages.uidaho.edu/rx-grazing/handbook/Chapter_1_Targeted_Grazing.pdf.

grazing of key areas can reduce carry-over biomass that would provide fuel during the next fire season. Late fall grazing can also target any fall-germinating cheatgrass before winter dormancy, thus reducing the vigor of these plants the following spring. Fall/winter grazing when desirable perennial grasses are dormant and their seeds have already dropped, results in minimal impact to these species and therefore can be conducted with minimal adverse impact to rangeland health in many areas.

- The Bureau of Land Management (BLM) in some locations has an active "green-strip" program designed to reduce fire size and spread in key areas. Obviously, livestock can be used to maintain such green-strips to reduce the fine fuels (grasses) and control the spread of fire.
- The concept of "brown-strips" refers to areas where one or more treatments (prescribed fire, mechanical thinning, herbicide, and/or grazing) are used to reduce shrub cover, releasing the native perennial grasses. These grassy areas are preferred by cattle, which can then be grazed to reduce herbaceous fuels. This method leaves "brown-strips" when the stubble dries out in mid-summer, serving as fuel breaks to control the spread of wildfire. Where appropriate, protein-supplemented cows or sheep could be used to intensively graze and create brown-strips (e.g. along fences) to reduce the spread of fires during or after years of excess fuel build-up.
- Targeted grazing for the management of herbaceous fuels often requires a high level of livestock management, especially appropriate timing, as well as grazing intensity and frequency. In order to meet prescription specifications, operators often use herders, portable fencing, and/or dogs to ensure pastures are grazed to specification before the livestock are moved. Other expenses may include feed supplements, guardian dogs and/or night enclosures for protection from predators, water supply portability, mobile living quarters, and grazing animal transport. Targeted grazing is a business whose providers must earn a profit. Therefore, land management agencies need the option of contracting such jobs to willing producers and paying them for the ecosystem service rendered. This payment approach is already being implemented in some private and agency-managed areas to a limited extent, primarily for control of invasive perennial weeds. The use of and payment for prescription livestock grazing as a tool has substantial potential in the immediate and foreseeable future for managing vegetation in site-specific situations.

- In general, and less intensively, livestock can be used strategically by controlling the timing and duration of grazing in prioritized pastures where reduction of desirable perennial grass cover is needed for fire reduction purposes. Strategic locations could be grazed annually to reduce fuel loads and continuity at specific locations. Rotation of locations across years prevents overgrazing of any one area but confers the benefits of fuel load reductions to much larger landscapes. Even moderate grazing and trampling can reduce fuels and slow fire spread.[54]

Dormant season grazing of perennial grasses has also been reported to aid in seedling recruitment. Some seeds require scarification before they will germinate. That can be accomplished by passage through the digestive tract or by hoof action on the seed. Hoof action can also press the seed into the ground and compress the soil around it, i.e. preparing a beneficial seed bed. These processes can also reasonably be expected to provide some benefit to the exotic annual grasses. These grasses; however, appear to succeed very well without that assistance. One can speculate that the perennial grasses would demonstrate a greater response to these effects and thus would gain some edge in the struggle for dominance with the exotic annuals. If those annuals were also grazed in the early spring before the perennials started or during fall germination events, or both, it is likely the annuals would have less vigor and produce less seed which would detract from their ability to out compete the perennials.[55] While the exact details of how the perennials benefit from dormant season grazing are not fully understood, Agricultural Research Service research in Nevada has reported success in decreasing annual grass dominance.

"The role of grazing as a tool for fuel management is generally supported, but it should be cautiously evaluated on a case-by-case basis because fire potential is influenced by interactions among several ecosystem variables."[46]

"The role of grazing as a tool for fuel management is generally supported, but it should be cautiously evaluated on a case-by-case basis because fire potential is influenced by interactions

[54] McAdoo, Kent, et al. "Northeastern Nevada Wildfires 2006: Part 2 – Can Livestock Grazing be Used to Reduce Wildfires?" University of Nevada Cooperative Extension. Fact Sheet-07-21. Available online at http://www.unce.unr.edu/publications/files/nr/2007/fs0721.pdf. Accessed June 2011.

[55] Schmelzer, L., Perryman, B. L., Conley, K., Wuliji, T., Bruce, L. B., Piper, K. 2008. *"Fall grazing to reduce cheatgrass fuel loads"*. Society for Range Management 2008.

among several ecosystem variables."[56] Targeted grazing can reduce wildfire risk in specific areas. The targeted grazing strategies discussed above all require a very flexible adaptive management approach by both land management agencies and targeted grazing providers. Managers must determine objectives, then select and implement the appropriate livestock grazing prescription, monitor accomplishments, and adjust as needed.[57]

Livestock grazing is a more desirable tool for managing wildland fire risk on both private and public lands because it poses less risk than prescribed burning, is less expensive than chemical applications, can be managed effectively for the long-term, and it benefits a large sector of the local economy.

[56] Fuhlendorf, S. D., D. D. Briske, and F. E. Smeins. 2001. Herbaceaous vegetation change in variable rangeland environments: the relative contribution of grazing and climatic variability. Applied Vegetation Science 4: 177-188.

[57] McAdoo, Kent, et al. "Northeastern Nevada Wildfires 2006: Part 2 – Can Livestock Grazing be Used to Reduce Wildfires?" University of Nevada Cooperative Extension. Fact Sheet-07-21. Available online at http://www.unce.unr.edu/publications/files/nr/2007/fs0721.pdf. Accessed June 2011.

Appendices

Appendix 1 - Mapping Products

Northwest Management, Inc.

233 East Palouse River Dr.
P.O. Box 9748
Moscow, ID 83843
208-883-4488
www.Consulting-Foresters.com

The information on the following maps was derived from digital databases held by CPAW[19] Northwest Management, Inc. Care was taken in the creation of these maps, but all maps are provided "as is" with no warranty or guarantees. Northwest Management, Inc. cannot accept any responsibility for errors, omissions, or positional accuracy, and therefore, there are no warranties accompanying this product. Although information from land surveys may have been used in the creation of this product, in no way does this product represent or constitute a land survey. Users are cautioned to field verify information on this product before making any decisions.

Figure 7.1. Land Ownership Map

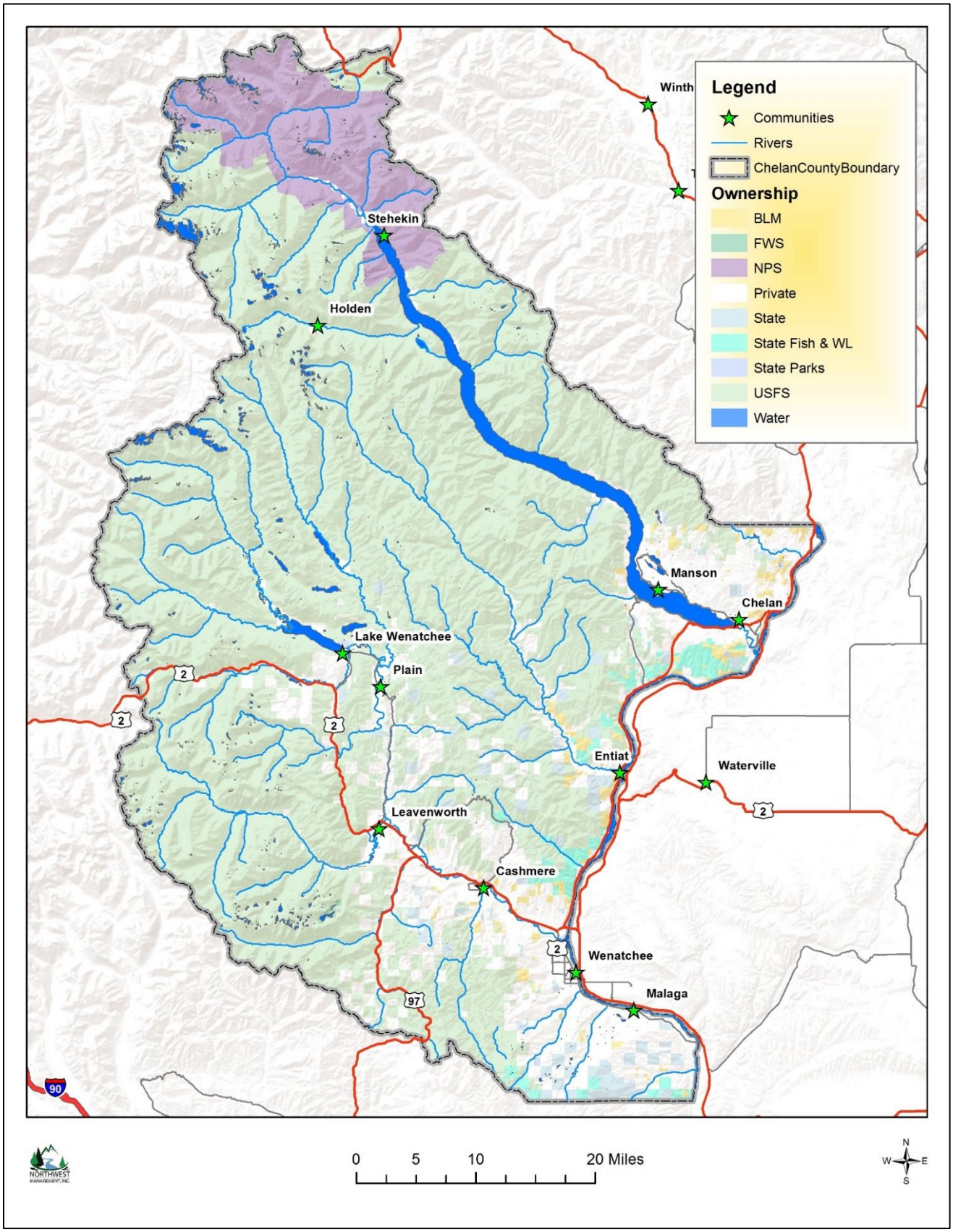


Figure 7.2. Aerial Imagery

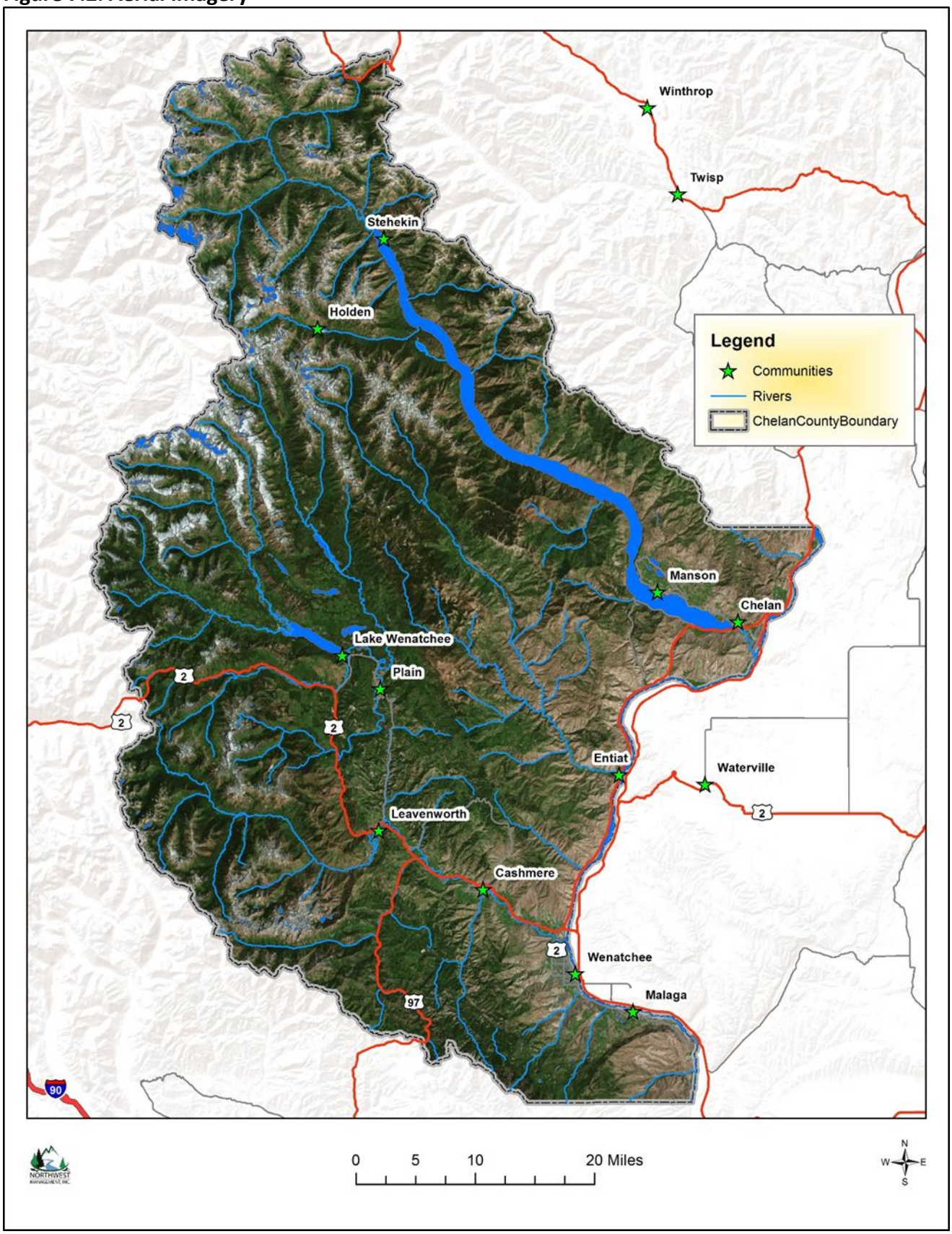


Figure 7.3. Fire Protection Boundary Map

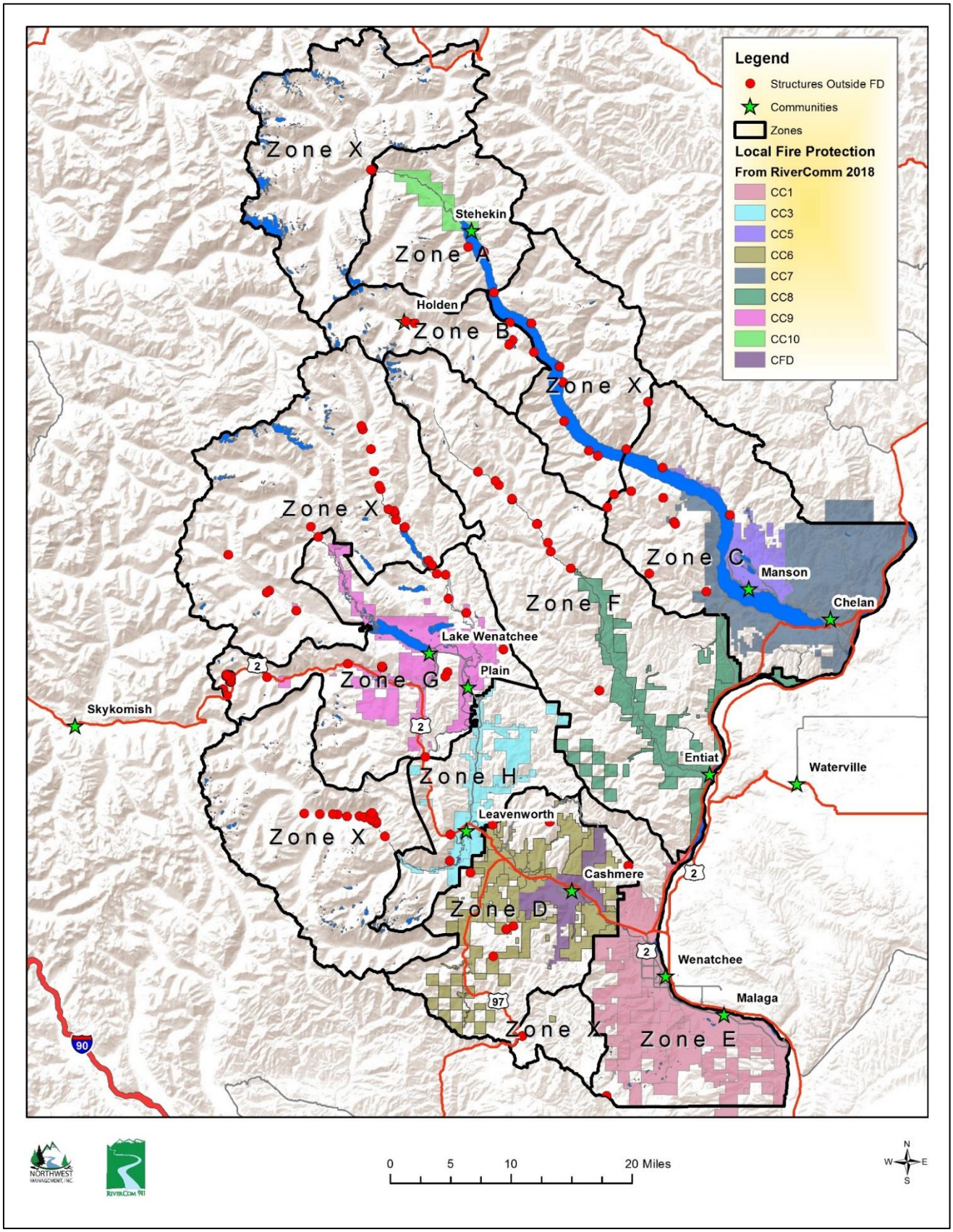


Figure 7.4. Historic Fire Regime Map

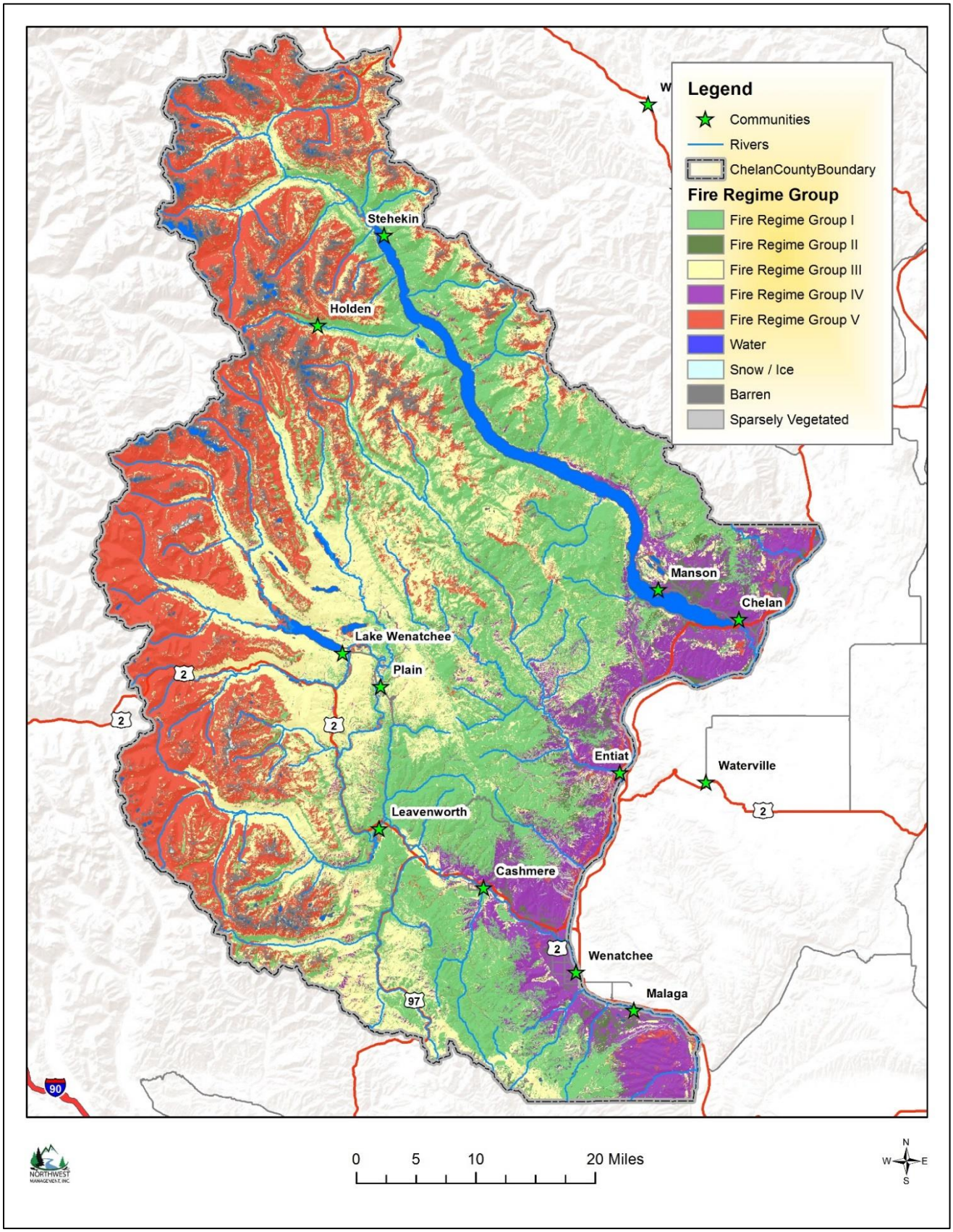


Figure 7.5. Fire Regime Condition Class Map

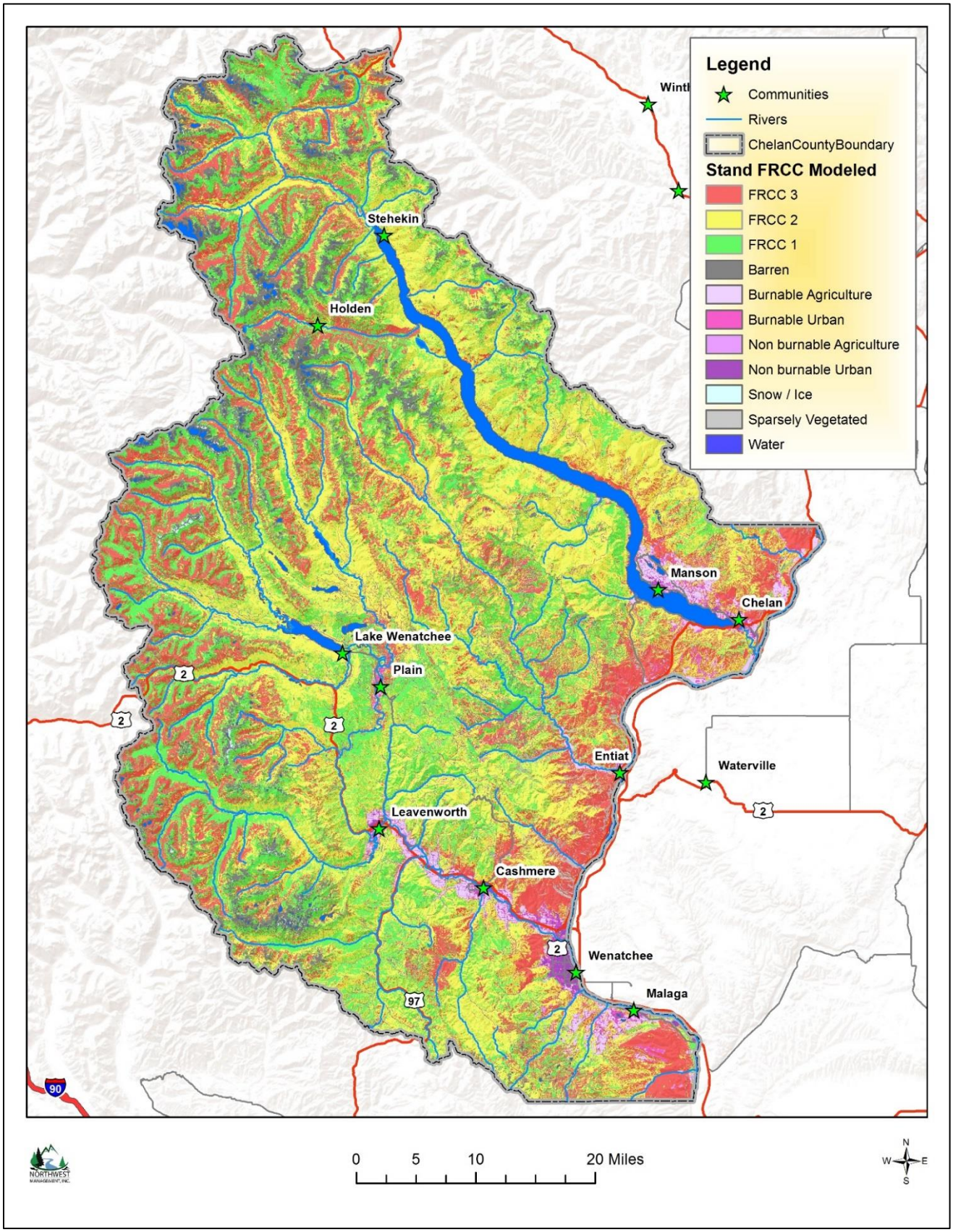


Figure 7.6. Wildland Urban Interface Map

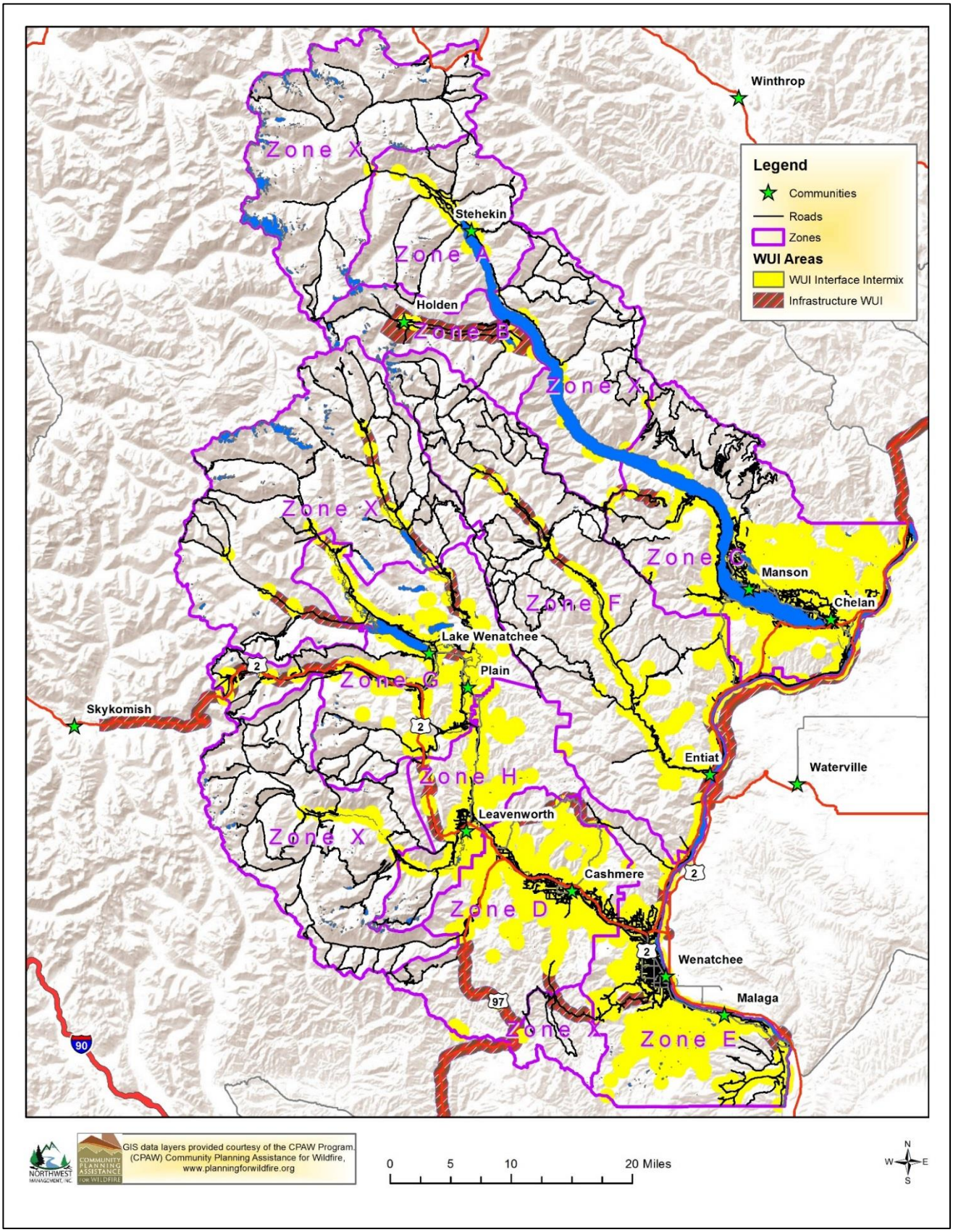


Figure 7.7. Local Wildfire Hazard Map

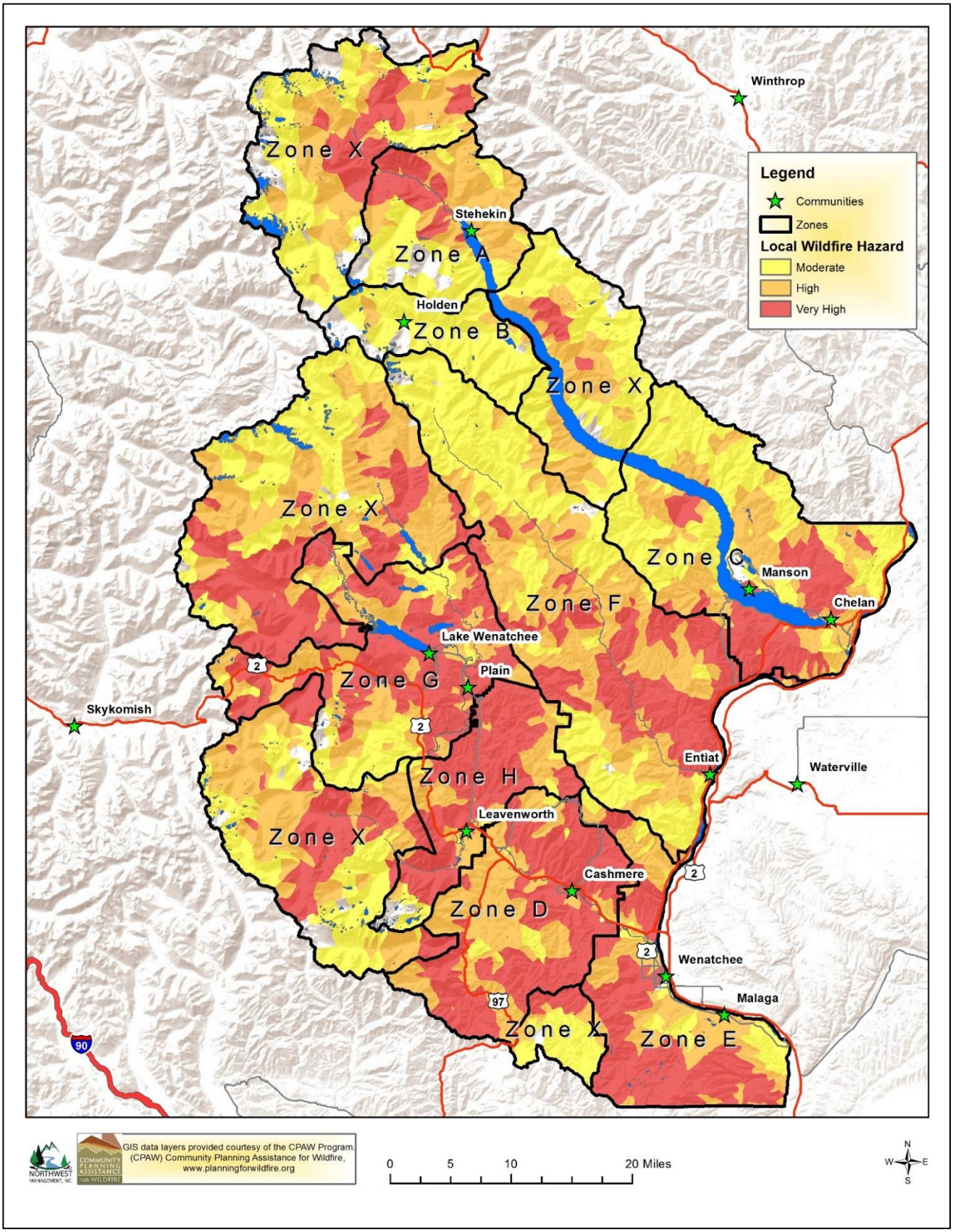


Figure 7.8. Landscape Wildfire Hazard Map

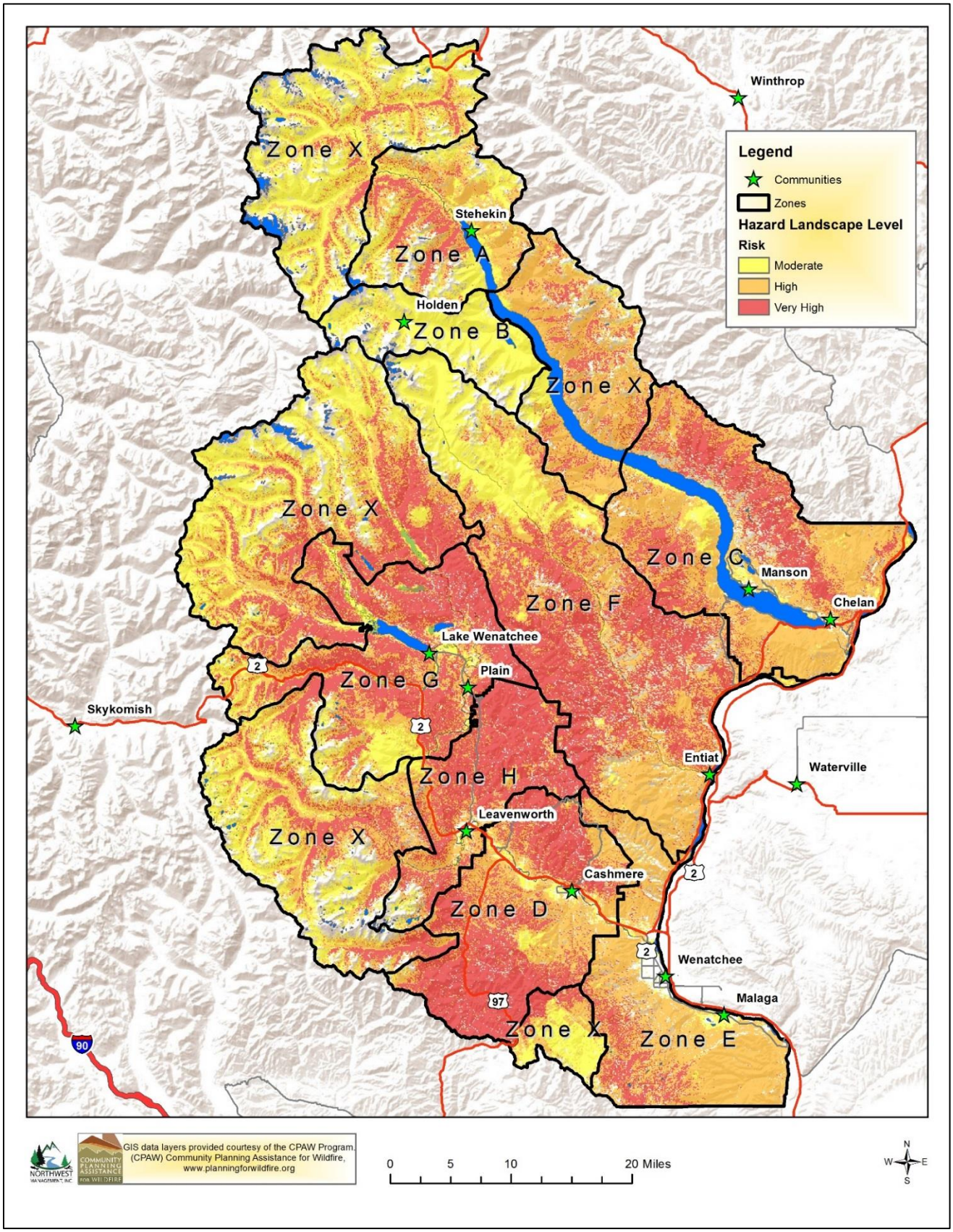


Figure 7.9. Proposed Projects

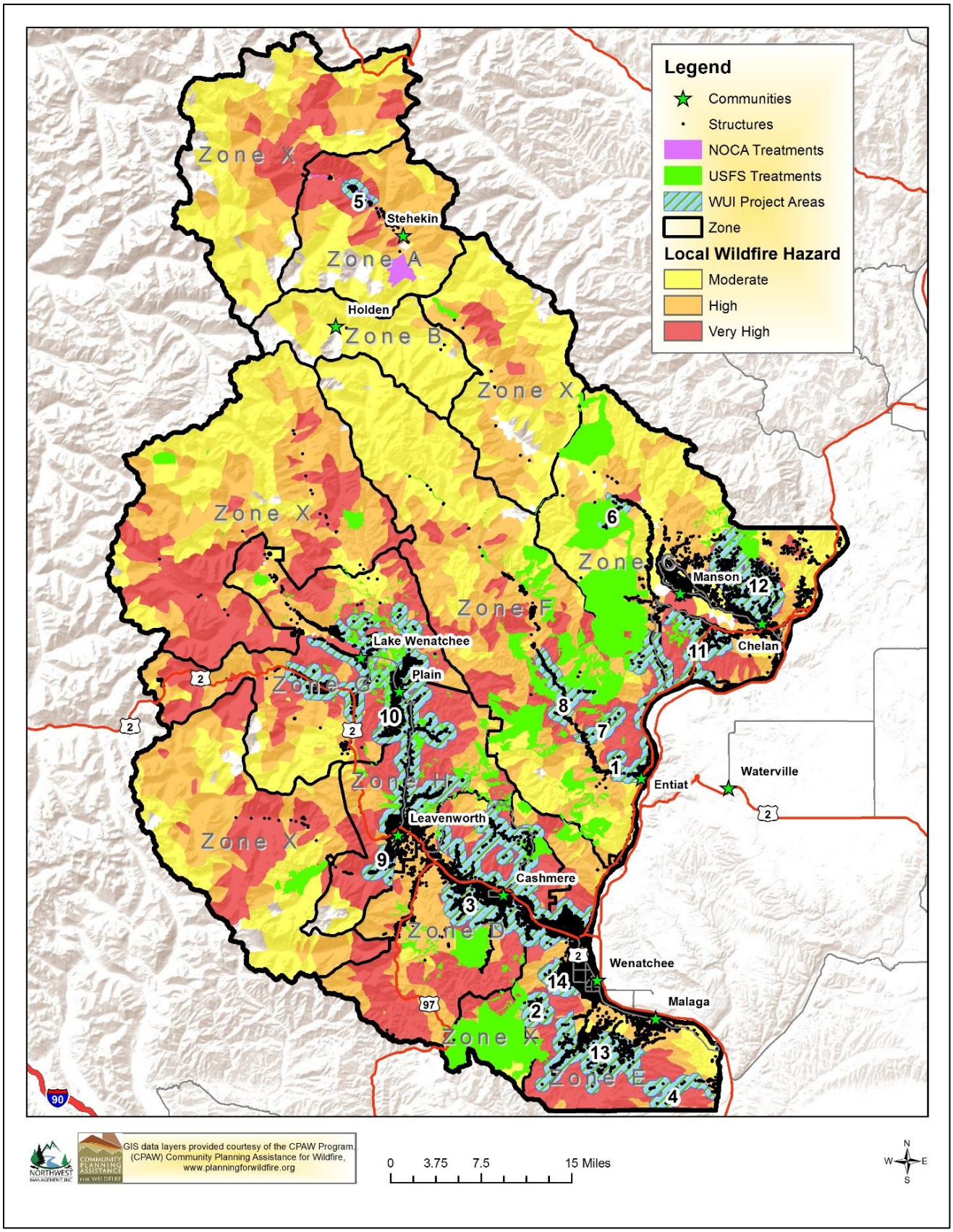


Figure 7.10. Zone A Project Areas.

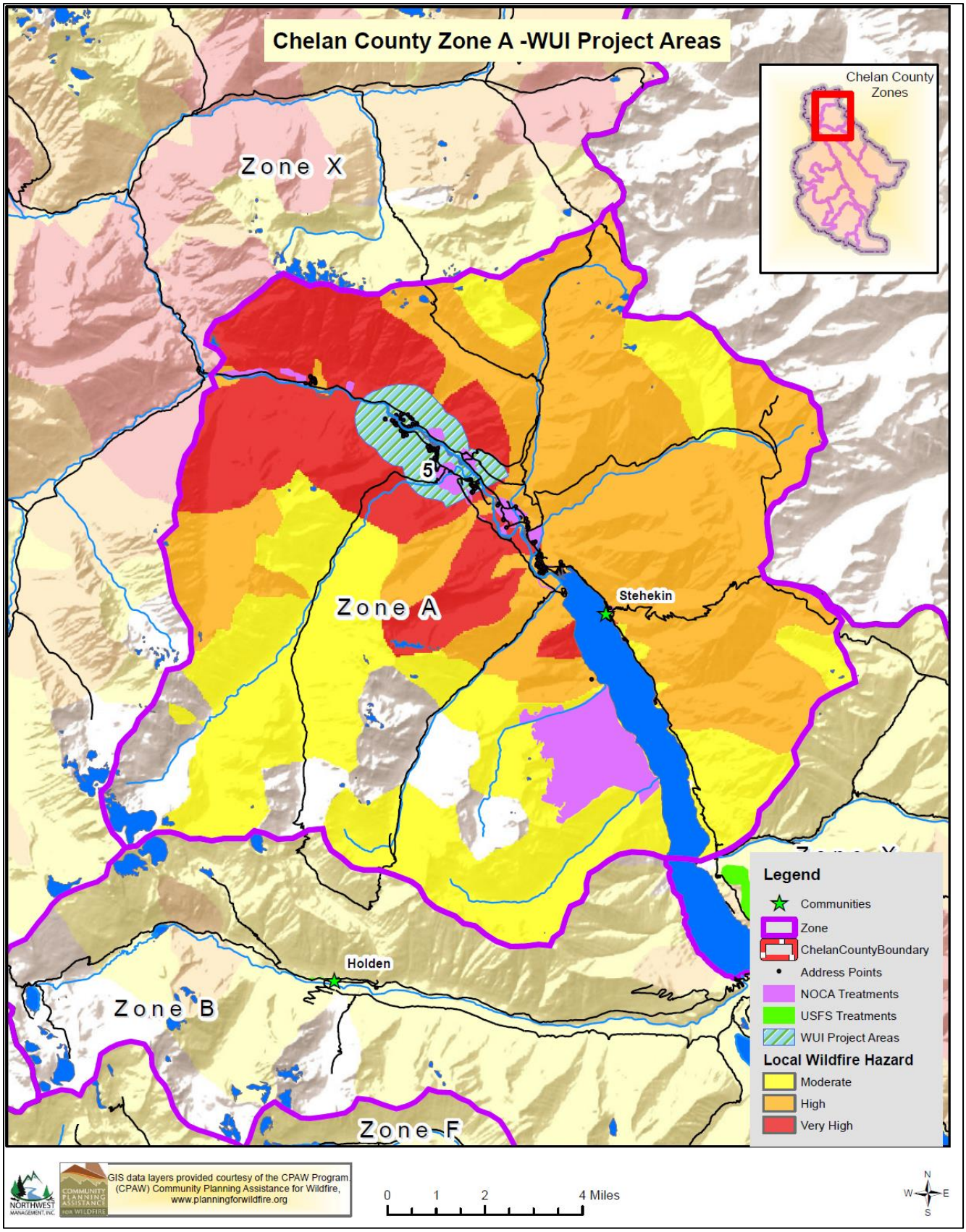


Figure 7.11. Zone C Project Areas.

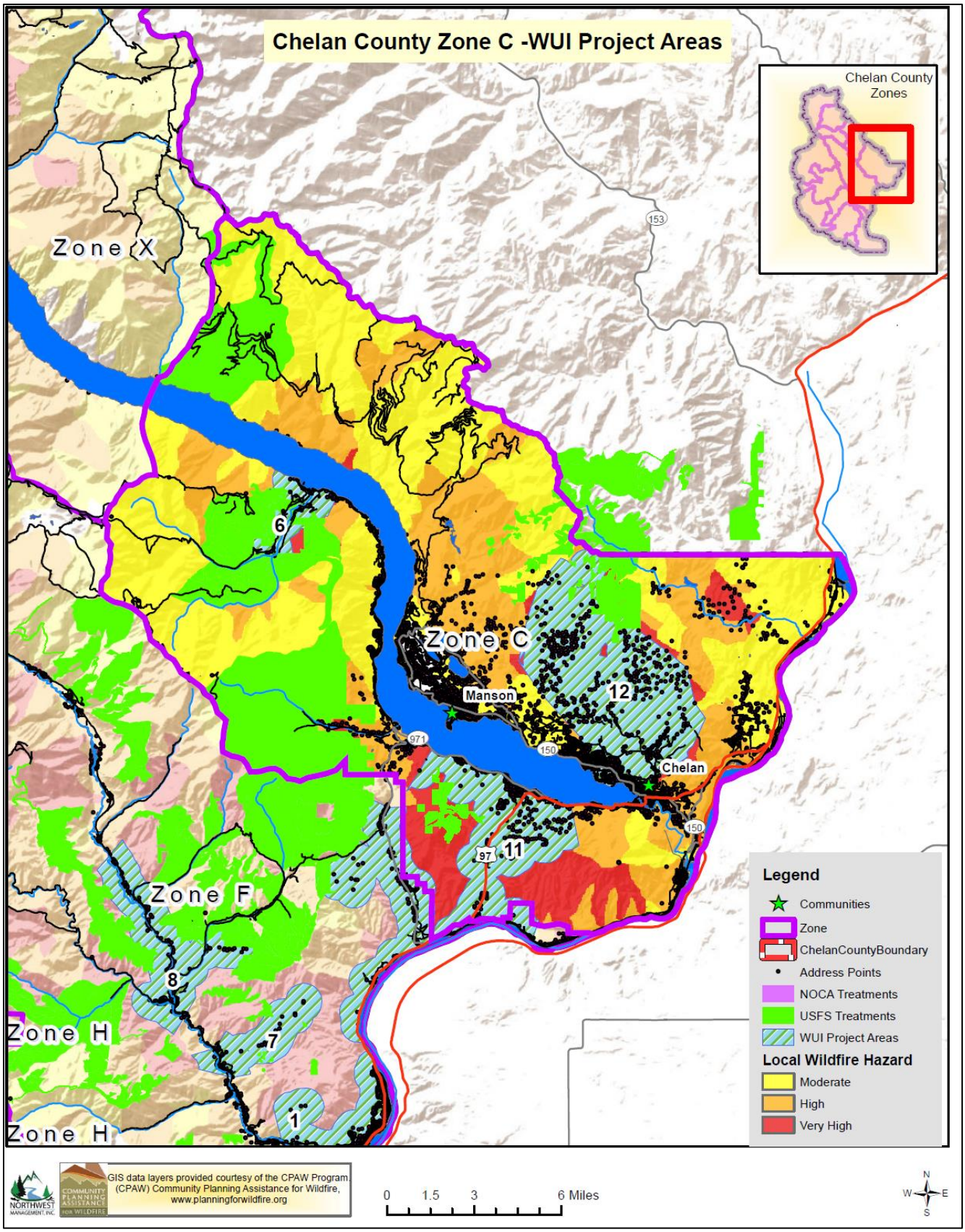


Figure 7.12. Zone D Project Areas.

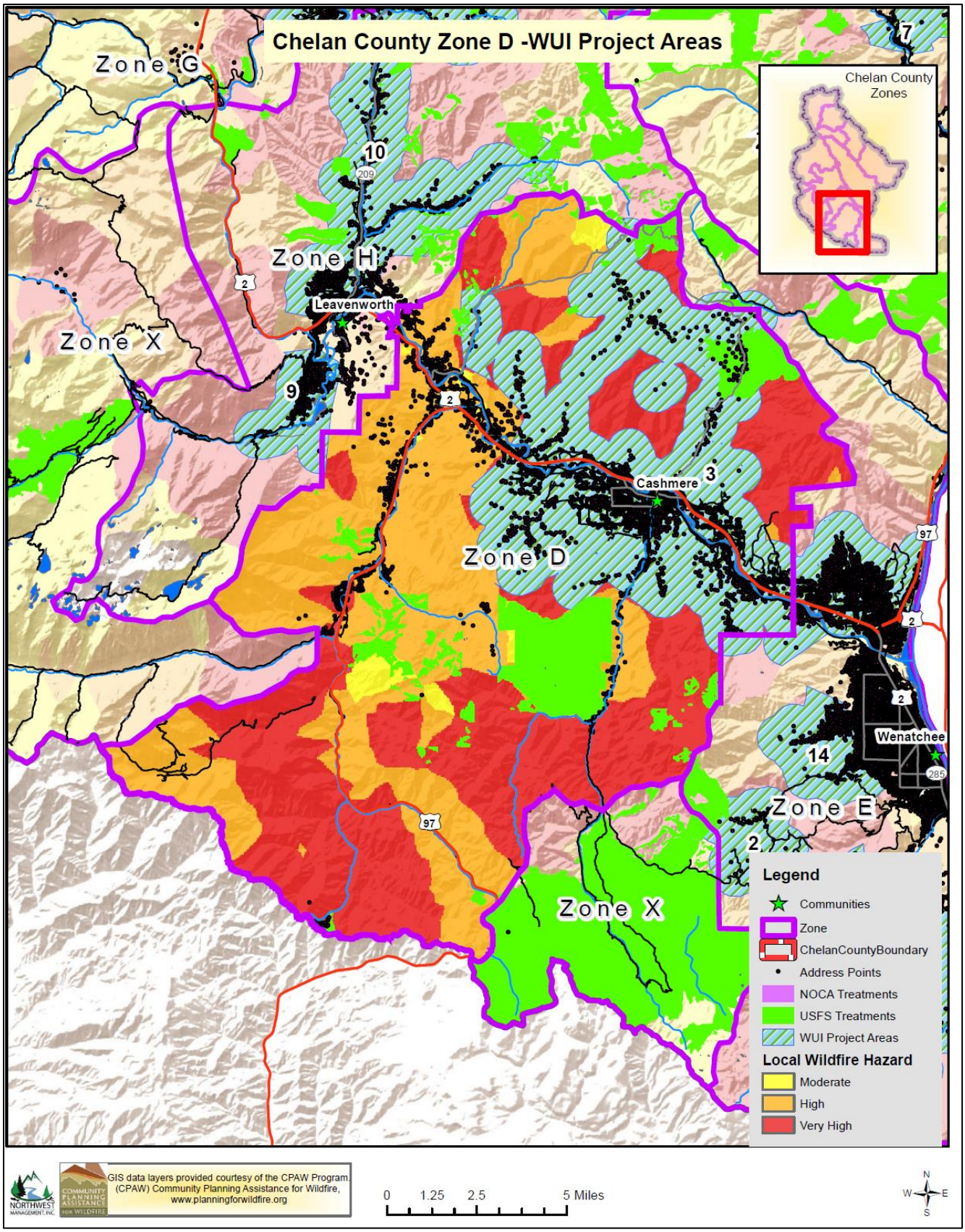


Figure 7.13. Zone E Project Areas.

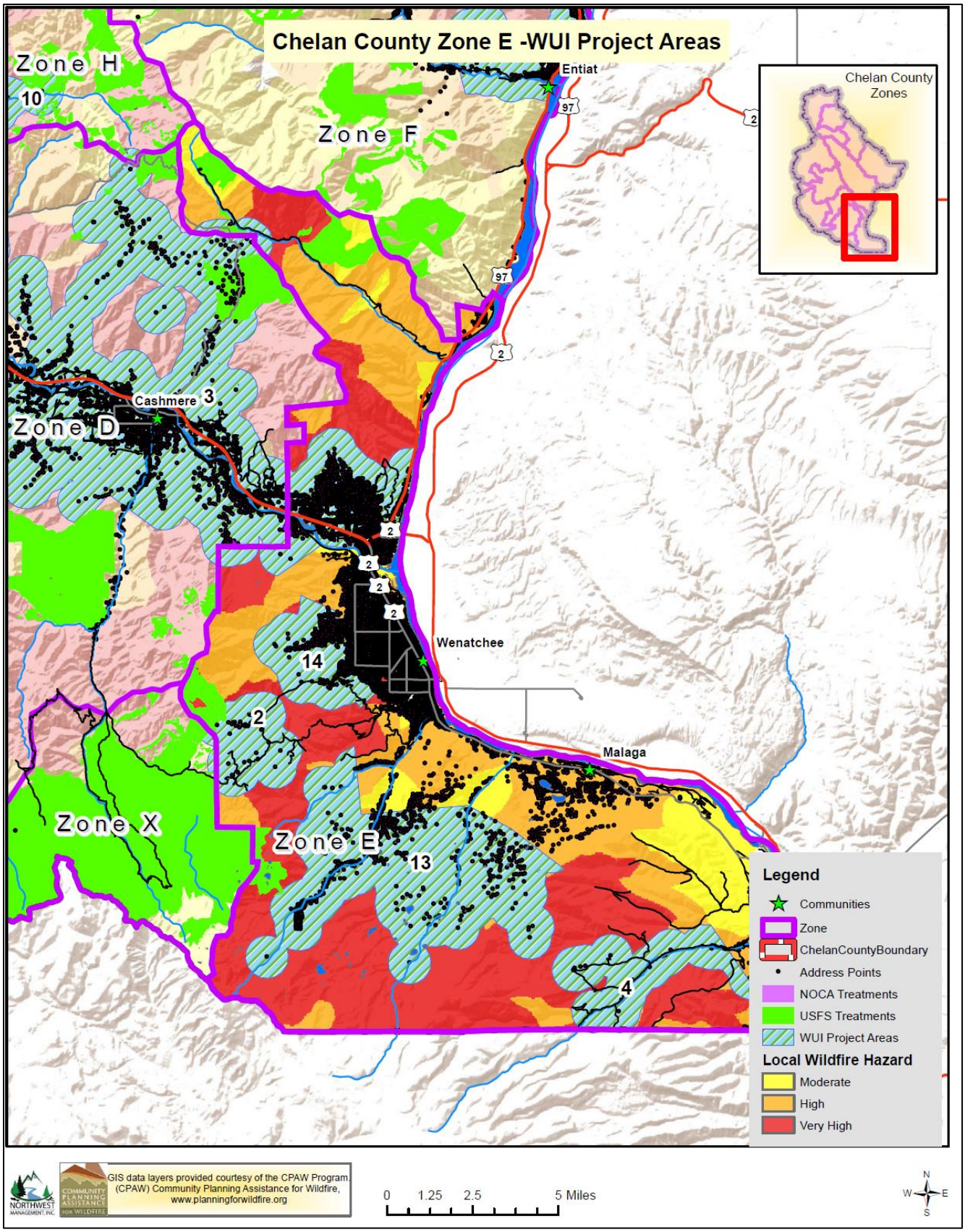


Figure 7.14. Zone F Project Areas.

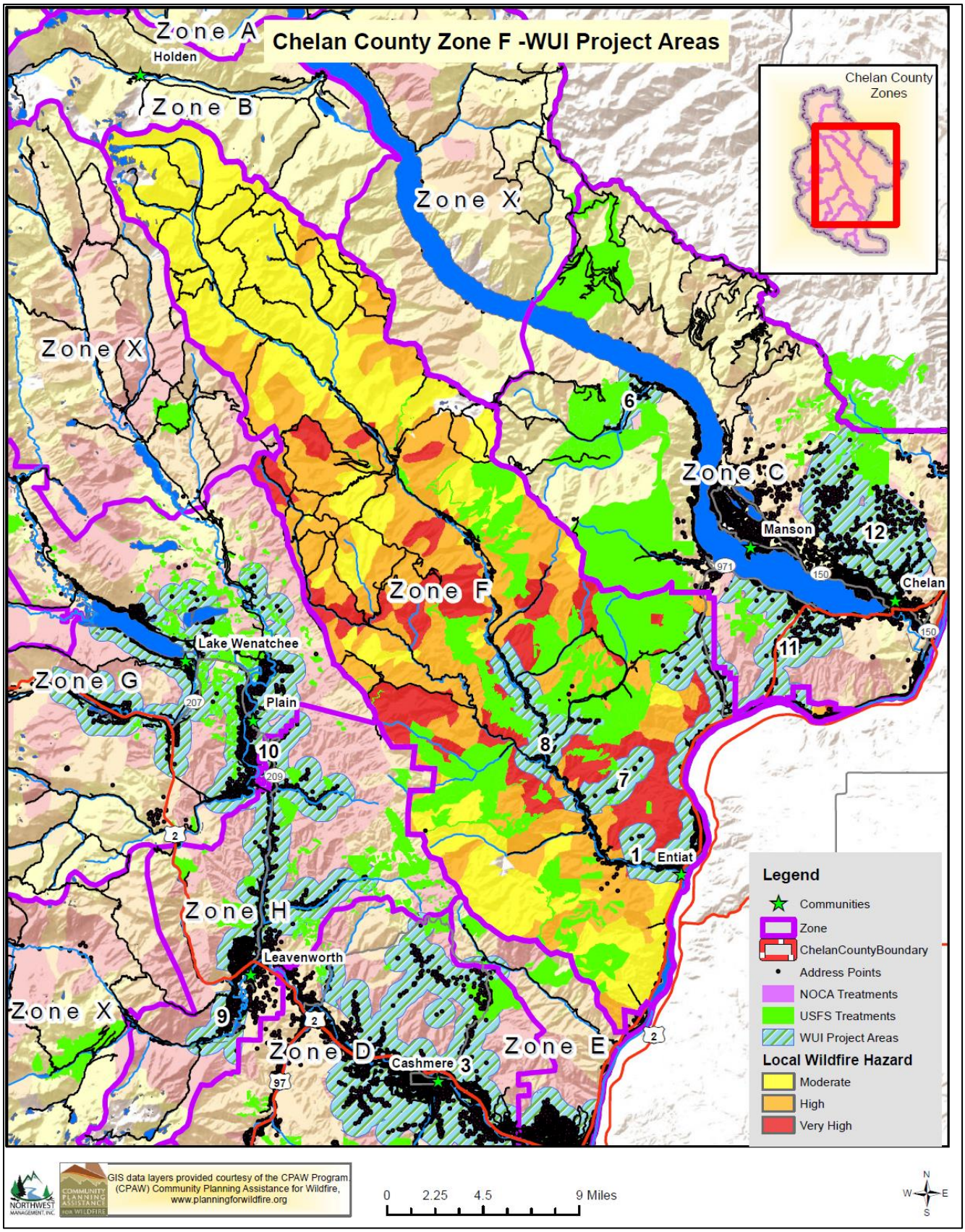


Figure 7.15. Zone G Project Areas.

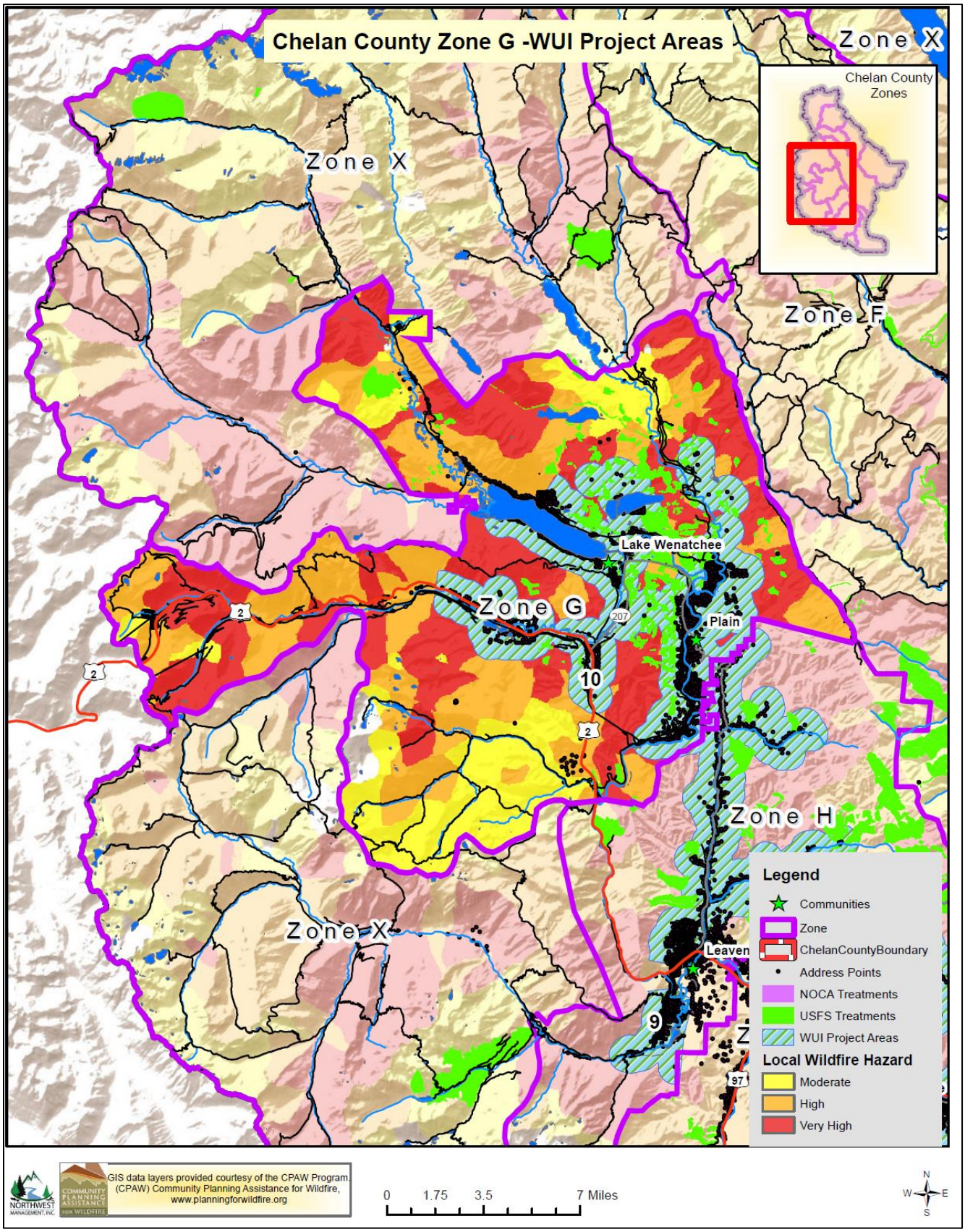
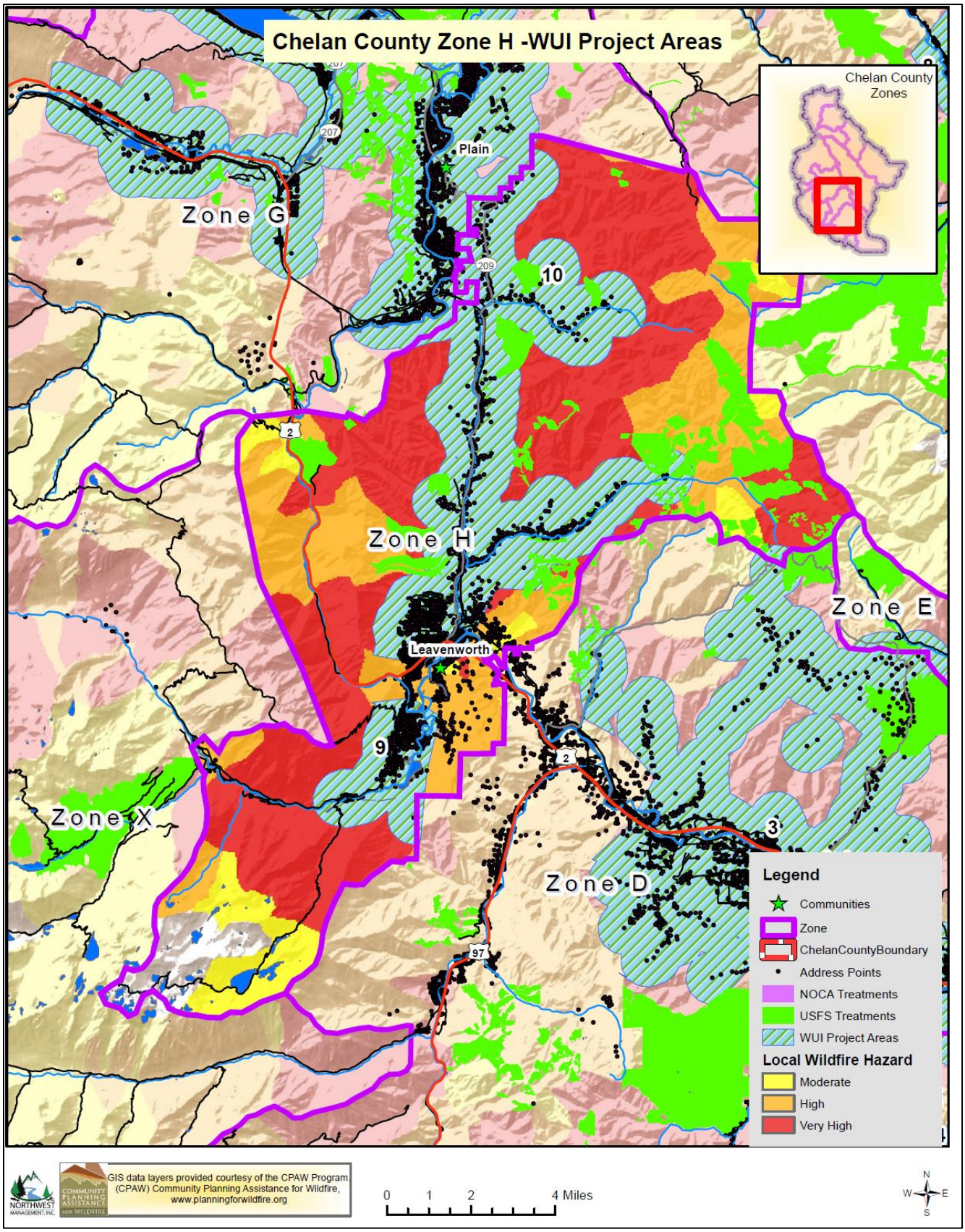


Figure 7.16. Zone H Project Areas.



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Appendix 2 - Documenting the Planning Process

Documentation of the planning process, including public involvement, is necessary to meet FEMA's DMA 2000 requirements (44CFR§201.4(c)(1) and §201.6(c)(1)). This appendix includes the minutes taken at planning team meetings, a record of published articles regarding the CWPP, and the presentation given at local public meetings.

Planning Team Meeting Minutes

March 6th, 2018 – Wenatchee, WA

Attendance:

Mary Sutton Carruthers, Cascadia Conservation District	Mike Burnett, Chelan County Fire District #1
Hillary Heard, Chelan County Natural Resources	Stan Smoke, Chelan County Emergency Management
Jon Riley, Chelan County Fire District #1	Mick Lamar, Lake Wenatchee Fire & Rescue
Phil Mosher, Chelan County Fire District #6	Patrick Haggerty, Cascadia Conservation
Alan Lawson, Washington DNR	Jim Brooks, City of Entiat
Jeff Gomes, City of Cashmere	Brad Tucker, Northwest Management, Inc. (NMI)
Cindi Tonasket-Ebel, Washington DNR	Scott Chambers, Washington DNR
Jeff Pierce, Holden Village	Bob Plumb, Chelan County Fire Marshall
Vicki Gempko, National Park Service	Sonya Shaw, National Park Service

Agenda Item #1 – Introduction:

Brad Tucker from Northwest Management gave a brief powerpoint presentation explaining the planning process, need for a Community Wildfire Protection Plan, and expectations from the planning team. Individuals introduced themselves. NMI passed around handouts. Brad made a general request for team members to send NMI relevant data (GIS, projects, plans, fire history, etc.)

Agenda Item #2 CPAW Update?

The consensus was that the risk assessment being developed through the Community Planning & Assistance for Wildfire (CPAW) project is in its final stages and should be ready within the next couple of weeks. NMI intends to utilize the risk assessment products in the CWPP process which should eliminate potential confusion of two separate risk assessment products. Using the CPAW products should also eliminate steps in the CWPP process because the risk assessment has already been performed and vetted.

Agenda Item #3 & #4 – Proposed sub-teams & responsibilities:

NMI recognizes the interest within the County regarding the CWPP, therefore NMI proposed using the individual community wildfire plans to organize sub-teams. These sub-teams would get together on their own and provide the County Plan with updated trends in development, action items, fuel reduction projects, planning area/WUI boundary, and review sections of the County Plan when available. The individual communities would be able to use the County Plan to update their plans if they were so inclined.

The planning team discussed options regarding this topic. The individual community CWPPs would still be valid and recognized, however the County Plan would cover the planning areas covered in the

individual community CWPPs. The general thought is that updating the individual community CWPPs is a difficult and often lengthy process making it improbable that these plans will be updated as often as needed. With the creation of a County level CWPP, the individual communities would be able to simply create an Action Plan and would not need to go through the other steps required in a CWPP update.

Agenda Item #5 – Fire District & Agency Information:

NMI explained the need to update the fire district and agency summaries and fuel reduction projects. Any agency or fire district that has fire suppression responsibilities within Chelan County also need to provide an updated resource list to NMI. The team requested that we send electronic versions of the survey forms to the team. Fire history data will be attained from the DNR/USFS.

Agenda Item #6– Public Involvement Strategy:

NMI explained the importance of including the public throughout the process. NMI will send press releases out to inform the public of the project's status. Public meetings will be held prior to the development of the final draft. The planning team was asked to be thinking about public meeting options (locations/ piggy back on other events). The public will have an opportunity to review the final draft and provide feedback before the document is signed. Agenda Item #7 – Wildland Urban Interface:

The team reviewed the current version of the WUI map which was based on structure density that was manually digitized at the time. It was decided that the Ferry Co. Planning Department would send NMI there 911 structure layer and rebuild the map from that to determine if there are major differences between the old and new versions. It was also decided that having the main travel corridors, traveling from the east to the west portions of the county, be included within the WUI.

Agenda Item #8 – Meeting Schedule:

The next meeting is scheduled for April 19th at 3:00 pm. Tentative location will be at the CTC building in Wenatchee. NMI will send out a reminder as we get closer.

April 19th, 2018 – Wenatchee, WA

Attendance:

Joel Walinski, City of Leavenworth	**Hillary Heard**, Chelan County
Mick Lamar, Lake Wenatchee Fire	**Mike Burnett**, Chelan County F.D. #1
Patrick Haggerty, Cascadia Conservation District	**Jeff Pierce**, Holden Village
Jon Riley, Chelan County F.D. #1	**Bob Plumb**, Chelan County - Fire & Life Safety
Vicki Gempko, National Park Service	**Tonya Neider**, National Park Service
Scott Ebel, National Park Service	**Mike Cushman**, Cascadia Conservation District
Jaye Gilmore, USFS - Wenatchee River Ranger District	**Cindi Tonasket-Ebel**, Washington Department of Natural Resources
Mike Kaputa, Chelan County	**Jason Detamore**, Chelan County Public Works
Stan Smoke, Chelan County Emergency Management	**Mike Asher**, Chelan County F.D. #8
Kent Sisson, Chelan County Emergency Management	**Jim Brooks**, City of Entiat
Aaron Rowe, USFS - Entiat Ranger District	**Keith Goehner**, Chelan County

Agenda Item #1 – Old Business:

Brad Tucker from Northwest Management asked that everyone introduces themselves. He gave a brief overview explaining what was covered in the previous meeting and discussed the Community Planning Assistance for Wildfire project and how it is going to be used in the CWPP project. NMI passed around

handouts. Brad made a general request to the state and federal agencies for updated fuels reduction project data.

Agenda Item #2 Maps:

The planning team then looked at a series of maps create for this project. The first set was of the entire County and included; aerial, Fire Districts, precipitation, existing vegetation types, forest health, ownership, historic fire regime and fire regime condition class. NMI also digitized the "Planning Areas" from the individual community wildfire protection plans, then created a series of maps for each Planning Area that included; fire history, local wildfire hazard and the suggested wildland urban interface (the latter two were developed by the CPAW project).

Agenda Item #3– Wildland Urban Interface (WUI):

The wildland urban interface is where the wildland vegetation (or fuels) meet the structures built by humans. There are different classes to the WUI including interface and intermix. According to the recommendation of the CPAW project, interface is any area in the County with greater than 16 houses per square mile and less than 50% cover of vegetation. Intermix is any area in the County with houses present and greater than 50% cover of wildland vegetation. The Planning Team spent significant time discussing what to do with the suggested WUI identified during the CPAW project. The CWPP Planning Team determined it would be best, for now, to utilize the wildland urban interface developed by the CPAW project. The CWPP Planning Team asked that Northwest Management include an extra class to the WUI to cover certain infrastructure throughout the County (access roads, utilities, etc.). Northwest Management will bring the revised WUI map to the next meeting for discussion.

Agenda Item #4 – Risk Assessments:

The Planning Team also discussed how to break the County up in manageable pieces for risk assessment discussions. There are currently eleven community wildfire protection plans in existence within the County that were initiated in the mid-2000s. Only a couple of these plans have been updated since the initial plan was written. These individual community plans cover "Planning Areas" that describe areas around specific communities. Since these plans already have designated "Planning Areas" and detailed descriptions of these areas about wildland fire, the County CWPP Planning Team will utilize these areas in the County-level plan. The Fire Districts asked for modifications to the boundaries to reduce any Fire District from spanning multiple Planning Areas. The Fire Districts also asked that Northwest Management separate out each Fire District from their respective Planning Area to create interest in the Fire District and will highlight areas of the Planning Area that are not within the Fire District boundary.

Agenda Item #5 – Meeting Schedule:

The next meeting is scheduled for May 21st at 2:00 pm and will be at the District #1 Fire Station #11 at 206 Easy Street in Wenatchee.

May 21st, 2018 – Wenatchee, WA

Attendance:

Jon Tepley, US Forest Service	**Hillary Heard**, Chelan County
Mick Lamar, Lake Wenatchee Fire	**Mike Burnett**, Chelan County F.D. #1
Patrick Haggerty, Cascadia Conservation District	**Jeff Pierce**, Holden Village (called in)
Jon Riley, Chelan County F.D. #1	**Bob Plumb**, Chelan County - Fire & Life Safety
Vicki Gempko, National Park Service (called in)	**Kyle Cannon**, US Forest Service
Jerry Holm, Forest Ridge Wildfire Collaborative	**Mike Cushman**, Cascadia Conservation District
Dave Nalle, USFS & Chelan County F.D. #3	**Cindi Tonasket-Ebel**, Washington Department of Natural Resources
Mike Kaputa, Chelan County	**Rob Flanner**, Tetra Tech (called in)

Stan Smoke, Chelan County Emergency Management	**Jim Brooks**, City of Entiat
Phil Mosher, Chelan County F.D. #6	**Monica Nicholson**, Bureau of Land Management
Aaron Rowe, USFS - Entiat Ranger District	**Matt Castle**, US Forest Service
Brian Brett, Chelan County F.D. #1	**Brad Tucker**, Northwest Management, Inc.

Agenda Item #1 – Project Extension:

Brad Tucker from Northwest Management asked that everyone introduces themselves. He explained that there has been some concern amongst the planning team, County, and residents that the current deadline of September 15th would not be sufficient to produce an effective CWPP. Cindi Tonasket-Ebel reached out to the BLM to determine if there is a possibility to get the contract extended. The BLM said all they need is something in writing explaining why the extension is needed and how long we need to complete the project. After discussing this with the Planning Team, it was determined that we would target March as the new deadline to complete the Chelan County CWPP.

Agenda Item #2 Chelan County Hazard Mitigation Plan:

Hillary Heard of Chelan County Natural Resources and Rob Flanner of Tetra Tech explained the tentative timeline for the Chelan County Hazard Mitigation Plan (HMP) update. The goal is to have the CWPP annexed into the HMP because FEMA is urging counties to include the CWPP into their HMPs for several reasons. One reason is that there are numerous redundancies throughout the plan and planning processes for both documents. A second reason is that in the past, FEMA could not pay for a CWPP to be updated, but by including the CWPP into the HMP in some fashion FEMA will be able to provide funds to the counties to update both plans on the five-year cycle.

Tetra Tech plans to have the document ready for state and federal review by the first of 2019. This means that we should shoot for our CWPP to be finished in December.

Agenda Item #3– CWPP Work Plan:

Brad went over the new timeline and discussed maybe having one more meeting in June and then taking a bulk of the fire season (July-Sept.) off from having meetings. Brad would still be acquiring information from individuals on the planning team and the County and he would also continue to draft the document during this time. The HMP is scheduled to have public meetings in August and then again in November. We will have our public meetings at the same time/place.

Agenda Item #4 – Individual Community Action Plan Updates:

Patrick Haggerty with Cascadia Conservation District and Cindi Tonasket-Ebel have developed an Action Plan template for the individual community CWPPs. They did this by using the recently updated (but still a draft) Leavenworth CWPP. The template categorizes 'mitigation actions' into the three categories developed by the National Cohesive Wildland Fire Management Strategy. These categories include; Fire Adapted Communities, Fire Resilient Landscapes, Response. The only recommendations were to include another column for addressing updates to mitigation measures. Patrick and Cindi will reach out to individuals within the communities that have CWPPs to update their projects and mitigation actions over the next couple of months.

Agenda Item # 5 – Planning Areas:

Northwest Management (NMI) brought a revised Planning Area map for the group to comment on. It was decided that NMI would use watersheds rather than by Planning Area to break up the County into describable portions. The watersheds can be clumped or grouped to match the nearest Planning Area. A watershed can be split along Fire District boundaries or other feature that makes sense (ridge).

Agenda Item #6 – Wildland Urban Interface:

The wildland urban interface is where the wildland vegetation (or fuels) meet the structures built by humans. There are different classes to the WUI including interface and intermix. According to the recommendation of the CPAW project, interface is any area in the County with greater than 16 houses per square mile and

less than 50% cover of vegetation. Intermix is any area in the County with houses present and greater than 50% cover of wildland vegetation. The Planning Team spent significant time discussing what to do with the suggested WUI identified during the CPAW project. During our April meeting the CWPP Planning Team determined it would be best to utilize the wildland urban interface developed by the CPAW project. Northwest Management brought the new version of the WUI which included an extra class to the WUI to cover certain infrastructure throughout the County (access roads, utilities, etc.). After much discussion, the planning team has decided to make the entire County WUI. The reasoning for this is partially because there are some fuel types that under certain circumstances can reach the built environment within one operational period from several miles away. Having the entire County designated as WUI allows land managers (federal lands) to conduct fuels mitigation projects anywhere in the County.

Agenda Item #7 – Press Release

Brad passed out a draft press release to the group for review. The press release is intended to inform the residents of Chelan County that we are in the process of updating the County CWPP, what that means, what to expect, how they will be able to participate. Mike Kaputa's office will submit the press release to the various media outlets once the planning team approves the draft.

Agenda Item #8 – Chapter Review:

Brad provided the group with Chapters 1-3 draft and asked that the planning team review the chapters and provide NMI with feedback.

Agenda Item #9 – Agency Project Information:

Brad asked the federal (USFS, BLM, & NPS) and state (DNR) representatives to provide NMI with past projects (2007 to present) that have been completed and projects planned/proposed for the next 5 years.

Agenda Item #5 – Meeting Schedule:

The next meeting is scheduled for June 19th at 2:00 pm and will be at the District #1 Fire Station #11 at 206 Easy Street in Wenatchee.

June 19th, 2018 – Wenatchee, WA

Attendance:

Jon Tepley, US Forest Service	**Hillary Heard**, Chelan County
Mick Lamar, Lake Wenatchee Fire	**Brian Brett**, Chelan County F.D. #1
Katz Kienel, Chelan County F.D. #1	**Jeff Pierce**, Holden Village (called in)
Jon Riley, Chelan County F.D. #1	**Bob Plumb**, Chelan County - Fire & Life Safety
Craig Gildroy, City of Chelan	**Kyle Cannon**, US Forest Service
Luis Gonzalez, City of Chelan	**Mike Cushman**, Cascadia Conservation District
Brandon Asher, Chelan County Fire & Rescue	**Mike Asher,** Chelan County F.D. #8
Stan Smoke, Chelan County Emergency Management	**Brad Tucker**, Northwest Management, Inc.

Agenda Item #1 – Old Business:

Brad reminded the state and federal partners to provide their respective planned/proposed projects to him as soon as possible.

Mike Cushman with Cascadia Conservation District updated the group on the individual community action plan update process. He provided updated action plan templates and a point of contact list for each group. Mike asked for comments on the contact list so that his staff can begin contacting each group.

NMI will send the contact list and action plan template electronically.

Brad also asked if anyone had comments on the chapters 1-3 draft that he previously handed out to the group, there were none.

Agenda Item #2 Planning Areas:

Northwest Management (NMI) brought a revised Planning Area map broken up by watershed and split along Fire District boundary where appropriate for the group to comment on. It was decided at the May meeting that NMI would use watersheds rather than by Planning Area to break up the County into describable portions. The watersheds were then clumped or grouped to match the nearest Fire District. A watershed was split along Fire District boundaries when that makes sense.

There seemed to be a lot of confusion with who was ultimately responsible for projects in each Planning Area. NMI decided to change the term "Planning Area" to Zone. Then the group wanted to identify each Zone with a letter to reduce further confusion. The group wanted to remove Fire District and City boundaries from each Zone to eliminate the assumption of responsibility in each Zone.

Agenda Item #3– Wildland Urban Interface:

The wildland urban interface is where the wildland vegetation (or fuels) meet the structures built by humans. There are different classes to the WUI including interface and intermix. According to the recommendation of the CPAW project, interface is any area in the County with greater than 16 houses per square mile and less than 50% cover of vegetation. Intermix is any area in the County with houses present and greater than 50% cover of wildland vegetation.

The Planning Team spent significant time discussing what to do with the suggested WUI identified during the CPAW project. During our April meeting the CWPP Planning Team determined it would be best to utilize the wildland urban interface developed by the CPAW project. Northwest Management brought the new version of the WUI which included an extra class to the WUI to cover certain infrastructure throughout the County (access roads, utilities, etc.). At the May meeting the planning team decided to make the entire County WUI. The reasoning for this was partially because there are some fuel types that under certain circumstances can reach the built environment within one operational period from several miles away. Having the entire County designated as WUI would let land managers (federal lands) to conduct fuels mitigation projects anywhere in the County.

At our June meeting, the group spent more time on the WUI designation and it was determined to go back to the WUI that the CPAW project recommended along with the infrastructure WUI that NMI developed. Brad informed the group that they need to review the infrastructure WUI and provide additional infrastructure that should be covered (comm sites, ingress/egress routes, watersheds, etc.). The group asked NMI to send maps of each Zone with the WUI designation shown so they can make revisions.

Brad sent out an email last Friday with the updated maps of the WUI and Zones for folks to review. **Please provide feedback before July 1st.**

Agenda Item #5 – Meeting Schedule:

Our next meeting will occur in August and we may try to tie in to the County Hazard Mitigation Plan meeting at that point. I will send a notification out as soon as I know when it will be.

September 19th, 2018 – Wenatchee, WA

Attendance:

Matt Castle, US Forest Service	**Nick Pieper**, Bureau of Land Management
Mick Lamar, Lake Wenatchee Fire	**Hillary Heard**, Chelan County
Jerry Holm, FRWC	**Jeff Pierce**, Holden Village (called in)
Jon Riley, Chelan County F.D. #1	**Bob Plumb**, Chelan County - Fire & Life Safety

Dave Nalle, Chelan County F.D. #3	**Patrick Haggerty**, Cascadia Conservation District (called in)
Luis Gonzalez, City of Chelan	**Mike Cushman**, Cascadia Conservation District
Tonya Neider, National Park Service (called in)	**Mike Asher,** Chelan County F.D. #8
Jason Cirksena, Bureau of Land Management	**Brad Tucker**, Northwest Management, Inc.

Agenda Item #1 – Old Business:

Brad reminded the state and federal partners to provide their respective planned/proposed projects to him before October 5th. Brad also reminded the Districts and Agencies that he needs a summary of each District/Agency's capabilities and available resources. Brad will send a template for the summary and resource list. Matt Castle suggested that the area has a mobilization plan that would have available resources listed and that it would likely provide the information that NMI is looking for. District summaries and resource lists are due to Brad by October 5th as well.

Patrick Haggerty with Cascadia Conservation District updated the group on the individual community action plan update process. He stated the Wenatchee, Holden and Leavenworth Action Plans are completed. Lake Wenatchee, Entiat and Stehekin are in progress while Manson, Chelan and Cashmere have yet to meet. The goal is to have all community Action Plans finished by mid-October.

Agenda Item #2 Review Chapter 4:

The Planning Team reviewed the draft of Chapter 4 which assesses the wildfire risk and preparedness level of the County. The group had some recommendations at the time of the meeting, but Brad asked that they review the Chapter in more detail later. He asked for comments/revisions to the Chapter by October 5th.

Agenda Item #3– Public Meetings:

The group then discussed the plan for public meetings. There will be 3 meetings the occur during the evenings of October 9, 10 and 11 from 6-8 pm. This will be a joint effort between the County Natural Hazard Mitigation Plan and the Community Wildfire Protection Plan. The group selected to have the County wildfire risk map and the Wildland Urban Interface map printed as posters and then have a packet of maps to handout to residents. The map packets will focus on the area (Zone) where that public meeting is taking place.

Agenda Item #4 – Meeting Schedule:

Our next meeting is scheduled for October 16th at 2:00 pm. The location of the meeting is yet to be determined but we will let everyone know prior to the meeting.

October 16th, 2018 – Wenatchee, WA

Attendance:

Jason Cirksena, Bureau of Land Management	**Jeff Pierce**, Holden Village (called in)
Mick Lamar, Lake Wenatchee Fire	**Bob Plumb**, Chelan County - Fire & Life Safety
Dan Hilden, Chelan County F.D. #1	**Brian Brett**, Chelan County F.D. #1
Jon Riley, Chelan County F.D. #1	**Brad Tucker**, Northwest Management, Inc.

Agenda Item #1 – Old Business:

The group discussed how the public meetings went. There were several people at each meeting in official capacity, there was no participation by residents at any of the meetings. NMI will contact Cascadia Conservation District to determine when we might expect to have all the community action plans updated. Brad explained that we will reconvene the CWPP planning team to discuss the action plans once they are updated.

Brad also asked the group if there were any comments on Chapter 4 that was reviewed at our meeting in September. There were no additional comments on what was covered in last month's meeting.

Agenda Item #2 Review Chapter 5:

The Planning Team reviewed the draft of Chapter 5 which assesses each Zone's wildfire risk. Brad explained that this chapter is still "under construction" and that there are highlighted sections that need revised or expanded on. Most of the information used to populate some of these sections was taken from the individual cwpp associated with each area and CPAW data. The group asked where the parcel/structure information came from. Brad found out after the meeting that it came from the data developed for the CPAW project. The group had some revisions and recommendations at the time of the meeting, but Brad asked that they review the Chapter in more detail later. He asked for comments/revisions to the Chapter by November 1st. The group also asked for an electronic version of Chapter 5 for review.

Agenda Item #3 – Meeting Schedule:

Our next meeting is not currently scheduled. We will schedule a County CWPP meeting once the individual community action plans have been updated. We will send out a notice once the date/time/location are scheduled.

Appendix 3 - Risk Analysis Models

Historic Fire Regime

A natural fire regime is a general classification of the role fire would play across a landscape in the absence of modern human mechanical intervention, but including the influence of aboriginal burning (Agee 1993, Brown 1995). Coarse-scale definitions for natural (historical) fire regimes have been developed by Hardy et al. (2001) and Schmidt et al. (2002) and interpreted for fire and fuels management by Hann and Bunnell (2001). The five natural (historical) fire regimes are classified based on average number of years between fires (fire frequency) combined with the severity (amount of replacement) of the fire on the dominant overstory vegetation. These five regimes include: I – 0-35 year frequency and low (surface fires most common) to mixed severity (less than 75% of the dominant overstory vegetation replaced); II – 0-35 year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced); III – 35-100+ year frequency and mixed severity (less than 75% of the dominant overstory vegetation replaced); IV – 35-100+ year frequency and high (stand replacement) severity (greater than 75% of the dominant overstory vegetation replaced); V – 200+ year frequency and high (stand replacement) severity.

A database of fire history studies in Washington was used to develop modeling rules for predicting historical fire regimes (HFRs). Tabular fire-history data and spatial data was stratified into ecoregions, potential natural vegetation types (PNVs), slope classes, and aspect classes to derive rule sets which were then modeled spatially. Expert opinion was substituted for a stratum when empirical data was not available.

Fire is one of the dominant disturbance processes that manipulate vegetation patterns in Washington. The HFR data were prepared to supplement other data necessary to assess integrated risks and opportunities at regional and subregional scales. The HFR theme was derived specifically to estimate an index of the relative change of a disturbance process, and the subsequent patterns of vegetation composition and structure.

These data were derived using fire history data from a variety of different sources. These data were designed to characterize broad scale patterns of historical fire regimes for use in regional and subregional assessments. Any decisions based on these data should be supported with field verification, especially at scales finer than 1:100,000. Because the resolution of the HFR theme is 30 meter cell size, the expected accuracy does not warrant their use for analyses of areas smaller than about 10,000 acres (for example, assessments that typically require 1:24,000 data).

Vegetation Condition Class

Vegetation Condition Class (VCC) is an interagency, standardized tool for determining the degree of departure from reference condition vegetation, fuels, and disturbance regimes. Assessing VCC can help guide management objectives and set priorities for treatments.

As scale of application becomes finer the five historic fire regimes may be defined with more detail, or any one class may be split into finer classes, but the hierarchy to the coarse scale definitions should be retained. Coarse-scale VCC classes have been defined and mapped by Hardy et al. (2001) and Schmidt et al. (2001). They include three condition classes for each historic fire regime. The classification is based on a relative measure describing the degree of departure from the historical natural fire regime. This departure results in changes to one (or more) of the following ecological components: vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern;

and other associated disturbances (e.g. insect and disease mortality, grazing, and drought). There are no wildland vegetation and fuel conditions or wildland fire situations that do not fit within one of the three classes.

The three classes are based on low (VCC 1), moderate (VCC 2), and high (VCC 3) departure from the central tendency of the natural (historical) regime (Hann and Bunnell 2001, Hardy et al. 2001, Schmidt et al. 2002). The central tendency is a composite estimate of vegetation characteristics (species composition, structural stages, stand age, canopy closure, and mosaic pattern); fuel composition; fire frequency, severity, and pattern; and other associated natural disturbances. Low departure is considered to be within the natural (historical) range of variability, while moderate and high departures are outside.

Characteristic vegetation and fuel conditions are considered to be those that occurred within the natural (historical) fire regime. Uncharacteristic conditions are considered to be those that did not occur within the natural (historical) fire regime, such as invasive species (e.g. weeds, insects, and diseases), “high graded” forest composition and structure (e.g. large trees removed in a frequent surface fire regime), or repeated annual grazing that maintains grassy fuels across relatively large areas at levels that will not carry a surface fire.

Determination of amount of departure is based on comparison of a composite measure of fire regime attributes (vegetation characteristics; fuel composition; fire frequency, severity and pattern) to the central tendency of the natural (historical) fire regime. The amount of departure is then classified to determine the vegetation condition class. A simplified description of the vegetation condition classes and associated potential risks follow.

Table A.1. Vegetation Condition Class Description.

Vegetation Condition Class	Description	Potential Risks
Condition Class 1	Within the natural (historical) range of variability of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are similar to those that occurred prior to fire exclusion (suppression) and other types of management that do not mimic the natural fire regime and associated vegetation and fuel characteristics. Composition and structure of vegetation and fuels are similar to the natural (historical) regime. Risk of loss of key ecosystem components (e.g., native species, large trees, and soil) is low.
Condition Class 2	Moderate departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are moderately departed (more or less severe). Composition and structure of vegetation and fuel are moderately altered. Uncharacteristic conditions range from low to moderate. Risk of loss of key ecosystem components is moderate.
Condition Class 3	High departure from the natural (historical) regime of vegetation characteristics; fuel composition; fire frequency, severity and pattern; and other associated disturbances.	Fire behavior, effects, and other associated disturbances are highly departed (more or less severe). Composition and structure of vegetation and fuel are highly altered. Uncharacteristic conditions range from moderate to high. Risk of loss of key ecosystem components is high.

Wildfire Hazard Assessments and Mapping

To provide an effective decision support tool for the county and its partners, RMRS staff developed the following wildfire hazard mapping outputs. Three maps are provided at two scales; the Landscape Level Wildfire Hazard (270 m pixels), Local Wildfire Hazard (30 m pixels which includes ember zones) and Mitigation Potential (30 m). A summary of the methodology used to develop these outputs can be found in Appendix A.

Landscape Level Wildfire Hazard

This scale (120 m pixel resolution) represents the likelihood (probability) of a fire occurring and intensity of the fire at the landscape level based on the inherent landscape characteristics including broad existing vegetation, biophysical settings, fire regimes and fire histories (found on page 63). The polygon boundaries are based on the U.S. Geological Survey Hydrological Unit Code (HUC) 12 (subwatershed) boundaries. The subwatersheds range in size from 13 to 75 mi2, with an average of 36 mi2. The landscape level hazard assessment is delineated into the following rankings:

- MODERATE
- HIGH
- VERY HIGH

The factors influencing these rankings can be used to determine the potential landscape level exposure that a development will be subject to. The ranking at this scale is difficult to change at the local/parcel level. Mitigation affecting change at this scale is typically done by large scale disturbances such as insect mortality, fires or landscape level mitigation. Many of the very high ranked polygons are present on federal lands and would require mitigation by federal land management agencies.

Land Use Planning Application: This informs land use planners on the general areas where fires are most likely to occur and collaborative, multi-agency large-scale fire management planning and mitigation is necessary.

Local Level Wildfire Hazard

This scale (30 m pixel resolution) is based on an extreme event (worst fire days). The polygon boundaries are based on the catchment boundaries with the HUC 12 boundaries (found on page 65). This does not show the likelihood of a fire occurring but does shows where fires are likely to burn at high intensity. For example, a fire that starts in an area where the local hazard is high can spread fast and burn at high intensity creating significant wildfire exposure to any structures in the area. The same rankings used at the landscape scale are used at this local scale:

- MODERATE
- HIGH
- VERY HIGH

As part of the wildfire hazard analysis the potential ember transport was assessed using a number of approaches and all outcomes indicated that the entire county is susceptible to ember impingement.

Land Use Planning Application: This informs land use planners on the relative worst-case (hottest, driest, windiest days during a fire season) wildfire exposure (radiant, convective and ember) that can be expected in any given polygon where development exists or is planned for.

Appendix 4 – Fire Services

Table A.2. Fire Services Information

Chelan County Fire Protection District #1:	Chief: Brian Brett Telephone: 509-662-4734 E-Mail: www.chelancountyfire.com Address: PO Box 2106 Wenatchee 98807
Lake Wenatchee Fire and Rescue:	Chief: Mick Lamar Telephone: 509-763-3034 E-Mail: lwfrchief@nwi.net Address: 21696 Lake Wenatchee Hwy Leavenworth, WA 98826
Chelan County Fire Protection District #3:	Chief: Kelly O'Brien Telephone: 509-548-7711 Email: chief3@nwi.net Address: 228 Chumstick Rd Leavenworth, WA 98826
Chelan County Fire Protection District #5:	Chief: Arnold Baker Telephone: 509-687-3222 E-Mail: www.mansonfire.org Address: 250 W Manson Blvd Manson, WA 98831
Chelan County Fire Protection District #6:	Chief: Phil Mosher Telephone: 509-663-1678 E-Mail: p_mosher@ccfd6.net Address: PO Box 296 Monitor, WA 98836
Chelan County Fire Protection District #7:	Chief: Tim Lemmon Telephone: 509-682-4476 E-Mail: timl@cfr7.org Address: PO Box 1317 Chelan, WA 98816

Chelan County Fire Protection District #8:	Chief: Mike Asher Telephone: 509-784-1203 E-Mail: maa51@genext.net Address: PO Box 517 Entiat, WA 98822

Chelan County Fire Protection District #10:	Chief: Telephone: E-Mail: horsehammer@hughes.net Address: PO Box 21 Stehekin, WA 98852

Holden Village Fire:	Fire Marshall: Jeff Pierce Telephone: 509-678-5933 Email: firemarshall@holdenvillage.org Address: HC 0 Box 2 Chelan, WA 98816

Okanogan-Wenatchee National Forest:	Chief: Telephone: 509-664-9333 Email: Address: 215 Melody Lane Wenatchee, WA 98801

Bureau of Land Management:	Spokane District Office Fire Management Officer: Scott Boyd Telephone: 509-536-1237 Address: 1103 North Fancher Road Spokane, Washington 99212-1275

National Park Service:	North Cascades National Park Fire Management Officer: Telephone: 360-854-7200 Address: 810 State Route 20 Sedro-Woolley, Washington 98284

Washington State Department of Natural Resources:	Southeast Region, Fire Unit Forester: Telephone: 509-925-8510 Address: 713 Bowers Rd Ellensburg, Washington 98926

Table A.3. Fire Services Resource List

	Identifier	Year	Type	Resource	Gallons	Drive	Vehicle or License #	Specifications
District 1			Type 3	Wildland Engine	750	4x4	301	100 GPM
			Type 6	Wildland Engine	300	4x4	302	60 GPM
			Type 6	Wildland Engine	250	4x4	303	60 GPM
			Type 6	Wildland Engine	250	4x4	304	60 GPM
			Type 6	Wildland Engine	250	4x4	305	60 GPM
			Type 3	Wildland Engine	750	4x4	306	100 GPM
			Type 6	Wildland Engine	300	4x4	307	60 GPM
			Type 6	Wildland Engine	300	4x4	309	60 GPM
			Type 1	Structure Engine	500	2x4	201	1500 GPM
			Type 2	Structure Engine	750	2x4	203	1250 GPM
			Type 1	Structure Engine	500	2x4	204	1500 GPM
			Type 1	Structure Engine	500	2x4	205	1500 GPM
			Type 1	Structure Engine	750	2x4	206	1250 GPM
			Type 1	Structure Engine	750	2x4	207	1500 GPM
			Type 1	Structure Engine	500	2x4	209	1250 GPM
			Type 1	Structure Engine	830	4x4	210	1250 GPM
			Type 1	Structure Engine	750	2x4	211	1750 GPM
			Type 1	Structure Engine	750	2x4	212	1750 GPM
			Type 1	Aerial Truck	500	2x4	401	1500 GPM
			Type 1	Aerial Truck	500	2x4	402	1500 GPM
			Type 3	Tender	1500	2x4	501	500 GPM
			Type 3	Tender	2000	2x4	502	500 GPM
			Type 1	Tactical Tender	2000	6x6	503	250 GPM
District 5	**Engine-51**	**1995**	Type 1	Engine	1000	4x2	40603C	1250 GPM
	Engine-52	**2009**	Type 1	Engine	650	4x4	93709C	1500 GPM, 200-CFM, Class A CAFS, Pump-n-roll
	Engine-53	**1971**	Type 1	Engine	1000	4x4	C24134	1500 GPM
	Engine-54	**2000**	Type 3	Engine	1000	4x2 Locking	58064C	300 GPM, 125 CFM, Class A CAFS, Pump-n-roll
	Brush-51	**1992**	Type 6	Brush	300	4x4	22436C	100 GPM, Class A
	Brush -52	**1990**	Type 6	Brush	200	4x2	52537C	140 GPM, Class A
	Command-51	**2016**	Type 6	Brush/Command	200	4x4	A8524C	100 GPM, 45 CFM, Class A CAFS

District #6	**Tender-52**	**2015**	Type 2 Tactical	Tender	3000	6x4	A8518C	750 GPM 2-stage Pump
			Type 6	Wildland Engine	415	4x4	B-61	Class A Foam
			Type 6	Wildland Engine	415	4x4	B-62	Class A Foam
			Type 6	Wildland Engine	415	4x4	B-63	Class A Foam
			Type 6	Wildland Engine	250	4x4	B-65	Class A Foam
			Type 3	Strc/Wildland Eng	800	4X4	E-64	1250 GPM / Class A Foam
			Type 1	Pumper	1500		E-61	1250 GPM / Class A Foam
			Type 1	Pumper	750		E-62	1250 GPM / Class A Foam
			Type 1	Pumper	1500		E-63	1250 GPM / Class A Foam
			Type 1	Pumper/Tender	1500		P/T-64	1250 GPM / Class A Foam

Lake Wenatchee Fire and Rescue

4 type 1 structure engines
1 type 3 wildland engines
3 type 6 brush trucks
4 water tenders, 1,500; 2,000; 2,500 and 3,000 gallons
2 Command vehicles
1 Rescue Truck

Okanogan-Wenatchee National Forest

Suppression Resources:

Support: Type 2 National Fire Cache
Interagency Dispatch Centers
Aviation: Moses Lake Air Tanker Base – provides support to national contract retardant aircraft
North Cascade Smoke Jumper Base
1 Fixed wing Jump Platform
28 smoke jumpers
Wenatchee Valley Rappel Base
35 Rappellers / Short Haul crew
1 Type 1 Helicopter
1 Type 3 Helicopter
1 Type 2 Rappel Platform
1 Type 3 Short Haul Platform
1 - Contracted fixed wing Recon Platform
1 - Air Attack with fixed wing platform
Crews: 1 – Type 1 20 person IHC Crew
7 – Type 2IA 20 person Hand Crew
Engines: 13 - Wildland Engines, Type 3 and Type 6.
Overhead: Numerous single resource overhead personnel.

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Appendix 5 - State and Federal CWPP Guidance

National Cohesive Strategy

In response to requirements of the Federal Land Assistance, Management, and Enhancement (FLAME) Act of 2009, the Wildland Fire Leadership Council (WFLC) directed the development of the National Cohesive Wildland Fire Management Strategy (Cohesive Strategy).

The Cohesive Strategy is a collaborative process with active involvement of all levels of government and non-governmental organizations, as well as the public, to seek national, all-lands solutions to wildland fire management issues.

The Cohesive Strategy is being implemented in three phases, allowing stakeholders to systematically develop a dynamic approach to planning for, responding to, and recovering from wildland fire incidents. This phased approach is designed to promote dialogue between national, regional and local leadership.

Phase I involved the development of two documents: *A National Cohesive Wildland Fire Management Strategy* and the *The Federal Land Assistance, Management And Enhancement Act Of 2009 - Report to Congress*. These documents provide the foundation of the Cohesive Strategy.

In Phase II, regional assessments were completed to address the national goals to the needs and challenges found at regional and local levels. Regional Strategy Committees representing three regions of the country—the Northeast, Southeast, and West—examined the processes by which wildland fire, or the absence thereof, threatens areas and issues that American value, including wildlife habitats, watershed quality, and local economies, among others.

Phase III involves taking the qualitative information gathered in Phase II and translating it into quantitative models that can help inform management actions on the ground. Once the strategy is finalized, it will be implemented across the country and overseen by the Wildland Fire Executive Council (WFEC), which will establish a five-year review cycle to provide updates to Congress.

The Wildland Fire Executive Council (WFEC) accepted the final Regional Action Plans for each of the Cohesive Strategy Regions: Northeast, Southeast, and West in April 2013. The WFEC tasked the Cohesive Strategy Sub-Committee (CSSC) to use the regional action plans to inform the development of the national action plan. The National Risk Analysis Report and National Action Plan will become WFEC recommendations to the Wildland Fire Leadership Council (WFLC) and ultimately to the Secretaries of the Interior and Agriculture. The regional action plans reflect the regional perspective that is important in the development of that national-level recommendation. Implementation of actions identified in Regional Action Plans is the responsibility of the sponsoring organizations at the discretion of those organizations.

National Fire Plan

The National Fire Plan (NFP) was developed by the U.S. Departments of Interior and Agriculture and their land management agencies in August 2000, following a landmark wildland fire season, with the intent of actively responding to severe wildland fires and their impacts to communities while ensuring sufficient firefighting capacity for the future. The NFP addresses five key points: Firefighting, Rehabilitation, Hazardous Fuels Reduction, Community Assistance, and Accountability. The National Fire Plan continues to provide invaluable technical, financial, and resource guidance and support for wildland fire management across the United States.

Together, the USDA Forest Service and the Department of the Interior are working to successfully implement the key points outlined in the National Fire Plan.

This Community Wildfire Protection Plan fulfills the National Fire Plan's 10-Year Comprehensive Strategy Implementation Plan (WFLC 2006). The projects and activities recommended under this plan are in addition to other federal, state, and private / corporate forest and rangeland management activities. The implementation plan does not alter, diminish, or expand the existing jurisdiction, statutory and regulatory responsibilities and authorities or budget processes of participating federal and state agencies.

The NFP goals of this Community Wildfire Protection Plan include:

1. Improve Fire Prevention and Suppression
2. Reduce Hazardous Fuels
3. Restoration and Post-Fire Recovery of Fire-Adapted Ecosystems
4. Promote Community Assistance

By endorsing this implementation plan, all signed parties agree that reducing the threat of wildland fire to people, communities, and ecosystems will require:

- Maintaining firefighter and public safety continuing as the highest priority.
- Communities and individuals in the wildland-urban interface to initiate personal stewardship and volunteer actions that will reduce wildland fire risks.
- A sustained, long-term and cost-effective investment of resources by all public and private parties, recognizing overall budget parameters affecting federal, state, county, and local governments.
- A unified effort to implement the collaborative framework called for in the strategy in a manner that ensures timely decisions at each level.
- Accountability for measuring and monitoring performance and outcomes, and a commitment to factoring findings into future decision making activities.
- The achievement of national goals through action at the local level with particular attention to the unique needs of cross-boundary efforts and the importance of funding on-the-ground activities.
- Management activities, both in the wildland-urban interface and in at-risk areas across the broader landscape.
- Active forestland management, including thinning that produces commercial or pre-commercial products, biomass removal and utilization, prescribed fire and other fuels reduction activities to simultaneously meet long-term ecological, economic, and community objectives.

The National Fire Plan identifies a three-tiered organizational structure including 1) the local level, 2) state/regional and tribal level, and 3) the national level. This plan adheres to the collaboration and outcomes consistent with a local level plan. Local level collaboration involves participants with direct responsibility for management decisions affecting public and/or private land and resources, fire protection responsibilities, or good working knowledge and interest in local resources. Participants in this planning process include local representatives from federal and state agencies, local governments, landowners and other stakeholders, and community-based groups with a demonstrated commitment to achieving the strategy's four goals. Existing resource advisory committees, watershed councils, or other collaborative entities may serve to achieve coordination at this level. Local involvement, expected to be broadly represented, is a primary source of

planning, project prioritization, and resource allocation and coordination. The role of the private citizen should not be underestimated as all phases of risk assessment, mitigation, and project implementation are greatly facilitated by their involvement.

National Association of State Foresters

This plan is written with the intent to provide decision makers (elected and appointed officials) the information they need to prioritize projects across the entire county. These decisions may be made by the Board of Commissioners or other elected body or through the recommendations of ad hoc groups tasked with making prioritized lists of communities at risk as well as project areas. It is not necessary to rank communities or projects numerically, although that is one approach. Rather, it may be possible to rank them categorically (high priority set, medium priority set, and so forth) and still accomplish the goals and objectives set forth in this planning document.

The following was prepared by the National Association of State Foresters (NASF), June 27, 2003, and is included here as a reference for the identification and prioritizing of treatments between communities.

Purpose: To provide national, uniform guidance for implementing the provisions of the "Collaborative Fuels Treatment" Memorandum of Understanding (MOU), and to satisfy the requirements of Task e, Goal 4 of the Implementation Plan for the 10-Year Comprehensive Strategy.

Intent: The intent is to establish broad, nationally compatible standards for identifying and prioritizing communities at risk, while allowing for maximum flexibility at the state and regional level. Three basic premises are:

- Include all lands and all ownerships.
- Use a collaborative process that is consistent with the complexity of land ownership patterns, resource management issues, and the number of interested stakeholders.
- Set priorities by evaluating projects, not by ranking communities.

The National Association of State Foresters (NASF) set forth the following guidelines in the Final Draft Concept Paper; Communities at Risk, December 2, 2002.

Task: Develop a definition for "communities at risk" and a process for prioritizing them, per the Implementation Plan for the 10-Year Comprehensive Strategy (Goal 4.e.). In addition, this definition will form the foundation for the NASF commitment to annually identify priority fuels reduction and ecosystem restoration projects in the proposed MOU with the federal agencies (section C.2 (b)).

Conceptual Approach

1. NASF fully supports the definition of the Wildland Urban Interface (WUI) previously published in the Federal Register. Further, proximity to federal lands should not be a consideration. The WUI is a set of conditions that exists on, or near, areas of wildland fuels nationwide, regardless of land ownership.
2. Communities at risk (or, alternately, landscapes of similar risk) should be identified on a state-by-state basis with the involvement of all agencies with wildland fire protection responsibilities: state, local, tribal, and federal.
3. It is neither reasonable nor feasible to attempt to prioritize communities on a rank order basis. Rather, communities (or landscapes) should be sorted into three, broad categories or zones of risk: high, medium,

and low. Each state, in collaboration with its local partners, will develop the specific criteria it will use to sort communities or landscapes into the three categories. NASF recommends using the publication "Wildland/Urban Interface Fire Hazard Assessment Methodology" developed by the National Wildland/Urban Interface Fire Protection Program (circa 1998) as a reference guide. (This program, which has since evolved into the Firewise Program, is under the oversight of the National Wildfire Coordinating Group (NWCG)). At a minimum, states should consider the following factors when assessing the relative degree of exposure each community (landscape) faces.

- **Risk:** Using historic fire occurrence records and other factors, assess the anticipated probability of a wildfire ignition.
- **Hazard:** Assess the fuel conditions surrounding the community using a methodology such as fire condition class, or [other] process.
- **Values Protected:** Evaluate the human values associated with the community or landscape, such as homes, businesses, and community infrastructure (e.g. water systems, utilities, transportation systems, critical care facilities, schools, manufacturing and industrial sites, and high value commercial timber lands).
- **Protection Capabilities:** Assess the wildland fire protection capabilities of the agencies and local fire departments with jurisdiction.

4. Prioritize by project not by community. Annually prioritize projects within each state using the collaborative process defined in the national, interagency MOUs, "For the Development of a Collaborative Fuels Treatment Program." Assign the highest priorities to projects that will provide the greatest benefits either on the landscape or to communities. Attempt to properly sequence treatments on the landscape by working first around and within communities, and then moving further out into the surrounding landscape. This will require:

   - First, focusing on the zone of highest overall risk but considering projects in all zones. Identify a set of projects that will effectively reduce the level of risk to communities within the zone.
   - Second, determining the community's willingness and readiness to actively participate in an identified project.
   - Third, determining the willingness and ability of the owner of the surrounding land to undertake, and maintain, a complementary project.
   - Last, setting priorities by looking for projects that best meet the three criteria above. It is important to note that projects with the greatest potential to reduce risk to communities and the landscape may not be those in the highest risk zone, particularly if either the community or the surrounding landowner is not willing or able to actively participate.

5. It is important, and necessary, that we be able to demonstrate a local level of accomplishment that justifies to Congress the value of continuing the current level of appropriations for the National Fire Plan. Although appealing to appropriators and others, it is not likely that many communities (if any) will ever be removed from the list of communities at risk. Even after treatment, all communities will remain at some, albeit reduced, level of risk. However, by using a science-based system for measuring relative risk, we can likely show that, after treatment (or a series of treatments); communities are at "*reduced risk.*"

Using the concept described above, the NASF believes it is possible to accurately assess the relative risk that communities face from wildland fire. Recognizing that the condition of the vegetation (fuel) on the landscape

is dynamic, assessments and re-assessments must be done on a state-by-state basis, using a process that allows for the integration of local knowledge, conditions, and circumstances, with science-based national guidelines. We must remember that it is not only important to lower the risk to communities, but once the risk has been reduced, to maintain those communities at a reduced risk.

Further, it is essential that both the assessment process and the prioritization of projects be done collaboratively, with all local agencies with fire protection jurisdiction taking an active role.

Healthy Forests Restoration Act

On December 3, 2003, President Bush signed into law the Healthy Forests Restoration Act of 2003 to reduce the threat of destructive wildfires while upholding environmental standards and encouraging early public input during review and planning processes. The legislation is based on sound science and helps further the President's Healthy Forests Initiative pledge to care for America's forests and rangelands, reduce the risk of catastrophic fire to communities, help save the lives of firefighters and citizens, and protect threatened and endangered species.

The Healthy Forests Restoration Act (HFRA) seeks to:

- Strengthens public participation in developing high priority projects;
- Reduces the complexity of environmental analysis allowing federal land agencies to use the best science available to actively manage land under their protection;
- Creates a pre-decisional objections process encouraging early public participation in project planning; and
- Issues clear guidance for court action challenging HFRA projects.

The Chelan County Community Wildfire Protection Plan was developed to adhere to the principles of the HFRA while providing recommendations consistent with the policy document. This should assist the federal land management agencies with implementing wildfire mitigation projects in Chelan County that incorporate public involvement and the input from a wide spectrum of fire and emergency services providers in the region.

Federal Emergency Management Agency Philosophy

Effective November 1, 2004, a hazard mitigation plan approved by the Federal Emergency Management Agency (FEMA) is required for Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation Program (PDM) eligibility. The HMGP and PDM programs provide funding, through state emergency management agencies, to support local mitigation planning and projects to reduce potential disaster damages.

The local hazard mitigation plan requirements for HMGP and PDM eligibility are based on the Disaster Mitigation Act (DMA) of 2000, which amended the Stafford Disaster Relief Act to promote an integrated, cost effective approach to mitigation. Local hazard mitigation plans must meet the minimum requirements of the Stafford Act-Section 322, as outlined in the criteria contained in 44 CFR Part 201. The plan criteria cover the planning process, risk assessment, mitigation strategy, plan maintenance, and adoption requirements.

FEMA only reviews a local hazard mitigation plan submitted through the appropriate State Hazard Mitigation Officer (SHMO). FEMA reviews the final version of a plan prior to local adoption to determine if the plan meets the criteria, but FEMA will not approve it prior to adoption.

A FEMA designed plan is evaluated on its adherence to a variety of criteria.

- Adoption by the Local Governing Body
- Multi-jurisdictional Plan Adoption
- Multi-jurisdictional Planning Participation
- Documentation of Planning Process
- Identifying Hazards
- Profiling Hazard Events
- Assessing Vulnerability: Identifying Assets
- Assessing Vulnerability: Estimating Potential Losses
- Assessing Vulnerability: Analyzing Development Trends
- Multi-jurisdictional Risk Assessment
- Local Hazard Mitigation Goals
- Identification and Analysis of Mitigation Measures
- Implementation of Mitigation Measures
- Multi-jurisdictional Mitigation Strategy
- Monitoring, Evaluating, and Updating the Plan
- Implementation through Existing Programs
- Continued Public Involvement

Appendix 6 - Potential CWPP Project Funding Sources

Assistance to Firefighters Grant (AFG)

http://www.fema.gov/assistance-firefighters-grant

The primary goal of the Assistance to Firefighters Grant (AFG) is to meet the firefighting and emergency response needs of fire departments and nonaffiliated emergency medical service organizations. Since 2001, AFG has helped firefighters and other first responders to obtain critically needed equipment, protective gear, emergency vehicles, training and other resources needed to protect the public and emergency personnel from fire and related hazards.

Fire Service Grants and Funding (AFGP)

http://www.usfa.fema.gov/grants/

Under the Federal Emergency Management Agency's Assistance to Firefighters Grant Program (AFGP), career and volunteer fire departments and other eligible organizations can receive funding through three different grants to:

- *Enhance a fire department's/safety organization's ability to protect the health and safety of the public.*
- *Protect the health of first responders.*
- *Increase or maintain the number of trained, "front-line" firefighters available in communities.*

Staffing for Adequate Fire & Emergency Response Grant (SAFER)

http://www.fema.gov/staffing-adequate-fire-emergency-response-grants

The Staffing for Adequate Fire and Emergency Response Grants (SAFER) was created to provide funding directly to fire departments and volunteer firefighter interest organizations to help them increase or maintain the number of trained, "front line" firefighters available in their communities. The goal of SAFER is to enhance the local fire departments' abilities to comply with staffing, response and operational standards established by the NFPA (NFPA 1710 and/or NFPA 1720).

Fire Prevention & Safety Grants (FP & S)

http://www.fema.gov/fire-prevention-safety-grants

The Fire Prevention and Safety (FP&S) Grants are part of the Assistance to Firefighters Grants (AFG) and support projects that enhance the safety of the public and firefighters from fire and related hazards. The primary goal is to reduce injury and prevent death among high-risk populations. In 2005, Congress reauthorized funding for FP&S and expanded the eligible uses of funds to include Firefighter Safety Research and Development.

Buffer Zone Protection Program (BZPP)

http://www.fema.gov/pdf/government/grant/bzpp/fy06_bzpp_guidance.pdf

The FY 2006 BZPP provides funds to build capabilities at the state and local levels to prevent and protect against terrorist incidents primarily done through planning and equipment acquisition.

Emergency Management Performance Grant Program

https://www.fema.gov/fiscal-year-2015-emergency-management-performance-grant-program

The purpose of the EMPG Program is to provide Federal grants to states to assist state, local, territorial, and tribal governments in preparing for all hazards, as authorized by the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Stafford Act), as amended (42 U.S.C. §§ 5121 et seq.) and Section 662 of the Post Katrina Emergency Management Reform Act of 2006, as amended (6 U.S.C. § 762). Title VI of the Stafford Act authorizes FEMA to make grants for the purpose of providing a system of emergency preparedness for the protection of life and property in the United States from hazards and to vest responsibility for emergency preparedness jointly in the Federal government and the states and their political subdivisions. The Federal government, through the EMPG Program, provides necessary direction, coordination, and guidance, and provides necessary assistance, as authorized in this title, to support a comprehensive all hazards emergency preparedness system.

State Homeland Security Program

https://www.fema.gov/fiscal-year-2015-homeland-security-grant-program

The SHSP assists state, tribal and local preparedness activities that address high-priority preparedness gaps across all core capabilities and mission areas where a nexus to terrorism exists. SHSP supports the implementation of risk driven, capabilities-based approaches to address capability targets set in urban area, state, and regional Threat and Hazard Identification and Risk Assessments (THIRAs). The capability targets are established during the THIRA process, and assessed in the State Preparedness Report (SPR) and inform planning, organization, equipment, training, and exercise needs to prevent, protect against, mitigate, respond to, and recover from acts of terrorism and other catastrophic events

Urban Areas Security Initiative

https://www.fema.gov/fiscal-year-2015-homeland-security-grant-program

The UASI program funds addressed the unique risk driven and capabilities-based planning, organization, equipment, training, and exercise needs of high-threat, high-density Urban Areas based on the capability targets identified during the THIRA process and associated assessment efforts; and assists them in building an enhanced and sustainable capacity to prevent, protect against, mitigate, respond to, and recover from acts of terrorism.

Operation Stonegarden

https://www.fema.gov/fiscal-year-2015-homeland-security-grant-program

OPSG program supports enhanced cooperation and coordination among Customs and Border Protection (CBP), United States Border Patrol (USBP), and local, tribal, territorial, state, and Federal law enforcement agencies. The OPSG Program funds investments in joint efforts to secure the United States' borders along routes of ingress from international borders to include travel corridors in states bordering Mexico and Canada, as well as states and territories with International water borders.

Pre-Disaster Mitigation Grant Program

https://www.fema.gov/pre-disaster-mitigation-grant-program

The PDM Program, authorized by Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, is designed to assist States, territories, Federally-recognized tribes, and local communities in implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis.

Hazard Mitigation Grant Program

https://www.fema.gov/hazard-mitigation-grant-program

The purpose of HMGP is to help communities implement hazard mitigation measures following a Presidential Major Disaster Declaration in the areas of the state, tribe, or territory requested by the Governor or Tribal Executive. The key purpose of this grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters. This webpage includes extensive resources and job aids to streamline project implementation. The primary guidance document for this program is the HMA Guidance. HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Community Assistance Grants

http://www.fs.fed.us/r6/fire/fireplan/apply/

The 2016 National Fire Plan grant process has been scaled down to accommodate a limited source of funding that is directly tied to state planning efforts. At a minimum, project proposals must reside within high priority areas identified in the statewide assessments and resource strategies (refer to links below) to be considered.

In order to focus limited resources and funding (potentially $875,000 within each state), the interagency Pacific Northwest Wildfire Coordinating Group, FMWT Fuels Management Working Team (PNWCG-FMWT) has asked the Washington Department of Natural Resources (DNR) and the Oregon Department of Forestry (ODF) to collaborate with communities that are within high priority areas.

Projects should address and reduce the threat of wildfire within Eligible Project Areas and be identified as high priority in a completed Community Wildfire Protection Plan (CWPP). DNR will work with local CWPP groups to identify and prioritize projects.

Western States Fire Managers Wildland Urban Interface Grant Program

http://wflccenter.org/state-private-forestry/wui-grants/

The focus of much of this funding is mitigating risk in Wildland Urban Interface (WUI) areas. In the West, the State Fire Assistance (SFA) funding is available and awarded through a competitive process with emphasis on hazard fuel reduction, information and education, and community and homeowner action. This portion of the National Fire Plan was developed to assist interface communities manage the unique hazards they find around them. Long-term solutions to interface challenges require informing and educating people who live in these areas about what they and their local organizations can do to mitigate these hazards.

Appendix 7 - Additional Information

Glossary of Terms

Defensible Space - The area within the perimeter of a parcel, development, neighborhood or community where basic wildland fire protection practices and measures are implemented, providing the key point of defense from an approaching wildfire or defense against encroaching wildfires or escaping structures fires. The perimeter as used in this definition is the area encompassing the parcel or parcels proposed for construction and or development, excluding the physical structure itself. The establishment and maintenance of emergency vehicle access, emergency water reserves, street names and building identification, and fuel modification measures characterize the area.

Disturbance - An event which affects the successional development of a plant community (examples: fire, insects, windthrow, and timber harvest).

Diversity - The relative distribution and abundance of different plant and animal communities as well as species within an area.

Exotic/Invasive Plant Species - Plant species that are introduced and not native to the area.

Fire Behavior - The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Behavior Prediction Model - A set of mathematical equations that can be used to predict certain aspects of fire behavior when provided with an assessment of fuel and environmental conditions.

Fire Danger - A general term used to express an assessment of fixed and variable factors such as fire risk, fuels, weather, and topography which influence whether fires will start, spread, and do damage; also the degree of control difficulty to be expected.

Fire Exclusion - The disruption of a characteristic pattern of fire intensity and occurrence (primarily through fire suppression).

Fire Intensity Level - The rate of heat release (BTU/second) per unit of fire front. Four foot flame lengths or less are generally associated with low intensity burns and four to six foot flame lengths generally correspond to “moderate” intensity fire behavior. High intensity flame lengths are usually greater than eight feet and pose multiple control problems.

Fire Prone Landscapes – The expression of an area’s propensity to burn in a wildfire based on common denominators such as plant cover type, canopy closure, aspect, slope, road density, stream density, wind patterns, position on the hillside, and other factors.

Fireline - A loose term for any cleared strip used in control of a fire. That portion of a control line from which flammable materials have been removed by scraping or digging down to the mineral soil.

Fire Management - The integration of fire protection, prescribed fire and fire ecology into land use planning, administration, decision making, and other land management activities.

Fire Prevention - An active program in conjunction with other agencies to protect human life, prevent modification of the ecosystem by human-caused wildfires, and prevent damage to cultural resources or

physical facilities. Activities directed at reducing fire occurrence, including public education, law enforcement, personal contact, and reduction of fire risks and hazards.

Fire Regime - The fire pattern across the landscape, characterized by occurrence interval and relative intensity. Fire regimes result from a unique combination of climate and vegetation. Fire regimes exist on a continuum from short-interval, low-intensity (stand maintenance) fires to long-interval, high-intensity (stand replacement) fires.

Fire Return Interval - The number of years between two successive fires documented in a designated area.

Fire Risk - The potential that a wildfire will start and spread as determined by the presence and activities of causative agents.

Fire Severity - The effects of fire on resources displayed in terms of benefit or loss.

Fire Use – The management of naturally ignited fires to accomplish specific prestated resource management objectives in predefined geographic areas.

Flashy Fuel - Quick drying twigs, needles, and grasses that are easily ignited and burn rapidly.

Fuel - The materials which are burned in a fire: duff, litter, grass, dead branchwood, snags, logs, etc.

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.

Fuel Loading - Amount of dead and live fuel present on a particular site at a given time; the percentage of it available for combustion changes with the season.

Fuel Model - Characterization of the different types of wildland fuels (trees, brush, grass, etc.) and their arrangement, used to predict fire behavior.

Fuel Type - An identifiable association of fuel elements of distinctive species; form, size, arrangement, or other characteristics, that will cause a predictable rate of fire spread or difficulty of control, under specified weather conditions.

Fuels Management - Manipulation or reduction of fuels to meet protection and management objectives, while preserving and enhancing environmental quality.

Habitat - A place that provides seasonal or year-round food, water, shelter, and other environmental conditions for an organism, community, or population of plants or animals.

Habitat Type - A group of habitats that have strongly marked and readily defined similarities that when defined by its predominant or indicator species incites a general description of the area; *e.q. a ponderosa pine habitat type*.

Heavy Fuels - Fuels of a large diameter, such as snags, logs, and large limbwood, which ignite and are consumed more slowly than flashy fuels.

Human-Caused Fires - Refers to fires ignited accidentally (from campfires, equipment, debris burning, or smoking) and by arsonists; does not include fires ignited intentionally by fire management personnel to fulfill approved, documented management objectives (prescribed fires).

Intensity - The rate of heat energy released during combustion per unit length of fire edge.

Inversion - Atmospheric condition in which temperature increases with altitude.

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

Landsat Imagery - Land remote sensing, the collection of data which can be processed into imagery of surface features of the Earth from an unclassified satellite or satellites.

Landscape - All the natural features such as grasslands, hills, forest, and water, which distinguish one part of the earth's surface from another part; usually that portion of land which the eye can comprehend in a single view, including all its natural characteristics.

Lethal - Relating to or causing death.

Lethal Fires - A descriptor of fire response and effect in forested ecosystems of high-severity or severe fire that burns through the overstory and understory. These fires typically consume large woody surface fuels and may consume the entire duff layer, essentially destroying the stand.

Litter - The top layer of the forest floor composed of loose debris, including dead sticks, branches, twigs, and recently fallen leaves or needles, little altered in structure by decomposition.

Mitigation - Actions to avoid, minimize, reduce, eliminate, replace, or rectify the impact of a management practice.

Monitoring Team - Two or more individuals sent to a fire to observe, measure, and report its behavior, its effect on resources, and its adherence to or deviation from its prescription.

Native - Indigenous; living naturally within a given area.

Natural Ignition - A wildland fire ignited by a natural event such as lightning or volcanoes.

Noxious Weeds - Rapidly spreading plants that have been designated "noxious" by law which can cause a variety of major ecological impacts to both agricultural and wildlands.

Planned Ignition - A wildland fire ignited by management actions to meet specific objectives.

Prescribed Fire - Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met, prior to ignition.

Prescription - A set of measurable criteria that guides the selection of appropriate management strategies and actions. Prescription criteria may include safety, economic, public health, environmental, geographic, administrative, social, or legal considerations.

Seral - Refers to the stages that plant communities go through during succession. Developmental stages have characteristic structure and plant species composition.

Stand Replacing Fire - A fire that kills most or all of a stand.

Surface Fire - Fire which moves through duff, litter, woody dead and down and standing shrubs, as opposed to a crown fire.

Watershed - The region draining into a river, river system, or body of water.

Wetline - Denotes a condition where the fireline has been established by wetting down the vegetation.

Wildland Fire - Any non-structure fire, other than prescribed fire, that occurs in the wildland.

Wildland Fire Use - The management of naturally ignited wildland fires to accomplish specific pre-stated resource management objectives in predefined geographic areas outlined in FMP's. Operational management is described in the WFIP. Wildland fire use is not to be confused with "fire use," which is a broader term encompassing more than just wildland fires.

Wildland Fire Use for Resource Benefit (WFURB) - A wildland fire ignited by a natural process (lightning), under specific conditions, relating to an acceptable range of fire behavior and managed to achieve specific resource objectives.

Wildland-Urban Interface (WUI) - For purposes of this plan, the wildland-urban interface is located defined in Section 4.5. In general, it is the area where structures and other human development meet or intermingle with undeveloped wildland.

General Mitigation Strategies

There are many actions that will help improve safety in a particular area; there are also many mitigation activities that can apply to all residents and all fuel types. General mitigation activities that apply to all of Chelan County are discussed below while area-specific mitigation activities are discussed within the strategic planning area assessments.

Prevention. The safest, easiest, and most economical way to mitigate unwanted fires is to stop them before they start. Generally, prevention actions attempt to prevent human-caused fires. Campaigns designed to reduce the number and sources of ignitions can be quite effective and can take many forms.

Limiting Use. The issues associated with debris burning during certain times of the year are difficult to negotiate and enforce. However, there are significant risks associated with the use of fire adjacent to expanses of flammable vegetation under certain scenarios. Fire departments typically observe the State of Washington closed fire season between July 1st to September 30th. During this time, an individual seeking to conduct an open burn of any type shall obtain a permit to prescribe the conditions under which the burn can be conducted and the resources that need to be on hand to suppress the fire. Although this is a statewide regulation, compliance and enforcement has been variable between fire districts.

Defensible Space. Effective mitigation strategies begin with public awareness campaigns designed to educate homeowners of the risks associated with living in a flammable environment. Residents of Franklin County must be made aware that home defensibility starts with the homeowner. Once a fire has started and is moving toward a structure, the probability of that structure surviving is largely dependent on the structural and landscaping characteristics of the building. The Firewise Communities USA program is an excellent tool for educating homeowners on the steps to take in order to create an effective defensible space. Residents of Chelan County should be encouraged to work with local fire departments and fire management agencies within the county to complete individual home site evaluations. Home defensibility steps should be enacted based on the results of these evaluations. Beyond the homes, forest management efforts must be considered to slow the approach of a fire that threatens a community.

Evacuation. Development of community evacuation plans is necessary and critical to assure an orderly evacuation in the event of a threatening wildland fire. Designation and posting of escape routes would reduce chaos and escape times for fleeing residents. Community safety zones should also be established in the event safe evacuation is impossible and 'sheltering in place' becomes the better option.

Access. Also of vital importance is the accessibility of homes to emergency apparatus. The fate of a home will often be determined by homeowner actions prior to the event. A few simple guidelines such as widening or pruning along driveways and creating a turnaround area for large vehicles, can greatly enhance home survivability.

Facility Maintenance. Recreational facilities near communities or in the surrounding forests such as parks or natural areas should be kept clean and maintained. In order to mitigate the risk of an escaped campfire, escape-resistant fire rings and barbeque pits should be installed and maintained. In some cases, restricting campfires during dry periods may be necessary. Surface fuel accumulations in nearby forests can also be kept to a minimum by periodically conducting pre-commercial thinning, pruning and limbing, and possibly controlled burns.

Fire District Response. Once a fire has started, how much and how large it burns is often dependent on the availability of suppression resources. In most cases, rural fire departments are the first to respond and have the best opportunity to halt the spread of a wildland fire. For many districts, the ability to reach these suppression objectives is largely dependent on the availability of functional resources and trained individuals. Increasing the capacity of departments through funding and equipment acquisition can improve response times and subsequently reduce the potential for resource loss.

Development Standards. County, city, and even fire district policies can be updated or revised to provide for more fire conscious techniques such as using fire resistant construction materials; improving roads, and establishing permanent water resources.

Other Mitigation. Other actions to reduce fire hazards are thinning and pruning timbered areas, creating a fire resistant buffer along roads and power line corridors, and strictly enforcing fire-use regulations. Ensuring that areas beneath power lines have been cleared of potential high risk fuels and making sure that the buffer between the surrounding lands is wide enough to adequately protect the poles as well as the lines is imperative.

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