Salmon River Community Wildfire Protection Plan

A Wildfire Protection Plan for Residents, Communities, and All Lands in the Watershed of the Salmon River, California

Red Salmon Complex from along Cecilville Road, October 12, 2020. Photo K. Greenberg

Coordinated by the Salmon River Fire Safe Council

March, 2021

Preface to the 2021 Salmon River CWPP

With the exception of online maps (see MAPPING section), almost the entirety of this document was created—including linked PDF maps—by March, 2021. Additional minor editing to the document was completed between March and December, 2021. However, this editing did not include complete inclusion of information from the wildfire season of 2021. The 2021 wildfire season included fires that burned a substantial proportion of the Salmon River Watershed—over 23% in total between the River Complex and the McCash Fire. The online Fire History map (see MAPPING section) has been updated to include the 2021 fire footprints, but the information in this document (e.g., FIRE HISTORY section) has not yet been updated to reflect the 2021 events.

The 2021 River Complex fire is important to consider for future planning efforts. This is especially true because it burned over a significant portion of the east part of the Salmon River Watershed where fire had not previously occurred since detailed records of fire perimeters have been kept (i.e. since the early 1900's). This area, partly because of the lack of fire in at least 100 years, and partly because it surrounds the town of Cecilville and its satellite rural communities, is called out in this CWPP document for being the highest priority area for fire hazard mitigation projects (e.g., fuels reduction and prescribed fire) in the Salmon River Watershed. In the areas that burned in 2021, it will be important to consider the wildfire's impacts to prioritize treatment areas and appropriate treatment types. For example, areas within the River Complex footprint that resulted in low severity fire effects may no longer be in need of immediate treatment, while areas with concentrations of fire-caused standing dead trees and/or heavy brush response may warrant sooner treatment.

Community Wildfire Protection Plan

Approval Signature Page

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Ruth D'Amico, Salmon-Scott District Ranger **Klamath National Forest**	Date
Bill Stirton, Battalion Chief **CAL FIRE Siskiyou Unit, Scott Valley CA**	Date
Tina Bennett, Fire Chief **Salmon River Volunteer Fire Department**	Date
Bill Tripp, Director **Karuk Tribe Department of Natural Resources**	Date
Brendan Twieg, Fire/Fuels/Forestry Program Coordinator **Salmon River Fire Safe Council**	Date

Stakeholders and Process

Core Planning Team

Member	Organization	Position
Tina Bennett	Salmon River VFD, SR FSC, resident	**EMT**, Fire Chief
Lori Connely	SR FSC; resident	n/a
Sharon Hoppas	SR FSC; resident	n/a
George Martin	SR FSC; resident	n/a
Will Harling	Mid Klamath Watershed Council, resident	Co-Director; WKRP Co-Lead and Core Team member
Scot Steinbring	Karuk Tribe	Fire Management Officer
Curt Lindstrand	Klamath National Forest	Fire Management Officer
Clint Isbell	Klamath National Forest	Fire Ecologist
Anna Wright	Klamath National Forest	Fuels Specialist – Salmon District
Josh Schmalenberger	Klamath National Forest	Fuels Specialist – Scott District
Bill Stirton	CAL FIRE	Battalion Chief, Siskiyou Unit
Spencer Holmes	Deer Creek Resources - Consultant	GIS Program Manager
Brendan Twieg	SR FSC; SRRC; resident	Fire, Fuels, and Forestry Program Coordinator
Karuna Greenberg	SR FSC; SRRC; resident	Restoration Director; WKRP Core Team

Requirements of a Community Wildfire Protection Plan (CWPP)

CWPP documents have evolved over the past decade due to changes in Federal and State policies. The following is a list of how those requirements have evolved within the different agencies:

Federal

CWPPs are required to be consistent with and tiered to the 2010 Federal Land Assistance Management and Enhancement (FLAME) Act and The Healthy Forest Restoration Act (HFRA) of 2003.

The Federal policies that implement these acts are the 10 Year Implementation Plan for HFRA and the 'National Cohesive Wildland Fire Management Strategy (Cohesive Strategy)' for the FLAME Act – The Cohesive Strategy is a national collaborative effort to make meaningful progress towards three goals:

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

The Healthy Forest Restoration Act (HFRA) gives funding priority to projects identified in a CWPP (HFRA sec 103 [d1]) and directs Federal agencies to consider recommendations identified in CWPPs (HFRA sec. 103[b]) and implement those projects on federal lands (HFRA sec. 102[a]).

State of California

This analysis is consistent and supported by the findings in the 2017 Forest and Range Assessment of California. (California Department of Forestry and Fire Protection, Fire and Resource Assessment Program, 2017)
https://frap.fire.ca.gov/media/3180/assessment2017.pdf
The 2019 Strategic Fire Plan for California (California Department of Forestry and Fire Protection and the California Natural Resources Agency 2019) is the State's road map for reducing the risk of wildfire. By placing the emphasis on what needs to be done long before a fire starts, the plan looks to reduce firefighting costs and property losses, increase firefighter safety, and contribute to ecosystem health. The plan was a cooperative effort between the State of California Natural Resources Agency and the California Department of Forestry and Fire Protection (CAL FIRE). The values in the CWPP are similar to CAL FIRE's strategic plan values of Service, Cooperation, and Protection.
https://www.fire.ca.gov/media/5504/strategicplan2019-final.pdf

CWPP GOALS AND OBJECTIVES

The Mission of the Salmon River Fire Safe Council (SR FSC) is:
To help plan, implement and monitor the reinstatement of natural fire regimes in the Salmon River ecosystem in a manner that protects life and property, improves forest health, and enhances the resources valued by its stakeholders.

The two overarching goals of the Salmon River Watershed CWPP are:

1) Protect life and property of residents and visitors.
2) Help direct the planning area toward a better relationship between fire, people, and the natural world.

The objectives presented in the CWPP that will help the planning area achieve these goals are:

- Prioritize and recommend fuel reduction programs, coupled with prescribed fire and management of unplanned ignitions to reduce adverse fire impacts to life, property, infrastructure, and other resources of community and cultural value.

- Compile critical information to provide to Incident Management Teams and other emergency response personnel that will assist in maximizing safety, effectiveness, efficiency and beneficial measures of fire management, and minimize adverse effects to resources.

- Recommend measures for restoring beneficial fire to the landscape.

- Provide data and rationale to enhance possibility of obtaining private, Federal, and State grants for reducing fuels and fire hazard to protect the community and restore fire resiliency to the surrounding landscape.

- Recommend actions to reduce the cost of managing large wildfires.

PLANNING AREA

The Salmon River Fire Safe Council's (FSC's) planning area is the entire watershed of the Salmon River, which covers 480,830 acres (751 square miles). This document will speak of the planning area and the watershed synonymously. The planning area consists of only about 1.2% private lands. Of the remaining area, about 83% is managed by Klamath National Forest (**KNF**), and about 17% is managed by Six Rivers National Forest (**SRNF**). SRNF covers the northwest portion of the watershed, capturing much of the tributary watersheds that feed the mainstem Salmon River downriver of the mouth of Nordheimer Creek.

A substantial proportion of the planning area is designated Wilderness Area. Within the planning area, the Marble Mountains Wilderness covers 148,934 acres, the Russian Wilderness covers 5,249 acres, and the Trinity Alps Wilderness covers 65,410 acres. A few of the improved private properties in the watershed are inholdings surrounded by designated Wilderness. The headwaters of the North Fork Salmon River are located in the Marble Mountains Wilderness, and the South Fork Salmon River originates in the Trinity Alps Wilderness. Both of these river forks and the mainstem Salmon River, which begins where the North and South Forks meet in the town of Forks of Salmon, were designated Wild and Scenic Rivers in 1981.

Incident Response – Fire and Medical Emergency

The private lands in the watershed are widely dispersed among the matrix of National Forest lands. Because of this, the California Fire Management Agreement (CFMA), between CAL FIRE (formerly California Department of Forestry and Fire Protection) and the Federal Agencies assigns KNF and SRNF response duties for the private lands they surround as Direct Protection Areas (**DPA**'s); USDA Forest Service are the first responders to fires throughout the watershed. Salmon River Volunteer Fire and Rescue (**SR VFR**) also responds to fires within the watershed, particularly on private properties when local capacity exists.

The SR VFR has fire response capabilities in Forks of Salmon. The SR VFR also has ambulance services in Forks of Salmon with Emergency Medical Technicians (EMTs) on call. SR VFR responds to emergency calls within the Salmon River watershed, but has limited capacities due to a lack of locally qualified volunteers. The lower mainstem Salmon River will have response from SR VFR and/or Orleans Volunteer Fire Department (OVFD), (in Humboldt County). Etna and Orleans Ambulance Services respond to emergency calls. Helicopter evacuation is provided by Mercy Air out of Weed and Medford Air. Almost all emergency response calls for injuries within the watershed result in a helicopter transport due to the remote location and limited local

capacity. The Forest Service has seasonally staffed fire stations in Sawyers Bar, Petersburg (near Cecilville) and Oak Bottom (near Somes Bar).

Community Liaison Program

The purpose the of the Salmon River Community Liaison Program (CLP) is to facilitate timely and transparent communication and information exchange between the incoming Incident Management Teams (IMT's), the local Forest Service (USFS), and the affected communities during and after a wildfire event.

Liaisons are often trusted community members with ample fire, natural resource, and community knowledge who can be effective at getting real-time information out to local and interested audiences, assure that place-based and accurate local knowledge and information is available for fire teams, and ease tensions as they arise in this stressful wildfire environment. When embraced and skillfully implemented, Community Liaison Programs can have huge benefits to communities, governing agencies like the USFS and CAL FIRE, and Incident Management Teams.

The Klamath National Forest (KNF) has embraced the CLP concept since shortly after its inception in 2009 and has encouraged all of the Fire Safe Councils within the Forest to assign local liaisons.

When a single wildfire event or a fire complex (several wildfires) becomes more than the local fire crews can handle, an Incident Management Team (Team) is brought in to manage the fire suppression operation. The Team needs to be brought up to date on many aspects including location of private properties and structures, emergency access routes, Engine Fill Sites, and other infrastructure and community information. Many of the current Salmon River community members have lived here through numerous wildfire events and know a surprising amount about fire behavior, fuel conditions, topography, and the needs and resources of community residents and properties.

The Salmon River Restoration Council (SRRC), in coordination with the Salmon River Fire Safe Council, have extensive GIS capabilities and information that can be very useful to Incident Management Teams in their wildfire management role. Local community members are always concerned and want to know detailed information about how wildfires are being managed in real time, so they can make informed decisions. The Incident Management Team is too often either unprepared for the complexities of managing wildland fires in the rugged and isolated Klamath Region, reluctant to listen to local community input due to valid concerns for accuracy

and consistency, or concerned about being inundated by local community members giving advice and asking questions.

To assist the Team and local US Forest Service, the SRRC and FSC have developed a team of FSC/Community Liaisons (Liaisons) who are prepared with accurate information that can save the Team time, increase efficiency, and promote safety for the Team, the FSC, landowners, and the Community. Liaisons are responsible for coordination with the Team to address their needs and concerns and to serve as a tiered link with landowners and the Community. The Community Liaison Program does not negate the important need for formal community meetings which give the Team and community members periodic face to face information sharing; instead, the Liaisons help coordinate these meetings and build cooperation and information exchange that increases the Team's effectiveness in protecting residents and residences, as well as providing the maximum amount of information to the communities affected.

The Liaisons are selected to participate in the program by their ability, willingness and knowledge of the community and fire history and behavior. The SRRC/FSC supply them with a cache of maps and other information that can be provided to the Team and local Forest Service during a wildfire emergency. Liaisons are expected to attend the annual Fire Safety Refresher in order to be able to work with the Team when such qualifications are needed. On an annual basis, in spring, the Community Liaison Program should be reviewed and updated as needed by the FSC to promote accurate and consistent information regarding Liaisons, their contact information, map layers, and other pertinent tools for managing wildfires in the Salmon River. The District and Forest will recommend that the Team use the Community Liaison Program. This is done through in the letter of designation that an incoming Incident Management Team signs when they take over management of the fire.

The Klamath hosts a community liaison program wherein community volunteers have been identified to be a main point of contact during fire incidents. To give you a feel for this unique program the typical expectations of the community liason are listed below. Attached in Appendix B are all the names and contact information for the liaisons by community.

The Community Liaison Team will perform the following:

1. Annually update and maintain community information
2. Work with local Forest Service to annually update and maintain corporate data
3. Work with incoming Incident Command Teams to share local conditions and community information/concerns
4. Work with communities throughout the year to communicate the importance of private property fuel reduction
5. Work with the communities during wildfire events to help communicate what is happening
6. Provide information to the situation and planning portion of the IMT
7. Work with line officer while writing operational objectives before the new team arrives
8. Develop a mission critical checklist to get across to the new team

Excerpt from Klamath National Forest Incident Information Guidance

The Klamath has a community liaison program, established to provide incoming IMT's a local contact to coordinate communication and information between the IMT and the community. The liaison for the Log and Man fires is Larry Alexander of the Coalition of Fire Safe Councils of Scott Valley; Bruce Courtright is his alternate. The liaison for the Whites and Leef fire is Karuna Greenburg of the Salmon River Fire Safe Council; Will Harling will serve as her alternate. The Rays fire has no liaison designated. Please extend these liaisons every courtesy and ensure that they are integrated into team planning and operations to the extent they desire. In addition, establishing and maintaining excellent general public relations and providing timely and accurate information to local stakeholders is critical. The timely production of news releases, updates to inciweb, and the professional conduct of public meetings are important components of our shared success with this complex.

Excerpt from the KNF Letter of Designation, signed by incoming IC from IMT

Local Areas and Neighborhoods

There are four primary unincorporated communities in the planning area and no incorporated municipalities. See the Local Areas Reference Map for their locations. These communities are:

- Somes Bar, at the confluence of the Salmon River with the Klamath River; a good portion of this community is located outside of the planning area, on the mid- Klamath, and is served by the Orleans/Somes Bar Fire Safe Council.
- Forks of Salmon, at the confluence of the North Fork Salmon River and South Fork Salmon River.
- Sawyers Bar, about 14 road miles up the North Fork Salmon River from Forks of Salmon.
- Cecilville, about 17.5 road miles up the South Fork Salmon River from Forks of Salmon.

Each of these communities has several outlying neighborhoods with private properties and residences clustered to various degrees. For the purposed of this CWPP, these four communities are referred to as "Local Areas", and a fifth Local Area—the Bear Country Area—is added to define an area that is somewhat distanced from the other communities and has three large, separate inholdings (some with multiple parcels) that are surrounded by KNF lands. Each of the Local Areas are further divided into "Neighborhoods" to facilitate communication and break up the area into geographic units that can be mapped at appropriate scales; at the Neighborhood level, maps include such details as structures, private roads and any bridges along them, water storage and sources, hydrants, etc. See the Local Area Reference Map for relative location of each Local Area.

Somes Bar Local Area

The center of Somes Bar is generally considered to be where the store (Salmon River Outpost) is located, which is on the boundary of the planning area. Much of the Somes Bar community is located outside of the planning area. For purposes of this CWPP, two neighborhood areas are defined in the Salmon River watershed that are near Somes Bar: 1) Somes Bar to Oak Bottom and Camp Three Road, and 2) Butler Creek and Butler Flat neighborhoods.

Somes Bar to Oak Bottom and Camp Three Road

The Somes Bar to Oak Bottom and Camp Three neighborhood encompasses the private parcels, allotments, and USFS work stations from the mouth of the Salmon River along Highway 96, up the Salmon River Road to Three Dollar Bar near the MS milepost 3, as well as a private inholding up Camp Three Road (Forest Road 15N17). The neighborhood contains three clusters of residents along the lower Main-stem Salmon River, one near the confluence with the Klamath River, a second about one mile up the Salmon River Road at Merrill Creek, and the third between Oak Bottom (MS milepost 2) and Three Dollar Bar (MS milepost 3), as well as one

private inholding up Camp Three Road. Overall, the neighborhood contains over 30 residences on private, allotment and USFS managed lands, including multiple USFS employee trailers at the *USFS Oak Bottom Work Station*.

This neighborhood is the only neighborhood on the Salmon River with grid power (electricity from a utility provider). The *Salmon River Outpost*, the only store within the planning area, is located on Highway 96 at the far western edge of the watershed. It provides diverse grocery options as well as local crafts, regional books, fishing licenses and paraphernalia, propane, coffee and other essential household goods. Recreational facilities within the neighborhood include three river accesses (George Geary, Oak Bottom, Brannon's Bar), and the Oak Bottom Campground (with a permanent campground host), as well as the Wooley Creek Trailhead and Steinacher Trailhead.

There are four engine fill sites within the neighborhood, one at the Merrill Creek crossing, one at George Geary River Access, a third at the Oak Bottom River Access and one at Oak Bottom Work Station. A USFS fire use module resides at the Oak Bottom Work station year round.

Butler Flat and Butler Creek

The Butler Flat and Butler Creek neighborhood consist of three private inholdings around the confluence of Butler Creek with the Mainstem Salmon River, at around the MS milepost 7.5. The neighborhood contains approximately 10 residences.

Adjacent to the public vault toilet at Butler Creek, there is a steep, short trail that accesses the creek and can be used to pump water to an engine (using a portable pump). Additionally, the Butler Creek property has a community water system that provides water to the residences as well as multiple hydrants throughout the property.

The neighborhood has had considerable fuels reduction and prescribed burning conducted on the properties. The 2013 Butler Fire burned around and onto the Butler Creek property, holding at the ditch line above the residences. This fire greatly reduced the fuel loading on the surrounding forest lands, but is overdue to a repeat understory burn to maintain a healthy fire regime and low fuels. Pockets of high severity fire from 2013 have created fuel jackpots both on and adjacent to private property.

Wilderness-Surrounded Property – Trail Access Only

Wooley Creek

The inholding property about 6.2 miles up the Wooley Creek Trail has two houses just above Wooley Creek on creek right. These include the Hoover Cabin, a historic site where President's Herbert Hoover and Teddy Roosevelt once came to fish for steelhead, and the caretaker's cabin. There is another historic cabin, Fowler's Cabin, two miles further up Wooley Creek on public lands. This property is accessible by foot or stock only, and this trail is sporadically maintained.

Forks of Salmon Local Area

The small unincorporated town of Forks of Salmon is the center of the Forks of Salmon Local Area; it is located around the confluence of the North and South Forks of the Salmon River. This local area consists of four neighborhood areas, listed below, with the town of Forks of Salmon containing the main services available within the local area. The Forks of Salmon Local Area covers the private and allotment lands from Morehouse Creek (Mile 11.5) on the mainstem Salmon River Road, up the North Fork Salmon River to Dougherty Mine (5-mile post) on the Sawyers Bar Road, and 4.5 miles up the South Fork Salmon River to just before "Windy Bridge" where the road crosses the river.

Crapo Creek and Nordheimer Creek, to Morehouse Creek

This is the most downriver grouping of private properties in the Forks of Salmon Local Area and is located entirely along the mainstem Salmon River. The neighborhood reaches between Morehouse Creek (MS 11.5 mile) and Quail Flat (MS 14-mile post), and includes properties up Nordheimer and Crapo creeks. The neighborhood contains 12 residences on eight private parcels, as well as the KNF and SRNF jointly managed Nordheimer Flat Campground and River Access. The campground consists of 4 group sites, multiple individual sites, 4 vault toilets, a popular river access for boating, and a pay phone. The campground does not currently have a campground host.

Downtown Forks of Salmon to Otter Bar

The Forks of Salmon to Otter Bar neighborhood is the central grouping of properties within the Forks of Salmon Local Area. The neighborhood encompasses the confluence of the North Fork, South Fork, and mainstem Salmon River, reaching 3 miles down the mainstem to just below Otter Bar Lodge (MS-15-mile post), one mile up the North Fork, and about ½ mile up the South Fork to encompass the Old Post Office Road. The neighborhood contains approximately 25 private residences on 20 private parcels and allotments. The Forks of Salmon neighborhood also contains many of the services available in the Salmon River planning area, including the ***Forks of***

Salmon Post Office, Forks of Salmon Community Park with public vault toilet, *Forks of Salmon Elementary School*, *Forks of Salmon Community Club*, *Salmon River Volunteer Fire and Rescue* headquarters, the *Siskiyou County Public Works/Salmon River Road Division* headquarters, *Siskiyou Telephone Company* facility, and the Otter Bar Lodge. Additionally, there is an engine fill site below the school, several historic structures and an old USFS station site that is often used as a fire camp or spike site during wildfire events.

Across the road and up the hill from the post office, there is a 20,000-gallon water storage tank that is connected to a pump site in the river below the Post Office. This system is designed to feed the 4 fire hydrants throughout the town of Forks of Salmon. However, this system has never been fully functional. The pump housing and location needs to be worked on, and there is a leak in the line under the current post office. A new line needs to be added in to bypass the portion under the post office. This new line construction requires permitting from the Klamath National Forest for the ground disturbance. This hydrant system is essential for the safety of the town of Forks of Salmon and would have been very helpful and saved considerable resources during the 2020 wildfire season if it had been functional.

Recommendation: The USFS, Salmon River Volunteer Fire and Rescue, and Salmon River Fire Safe Council should work together to design and permit the new pipe extension, pump housing and draft location. Once permitted, funds should be acquired to complete the work and make the system fully functional.

There is a neighborhood water system out of McNeal Creek that provides water to several residences as well as the Forks of Salmon School grounds and the Forks of Salmon Community Club.

Knownothing Neighborhood

The Knownothing neighborhood is the grouping of properties on the lower South Fork Salmon River above and below the mouth of Knownothing Creek. The neighborhood starts 1.5 miles up the South Fork Salmon River and ends just below the SF 5-mile post, below Windy Bridge, where that Cecilville Road crosses the South Fork Salmon River. The neighborhood contains approximately 16 private residences on 14 private parcels and allotments. The neighborhood also includes structures up the Knownothing Creek drainage, including several historic structures. There are two engine fill sites within the neighborhood, one at the Knownothing Creek bridge crossing and one just upriver from the main cluster of homes, with an additional engine fill site on the downriver side of Windy Bridge.

This neighborhood had considerable fuels reduction and fire preparations conducted in summer 2020 in preparation for the Red Salmon Complex wildfire. The Red Salmon Complex burned around the southern extent of the neighborhood at low intensity. Low intensity fire was brought around, and in some instances through, the properties on the south side of the Cecilville Road, with the assistance of defensive firing operations by experienced, local fire use crews. The risk of detrimental wildfire coming from the south, west and east has been greatly reduced to the Knownothing Neighborhood by this extensive wildfire.

The Knownothing Neighborhood has been plagued by water shortages due to continuing drought and the loss of a community water system originating from Knownothing Creek. Several landowners lost water lines in the 2020 Red Salmon Complex that have not been rebuilt, increasing the need to pump water from Knownothing Creek and the SF Salmon River.

Recommendation: As drought and wildfire interact to reduce instream flows and destroy above ground gravity fed water systems, residents are forced to pump out of mainstem rivers and large side creeks, with potential for fuel spillage and increased costs. Funding could be sought to install buried water systems for our most at-risk and needy residents, both in the Knownothing Neighborhood and throughout the watershed. This would reduce the impacts of burned plastic in tributary streams, and provide critical water delivery for both residents and fire suppression.

Lower North Fork Neighborhood

The Lower North Fork neighborhood encompasses properties from above the 1-mile post to below the 5-mile post on the North Fork Salmon River (Sawyers Bar Road). The neighborhood contains one cluster of homes on the down river end and several outlying properties moving upriver, including 8 private residences on 7 private parcels and an historic home on USFS managed lands. There are two engine fill sites within the neighborhood, one at Yellow Jacket Mine (NF 3.2 mile) and the second at Sawpit Flat (NF 3.8 mile) on the Sawyers Bar Road.

Cecilville Local Area

The small, unincorporated town of Cecilville is the center of the Cecilville Local Area. The local area extends from the 16 milepost through the 23 milepost on the Cecilville Road. It includes the inholdings on Taylor Creek, and continues out the South Fork Salmon River through Petersburg and Summerville. It also includes the Upper South Fork wilderness trail access properties, in the Trinity Alps Wilderness. There are four neighborhoods identified within the Cecilville Local Area: Cecilville Downtown; Cecilville Upper South Fork; Cecilville East Fork South Fork Salmon and Taylor Creek; and Upper South Fork Trail-Access Properties.

Cecilville Downtown

The Cecilville Downtown neighborhood is located between miles posts 16 and 18.5 along the Cecilville Road, on the South Fork Salmon River. The neighborhood stretches along the main road and the South Fork for just over two miles of more or less contiguous private lands, contains approximately 22 private residences on around the same number of private parcels.

The Cecilville Downtown neighborhood contains most of the services available within the local area. These services are located in the center of town under one ownership, they include the only gas station and bar on the Salmon River, the ***Salmon River Saloon*** and ***Cecilville Station***, as well as the ***Salmon River Disc Golf Course***, and a couple of rental cabins. At the upriver extent of the neighborhood are the
Cecilville Community Center, and the engine bays for the Cecilville Hose Company, associated with the ***Salmon River Volunteer Fire and Rescue***. One engine is located here, however with the size of the community overall, there are not always volunteers available to staff the engine. Additionally, there are two engine fill sites within the neighborhood (S15.8, and S17.8); the St. Claire engine fill site is the most often used and most accessible and is located on private lands at St. Clair Creek (SF 15.8 milepost), the Cecilville Access engine fill is located at the 17.8-mile post. Additionally, there are two 5,000 gallon tanks located next to the engine bays and Cecilville Community Center, they are plumbed for fire hose fittings and need to be refilled with a pump from the river.

The Cecilville Downtown neighborhood got considerable fuels reduction efforts and fire preparations conducted in summer 2020, ahead of the Red Salmon Complex. The Red Salmon Complex did not end up burning beyond the southwestern side of Plummer Creek, some distance downriver of the neighborhood. In 2021, Cecilville was again threatened by the River Complex that burned to the south and east, burning around homes on Taylor Creek and the upper South Fork Salmon River. The risk of detrimental wildfire coming from the south has been greatly reduced to the Cecilville Local Area by these extensive wildfires.

Cecilville East Fork South Fork Salmon and Taylor Creek

The Cecilville East Fork and Taylor Creek neighborhood consists of the clusters of properties and private inholdings along the East Fork South Fork Salmon River, between miles posts 20.5 and 23 along the Cecilville Road. This neighborhood also includes properties on Taylor Creek. The neighborhood contains approximately 9 private residences on 8 private parcels. There are two engine fill sites within the neighborhood, along Taylor Creek, the first is at the bridge that crosses Taylor Creek about 1/10th of a mile up forest road 38N04, the second is located 2.5 miles up Forest Road 38N04, just past the upper private inholding.

Cecilville Upper South Fork

The Cecilville Upper South Fork neighborhood encompasses the Petersburg and Summerville areas, including two ranches and a fire station along with several additional private parcels along the Caribou Road that follows the South Fork Salmon River where the river bends south and leaves the Cecilville Road. The neighborhood contains approximately 6 private residences on 4 private parcels, as well as the USFS Petersburg Fire Station, and accompanying barracks and engine bays. USFS KNF Engine 45, which is based out the Petersburg Fire Station is staffed during fire season. There are two engine fill sites within the neighborhood, the first is just over a mile up the Caribou Road 1E003, the second is located at the Petersburg Fire Station, 2.5 miles up the Caribou Road.

Upper South Fork Salmon Trail-Access Properties

Trails to these four properties, all completely surrounded by the Trinity Alps Wilderness, begin at the South Fork Trailhead near the end of Caribou Road, and near the intersection of the **FS** 37N08 Road. Access and egress are of particular concern for these isolated properties in the event of a wildfire. These properties were successfully defended during the 2021 River Complex Fire.

Rush Creek Wilderness Property (Menzies Ranch)

The Rush Creek Trail (9W14) heads NE from the South Fork Trailhead, following Rush Creek. At 3 miles, the trail forks, with the right-hand fork (McNeil Trail 10W25) crossing the main stem of Rush Creek and following one of its tributaries another 1.5 miles to the Menzies' Ranch. This trail continues east over the watershed boundary and meets Coffee Creek Road (in the Trinity River Watershed) about 4.5 miles past where it accesses the property. The property contains one cabin.

South Fork Salmon River Wilderness Properties (Glacierview Ranch, and Lakeview Ranch)

The South Fork Trail (11W34) heads ESE from the South Fork Trailhead, near the junction of Caribou Rd. and 37N08, paralleling the South Fork Salmon River, to three inholding properties. The trail intersects the first property, on which there currently are no structures, at about 1 mile in. The trail continues through this property before intersecting with another trail 0.3 miles further. From here, the northern branch goes 0.75 miles to the Glacierview Ranch property, which has large meadows, a house, and outbuildings; the meadows are large enough to serve as a **safety zone** in most fires. The trails into the Glacierview Ranch are accessible by ATV, and the property owners maintain an easement for use with the Forest Service.

The South Fork Trail (11W34) continues, following the left-hand branches, for about 2.2 miles to the east side of the Lakeview Ranch property, where there is a house and outbuildings. From the Lakeview Ranch, the trail continues 3.9 miles to Coffee Creek Road in the Trinity River Watershed. Another 0.4-mile connecting trail goes from near the end of this trail to the trailhead parking at Big Flat campground and trailhead.

Recommendation: It is recommended that particular focus be made on performing fuels reduction, home hardening, communications such as satellite internet, and in maintaining safety zones where feasible on these properties. The isolated locations and slow trail access make rapid evacuations particularly difficult.

Sawyers Bar Local Area

The small, unincorporated town of Sawyers Bar is the center of the Sawyers Bar Local Area and contains all available services within the local area; it is located between mile posts 14 and 15.5 along the Sawyers Bar Road. There are five neighborhoods identified within the Sawyers Bar Local Area: Little North Fork; Sawyers Bar Downtown; Eddy Gulch, White's Gulch, and Uncle Sam; Finley Camp, Rainbow Mine and Snowden; Taylor Hole.

Little North Fork

The Little North Fork neighborhood encompasses properties and allotments along the Sawyers Bar Road from the Gallia Mine to Jackass Gulch (NF mile posts 10-13), on the North Fork Salmon River. The neighborhood contains one cluster of homes on the down river end and one outlying property moving upriver, and includes approximately seven private residences on three private parcels and allotments. There are three engine fill sites within or adjacent to the neighborhood, one at Gallia Mine (NF 10.2-mile), one at a pond on private lands at the Little North Fork ranch (NF 11.2-mile), and two options at Jackass Gulch (NF 13.11-, 13.12-mile)—one in Jackass Gulch above the bridge, and one in the North Fork Salmon River below the road.

Sawyers Bar Downtown

The Sawyers Bar Downtown neighborhood is located between miles posts 14 and 16 along the Sawyers Bar Road, on the North Fork Salmon River. The neighborhood stretches along the main road and the North Fork for just under two miles of mostly contiguous private lands, contains approximately 37 private residences on around the same number of private parcels.

The Sawyers Bar Downtown neighborhood contains most of the services available within the local area. These services are located throughout the town, they include: The ***Salmon River Restoration Council***, a multipurpose watershed center/nonprofit organization that offers internet, computer, and fax services, and employs many community members; the ***Historic***

Catholic Church, the oldest Catholic Church in far northern California, built in 1855; the ***USFS Sawyers Bar Fire Station*** which includes barracks, a local engine staffed in summer months and the Salmon River Hotshots; the ***Sawyers Bar Post Office***, the ***Sawyers Bar Town Hall***; and the ***Sawyers Bar County Water District*** town water facilities. The water district facilities include two water sources, a treatment plant, ~50,000 gallons of water storage, and supply water to residents within the town as well as the 16 fire hydrants dispersed through town. Additionally, there is one engine fill site within the neighborhood (N14.7), located on the North Fork behind the Sawyers Bar Post Office; **however** this site is on private land and is behind a gate that is sometimes locked. The Community Liaison can help obtain permission and get access during a fire. This river bar location also serves as a helicopter landing area in case of medical emergencies.

Significant fuels work has been completed by SR FSC/SRRC and the USFS as a fuels break around the north side of Sawyers Bar. In 2017 the USFS conducted a 1,536 acre prescribed fire encircling the north side of town in the Tanners Gulch drainage. This prescribed fire took advantage of the reduced fuels from the 2013 Salmon Complex and the 2014 August Complex that made up its exterior boundary, creating a significantly reduced fuels zone for miles to the north and minimizing risks for the prescribed fire.

Recommendation: It is recommended that the Sawyers Bar County Water District seek infrastructure funding to upgrade the town water system, separating the hydrant and fire protection system from household water system, and reestablishing a backup pumping system from the river in the case of emergency.

Eddy Gulch, White's Gulch, and Uncle Sam

The Eddy Gulch, White's Gulch, and Uncle Sam neighborhood encompasses properties along two tributaries, Eddy Gulch and White's Gulch, that come into the south side of the North Fork Salmon River from the upper end of Sawyers Bar Downtown (NF mile post 15) to Whites Gulch (NF mile post 18). The neighborhood contains one cluster of homes a mile up Eddy Gulch, and several outlying private inholdings, and includes approximately seven private residences on six private parcels. There are five engine fill sites within or adjacent to the neighborhood, two up Eddy Gulch—one at Rollins Mine and the other on East Fork Eddy Gulch—and three near the bottom of Whites Gulch—one on the North Fork Salmon River just upstream of the Whites Gulch bridge, and two about a ½ mile up Whites Gulch Road (2E002) near the private inholding.

The 2014 Whites Fire burned across and/or directly around the two properties in White's Gulch. While the fire greatly reduced forest fuels, much of the area burned at high intensity and was

stand replacing, resulting in large snag patches and heavy cover of brush where mature forests previously stood.

Finley Camp, Rainbow Mine and Snowden

The Finley Camp, Rainbow Mine, and Snowden neighborhood encompasses properties along the North Fork Salmon River, North Russian Creek, and South Russian Creek, between mile posts 19 and 23.5 on the Sawyers Bar Road. The neighborhood contains one cluster of homes at Finley Camp and another between Idlewild Campground and Mule Bridge Campground along the North Fork Salmon River, as well as outlying private inholdings on North Russian Creek and at Rainbow Mine up South Russian Creek. The cabins up the North Fork above Idlewild Campground are lease cabins on USFS managed lands. Overall, the neighborhood contains approximately 11 residences and cabins on nine private parcels, and seven residences and cabins on USFS leases.

There are six engine fill sites within or adjacent to the neighborhood, two up Forest Road 40N47 from Idlewild Campground near the lease cabins, one at the North Russian bridge at the bottom of Forest Road 40N54, one up South Russian on the driveway to Rainbow Mine, and two along North Russian Creek near Snowden, between mile posts 22 and 23 on the Sawyers Bar Road.

The 2014 Whites Fire burned across and/or directly around the properties at Finley Camp and Rainbow mine, and the 2017 August Complex burned around Mule Bridge lease residences as well as Snowden. The Whites Fire burned one residence and several structures at Rainbow Mine. For the most part these two fires greatly reduced forest fuels around these properties and residences, however there are significant areas in both of these fires that burned at high intensity, resulting in large snag patches full of brush.

Taylor Hole

The Taylor Hole neighborhood encompasses a cluster of properties within the Taylor Creek Neighborhood on the upper North Fork Salmon River, along Forest Road 41N18. There are 3 residences on the private lands within the neighborhood. Forest Road 41N18 ends at the popular Taylor Lake Trailhead which accesses the Russian Wilderness area.

The 2014 Whites Fire burned onto the lower end of the Taylor Hole properties. There are no designated engine fill sites within this neighborhood, although there is a private road that accesses Taylor Creek. An extensive fuels reduction project was facilitated by SRRC in 2019-2020, covering most of the private properties.

Wilderness-Surrounded Property – Trail Access Only

Abbott Ranch

This Ranch is accessed via the North Fork Salmon River Trail in the Marble Mountain Wilderness. It is only accessible by foot or stock. The trail from the Mule Bridge Trailhead reaches the private inholding at just over four miles, and then it is about another 1/4 mile along the trail to where structures (a small cabin and some outbuildings) exist.

Bear Country Local Area

The Bear Country Local Area does not have a town or community center; instead it is made up of several private inholdings surrounded by National Forest managed lands within the Bear Country Area, defined loosely as the upslope land between the North and South Forks of the Salmon River, roughly from Black Summit westward. For the purpose of this CWPP, the Bear Country Local Area is divided into two Neighborhoods: 1) Godfrey and Harris Ranch, and 2) Blue Ridge and Black Bear Ranch. There are no services within this Local Area.

Godfrey Ranch and Harris Ranch

The Godfrey and Harris Ranch neighborhood encompasses properties within the upper 2/3rds slope of the Negro Creek drainage, along Forest Road 39N30. Currently all infrastructure and residences are located on Godfrey Ranch, a cluster of seven private parcels around large open meadows. The neighborhood contains approximately 14 private residences on seven private parcels. There is one engine fill site within the neighborhood, at an agricultural pond just north of the ranch on USFS lands, that is filled from Negro Creek. As the climate warms and dries in the area water sources are becoming scarce in the neighborhood and the nearly creeks, leaving the neighborhood dependent on winter water storage during fire season.

This neighborhood has had the most severe losses during wildfire events with the planning area. As a result, a considerable effort has been made to conduct fuels reductions, prescribed fires, and fire preparedness actions throughout the neighborhood. In preparation for the potential of the 2020 Red Salmon Complex crossing the South Fork Salmon River, extensive fire preparations were performed by residents, volunteers, and fire team crews. Along with defensible space work this included firelines that were put in surrounding the property on the south and north sides and tying into Forest Road 39N30. The neighborhood contains one of the largest and most dependable safety zones within the planning area, a 20-acre meadow with low cropped grass from grazing. This area was considered a valid and valuable safety zone by fire teams during the 2020 Salmon Complex wildfires.

Blue Ridge Ranch and Black Bear Ranch

The Blue Ridge and Black Bear Ranch neighborhood encompasses two properties within the Bear Country area, Blue Ridge Ranch in upper Indian Creek, and Black Bear Ranch midway up Black Bear Creek. The neighborhood contains approximately seven private residences on the ranches. There are three engine fill site within the neighborhood, one a 10,000-gallon private tank at Blue Ridge Ranch with a slow recharge rate, at pond in the upper reaches of Argus Gulch along Forest Road 39, locally known as Cedar Springs, and the third on Black Bear Creek just below the main residence at Black Bear Ranch. As the climate warms and dries in the area water sources are becoming scarce in the neighborhood and the nearby creeks, leaving the neighborhood dependent on winter water storage during fire season, especially at Blue Ridge Ranch.

Considerable effort has been made to conduct fuels reductions, prescribed fires, and fire preparedness actions throughout the neighborhood over the past 20 years. In preparation for the potential of the 2020 Red Salmon Complex crossing the South Fork Salmon River, extensive fire preparations were performed by residents, volunteers, and fire team crews. Blue Ridge contains a moderately sized safety zone in its largest meadow. Black Bear Ranch is located at the bottom of a three-mile-long, narrow one-way road and is considered to be a very high fire risk.

Recommendation: Given the long distance from reliable water sources during dry months, it is recommended that properties in the Bear Country Local Area develop extensive winter water storage exclusively for fire protection. It is recommended that 5,000-10,000 gallons be stored per residence, to allow for adequate water resources for exterior sprinkler systems as well as fire protection services during a wildfire event.

It is recommended that the USFS and private landowners work together to maintain and improve the firelines created during the 2020 Red Salmon Complex at Godfrey Ranch.

MAPPING

Maps are an essential part of this CWPP. Digital maps are too large to include in the CWPP document itself. They are available at srrc.org/CWPP

PDF documents are available at the linked website that each contain several maps based around a common theme. The maps are also available singly, as georeferenced PDF files that may be used with the PDF Maps (Avenza) App. Further, online maps are available to explore and print desired areas and zoom levels; see Online Maps heading at the end of this MAPPING section.

List of Maps by Theme

Individual maps are bulleted. There are 37 maps for the CWPP in total.

Base Map, Local Area Locator and Local Area Maps

- Base Map – shows entire planning area and surroundings with WUI
- Local Area Locator Map – shows entire planning area and extent of each designated local area; the following local area maps show extent of each neighborhood within each local area:
- Somes Bar to Butler Local Area Map
- Forks of Salmon Local Area Map
- Cecilville Local Area Map
- Bear Country Local Area Map
- Sawyers Bar Local Area Map

Structures and Water Sources Maps

These maps show greater detail for individual properties—helpful when an **IMT** is going to do property assessments before fire arrives.

Somes Bar to Butler Local Area

- Somes Bar to Oak Bottom and Camp Three Road
- Butler Flat and Butler Creek

Forks of Salmon Local Area

- Crapo Creek and Nordheimer Creek, to Morehouse Creek
- Forks of Salmon Downtown to Otter Barr
- Knownothing Neighborhood

- Lower North Fork

Cecilville Local Area

- Cecilville Downtown
- E Fork South Fork Salmon and Taylor Creek
- Upper South Fork Salmon River

Bear Country Local Area

- Godfrey Ranch and Harris Ranch
- Black Bear Ranch and Blue Ridge Ranch

Sawyers Bar Local Area

- Little North Fork
- Sawyers Bar Downtown
- Eddy Gulch, Whites Gulch, to Uncle Sam
- Finley Camp, Rainbow Mine, and Snowden
- Taylor Hole

Fire History Maps

Fire History and Ignitions History Maps

- Wildfires by Names and Years
- Wildfires by Names and Years with Firelines and Strategic Ridges
- Ignition History Map (Locations of Lightning and Human Ignitions)

Fire Overlaps and MTBS Fire Severity Maps

- Number of Fires (occurring since 1910)
- MTBS Fire Severity Map (for entire planning area)
- MTBS Fire Severity Map for Crapo and Yellowjacket Areas (severity of neighboring areas each burned in 1987 and burned again (2008 or 2013)

Recommended Treatments and Completed Treatments Maps

- Recommended Treatments (for planning area; shows firelines and strategic ridges)

Completed Treatments Maps

- Completed Treatments Map at 1:39,000 Scale (for more detail in planning area)
- Completed Treatments Map at 1:60,000 Scale (makes some USFS treatments in areas surrounding the watershed visible)

Fire Hazard Assessment Maps

- Flame Length Map (predicted flame length at 90th-percentile conditions)
- Rate of Spread Map (predicted ROS at 90th-percentile conditions)
- Fire Type Map (predicted fire type—surface, passive crown, active crown—at 90th-percentile conditions)
- Intrinsic Fire Hazard Assessment Map (relative hazard categories for individual properties or other areas with structures important to communities)
- Current Conditions Fire Hazard Assessment Map (relative hazard categories for individual properties or other areas with structures important to communities)

Online Maps

Online maps, which cover some of the information contained in the set of static maps (*i.e.*, the PDF maps available for download), are available for the public and incident management teams to use. These maps offer greater flexibility than PDF maps, especially in the event that a plotter is not available to print the maps at appropriate size. The online maps are interactive—the viewer can pan throughout the planning area, zoom as desired, turn layers on and off, print a desired map portion, and click on map features to view more details in pop-up windows.

The online maps can be shared with incident management teams and project collaborators to be useable in the ESRI Arc Collector App and related ESRI apps for portable devices. For this functionality, an SRRC administrator must add each specific user to a group. **Please email both srrc@srrc.org and fire@srrc.org if you have the Collector App and wish to access the CWPP online maps for use on your tablet or other device.**
The online maps will have priority for regular updates from the SR FSC. The list of maps below summarizes each online map's content and the features in them that will be priority to update on a regular basis.

Structures and Water Sources Map – Online Version

LINK:

Salmon River CWPP Structures and Water Sources Map

Like the PDF maps of the same name described previously, these maps are designed to show information at larger—more zoomed-in—scales. The information on these maps includes residences and other structures, access routes, bridges on private roads, water sources, engine fill sites, hydrants, and values at risk. The locations of habitable structures will be the highest

priority to update, along with new access routes (roads and/or trails) to them, when new structures are built and/or new information comes to light. Engine fill sites' status should also be updated regularly. These maps may be particularly useful for Incident Management Teams during wildfires.

Completed, Planned, and Recommended Treatments – Online Map

LINK:

Salmon River CWPP Completed, Planned, and Recommended Fuels Treatments Map

This online map contains information from both the Completed Treatments (PDF) map and the Recommended Treatments (PDF) map. This map is designed to allow collaborative planning around fire hazard mitigation treatments in the watershed. As updated versions of the federal FACTS (Forest Activity Tracking System) database are made available, completed and planned treatments with fire hazard reduction effects will be updated in this online map. Similarly, the SR FSC and SRRC will update planned and completed fuels treatments as frequently as possible. Further, this map shows the Standardized Recommended Treatment Priorities (in RECOMMENDED TREATMENTS AND FIRE-SAFING section); these priorities are also shown on the Recommended Treatments PDF map.

Fire History – Online Map

LINK:

Salmon River CWPP Fire History Map

This map shows all wildfires larger than 500 acres that have occurred in the planning area since detailed spatial records were kept (1910 onward for the planning area). Wildfires and larger prescribed fires in the watershed will be updated annually. This map also shows firelines (dozer lines and hand lines) that have been used in previous fires, as well as ridgelines identifies as strategic for fire containment—ridges that may see fireline construction during future wildfires. Fireline information will also be updated as frequently as possible.

Base Map – Online Map

LINK:

Salmon River CWPP Base Map

This map orients viewers to the planning area and the main local areas defined in this document—the area containing private properties and wilderness inholdings. This map shows the WUI as defined in this document. Another component on this map is the transportation network—roads and trails—in the planning area, identified by their priority levels for access and treatment (see RECOMMENDED TREATMENTS AND FIRE-SAFING, Standardized Treatment Priorities). Transportation routes and their access importance designations will be updated as needed, e.g., if new private roads are built, if Forest Service roads are closed, etc.

PHYSICAL ENVIRONMENT

Climate

The area has a Mediterranean climate with dry summers and wet winters. Summer temperatures can reach over 100° Fahrenheit, and winter temperatures rarely drop below 10° F. Annual precipitation within the Salmon River Watershed varies from over 80 inches in upper Wooley Creek to less than 40 inches along the South Fork. Intense, localized summer showers frequently occur and have been associated with soil erosion and debris torrents, which have been exacerbated by the cessation of natural and indigenous fire, followed by severe wildfires. Climate records maintained at Klamath National Forest cover back to the early 1900's, and the average precipitation (e.g., around 48 inches annually for Sawyers Bar) for the 1900s was higher than what has occurred since 1990 (see Table 1).

Table 1 Weather recorded, for years with full records, at the Sawyers Bar and Somes Bar Remote Automated Weather Stations (RAWS). Years and values in red are at or below the 20th percentile precipitation amount.

	Sawyers Bar	**Somes Bar**		**Sawyers Bar**	**Somes Bar**
Year	Precipitation (in.)		**Year**	Precipitation (in.)	
1990	30.37	43.92	2006	57.02	error
1991	*20.72*	*32.38*	2007	33.45	57.68
1992	*23.93*	*33.26*	2008	error	58.26
1993	40.68	58.9	2009	29.86	51.02
1994	*17.46*	*31.26*	2010	35.11	63.33
1995	49.72	67.26	2011	49.38	71.72
1996	42.89	42.57	2012	35.57	53.93
1997	error	52.78	2013	36.75	48.53
1998	37.29	60.84	*2014*	*24.88*	*41.89*
1999	error	61.56	2015	36.6	43.43
2000	26.91	43.49	2016	49.28	65.5
2001	*17.21*	*21.28*	2017	63.33	95.06
2002	34.15	error	2018	28.94	48.43
2003	error	error	2019	39.92	60.34
2004	32.25	error	*2020*	*20.91*	*35.66*
2005	31.53	49.96	**Average**	**35.0**	**51.6**

Drought may be an important factor in determining **fire severity**, both for wildfires and prescribed fires. In general, the interaction of drought with subsequent fire is only obvious when drought is fairly severe and fire follows rapidly (Kane et al. 2017). The timing and extent of drought effects is difficult to predict in the planning area. This difficulty lies partly in that the realized stress of drought on vegetation consists of complex interactions between precipitation in any given location and the effects of snow and other precipitation at higher elevations. Spring and summer snowpack at higher elevations is important in keeping both streams and groundwater charged throughout the growing season. Precipitation—mostly rain—at lower elevations may not always correspond to snowfall and retention at higher elevations. For instance, snowpack was extremely low in 2013-2015 (Fig 2), but precipitation at Somes Bar and Sawyers Bar **RAWS** was only below the 20th percentile in 2014 (for years since 1990; Table 1 and Figure 1).

While not scientifically studied, many prescribed fire practitioners in the planning area saw unexpectedly high fire severity associated with fall-season prescribed **underburns** in both 2014 and 2015. Tree mortality (a measure of **fire severity**) in these burns was often much higher than predicted by **fire intensity** during the burns (see Fire Severity subsection in FIRE SEVERITY section).

Table 2 Average April-1st snow depth and WEQ from the Etna Mountain station, categorized by given year ranges.

Years	Snow Depth (in.)	Water Equivalent (in.)
1951-1980	83.7	34.6
1981-2000	58.2	22.3
2001-2020	54.7	20.0
Overall	68.3	27.0

Snow is not uncommon during winter months throughout the watershed. However, snow rarely accumulates for more than a few days before melting except in elevations above ~3,000 to 4,000 feet, depending on aspect. While no snow survey stations exist in the planning area, there are several that are regularly monitored nearby. One station—Etna Mountain—is at 5,900 feet elevation, just over the divide between the Salmon River and Scott River Watersheds and not far from Sawyers Bar Road. Records for this site are available back to 1951. As shown in Table 2 and Figure 1, April 1st snowpack and snow water equivalents were, on average, higher for the period from 1951-1980. Three of the five years with the lowest values occurred 2013-2015 (Figure 1).

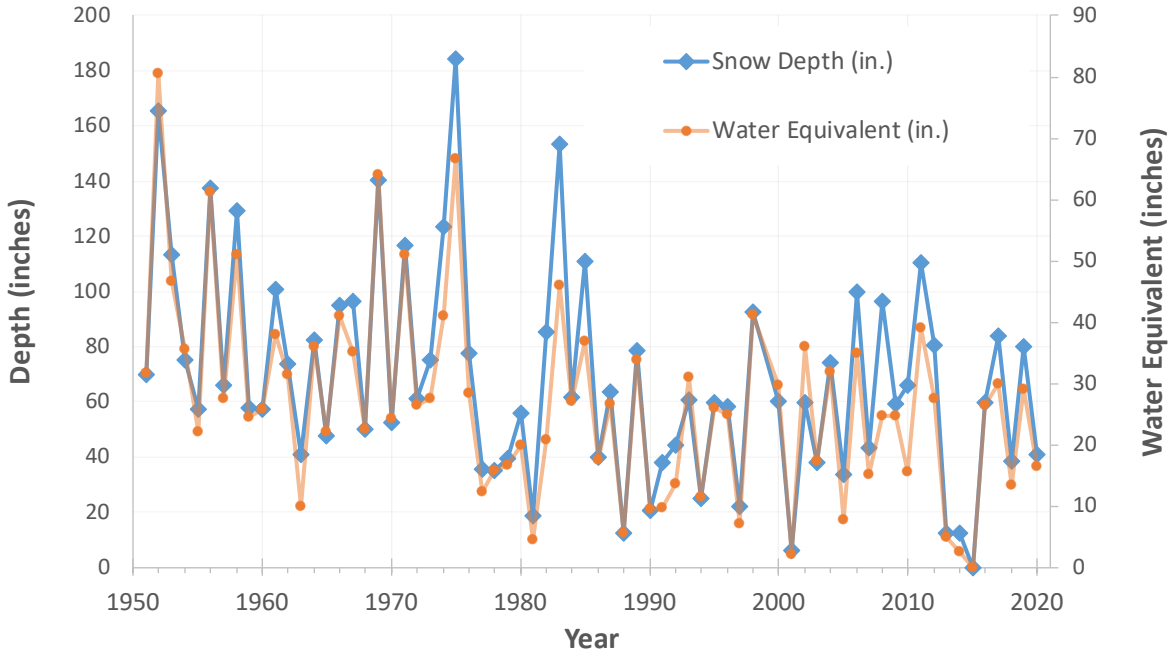


Figure 1 Snow depth and snow water equivalent for 1951 to present, from Etna Mountain snow gauge station.

Hydrology

The Salmon River Basin (4th field hydrologic unit) is subdivided into four major watersheds (5th field hydrologic units), North Fork (130,468 acres), South Fork (185,608 acres), Wooley Creek (95,188 acres) and Main Stem (69,362 acres). Approximately 1,414 miles of stream drain these watersheds. The largest of the watersheds, the South Fork, has 509 miles of stream or 36% of the total. The Salmon River sub-basin contains sixty-three drainages (7th field hydrologic units), ranging in size from 3,300 to 14,500 acres and averaging 7,625 acres.

Along much of its course, the river flows through a rugged gorge in which rock outcrops and bluffs are common. Several temporary landslide dams have formed along the Salmon River and its tributaries this century, with local influences on in-channel habitat and possibly fish passage. Periods of high precipitation, seismic events, and activities that disturb the soil or the vegetation can initiate landslide activity, which in turn has resulted in major channel alterations throughout the watershed. The hydrologic characteristics of the watershed are defined by climate and topography. Average annual discharge for the Salmon River is approximately 1.2 million acre feet.

Terrain

Besides terraces along the river corridors, the terrain in the planning area is generally steep. Only about 17% of the watershed has slope less than 35%, which is a widely used upper cutoff for many types of ground-based logging equipment and masticators, etc. Tracked equipment is typically capable of working on steeper slopes—often at least 45%--but regulatory agencies, such as the State of California North Coast Regional Water Quality Control Board, often limit project equipment use to 35% or lower slopes to prevent transport of sediment into waterways. The Recommended Treatments Map shows areas less than 35% slope in the planning area. Besides a few localized areas of lesser slope in the Bear Country Local Area, most of the larger contiguous areas of gentler slopes are in the Wilderness Areas. Table 3 shows the proportion of the watershed in percent-slope classes that were delineated according to expected fire rate of spread (see FIRE HAZARD ASSESSMENT – Intrinsic Hazards Assessment section).

Table 3 Percentage of watershed in given percent slope categories. Greater than 35% slopes are often considered unsuitable for working with heavy equipment.

Slope Category (Percent Slope)	Percentage of Planning Area
0 to <20%	5.6
20% to <35%	11.5
35% to <50%	21.8
50% to <70%	39.1
70% to <80%	12.5
80% to <90%	5.8
90% to <100%	2.3
≥100%	1.5

Vegetation

Most of the planning area is forested. The majority (87%) of the area's existing vegetation is classified into various non-oak-woodland "tree dominated orders" by **CALVEG**, which is widely used by the USFS to classify vegetation. Current CALVEG data for the planning area are based on imagery taken between 2013 and 2015, so the vegetation type determined may not be reflective of changes caused by wildfires and/or human management. The most recent **LANDFIRE** data, which take disturbances through 2019 into account, estimate the following percentages of total area by tree canopy cover classes: 1) 0 to <25% cover – 19.5% of area, 2) 25 to <50% cover – 27.7% of area, 3) 50 to <75% cover – 51.8% of area, and 4) 75 to 95% cover –

0.97% of area. Non-vegetated area (rock, bare soil, or water) comprises just over 2% of the watershed area.

Other vegetated types that cover the planning area are shrub-dominated or oak woodland. Shrub-dominated types are estimated to cover about 10.5% of the planning area. CALVEG data estimate only 0.3% (1,531 acres) of the watershed to be covered by oak woodland if using the determined "Regional Dominance Type", or "Vegetation Alliance". However, the Society of American Foresters (SAF) designates 7,826 acres as California black oak woodland and 1,226 acres as Oregon white oak woodland (total 1.9% of watershed area).

Local knowledge of oak woodlands would indicate that even the SAF estimate is low; many areas of known oak woodlands are simply lumped in with surrounding common types, such as the ubiquitous Pacific Douglas-fir Alliance. Similarly, forested patches dominated by other broadleaved tree species, such as Pacific madrone and canyon live oak, probably have significantly higher coverage in the planning area than indicated in available data that cover the entire watershed. If future climate scenarios predicted by scientific consensus come to pass, it is likely that shrub and woodland systems will tend to replace forested systems over the current century, especially on warmer aspects (Serra-Diaz et al. 2018).

It is important to consider existing and desired vegetation when formulating treatments to meet fire hazard reduction objectives. Hazard reduction treatments for various types of vegetation are discussed in the RECOMMENDED TREATMENTS section below. The FIRE HISTORY - Historic Fire Regimes discusses links between fire frequency and vegetation types, with the included Table 7 detailing the planning area's common vegetation assemblages in relation to fire regime.

Fire Hazard

Fire hazard in the planning area is generally high to extreme. As discussed, terrain is unusually steep and regularly covered with vegetation. With exception of some higher elevations in the Wilderness areas, there are not significant areas of unburnable terrain (i.e., rock and ice). At elevations where most of the residents in the planning area live, Douglas-fir is very common, which has highly flammable live foliage. One of the main understory species with regular cover throughout low to middle elevations of the planning area, canyon live oak (*Quercus chrysolepis*), has extremely flammable foliage, often resulting in isolated torching even when burning nearby piles during winter.

Recent fires are testament to the level of hazard present (see FIRE HISTORY section). The rapid spread and high severity of the 2014 Whites Fire was terrifying for locals, and the community is

lucky that relatively little property was destroyed and no lives were lost. The 2013 arson fires (Butler Fire and Salmon Complex) also burned very close to many residences. The extreme fire season of 1987 affected many residents throughout the watershed, burning near several Salmon River communities, and it resulted in several homes lost. Most recently, the 2021 River Complex and McCash Fires threatened the communities of Cecilville and Somes Bar, respectively. In 2020, the Red Salmon Complex burned to Cecilville Road and many of the properties in the Knownothing Neighborhood, with the Bear Country and Cecilville areas also under alert or evacuation notice. Sawyers Bar area residents were also under evacuation during the 2017 Salmon August Complex and were inundated with hazardous air quality for weeks.

The remoteness of the area lends substantially to the realized fire hazard for residents in the planning area. Emergency response capabilities are very limited within the area, and resources coming from outside the area are often at least an hour drive away. Roads in and out of the planning area are very narrow and windy. The tiny proportion of private land and very light development of the area mean that most residents are surrounded by huge areas of continuous wildlands, which in turn reach another step of difficulty and complexity in terms of access by firefighting personnel. Further, the regular frequency of dry summer lighting events and associate fire starts (see FIRE HISTORY – Ignition History section), means that many fires are started by natural causes almost every year, and often under dry conditions.

The National Fire Danger Rating System uses the Energy Release Component (**ERC**) to assess how dangerous fires might be, with consideration of dead and live fuel moistures. ERC is an estimate of how many BTUs will be available at the head of a fire, per square foot. In general, values above 20 indicate that initial attack on a fire might not be successful. In the region, even average ERC values are above 25 from late April to early November (see Figure 1). The maxima indicate that this level of ERC can occur throughout the year.

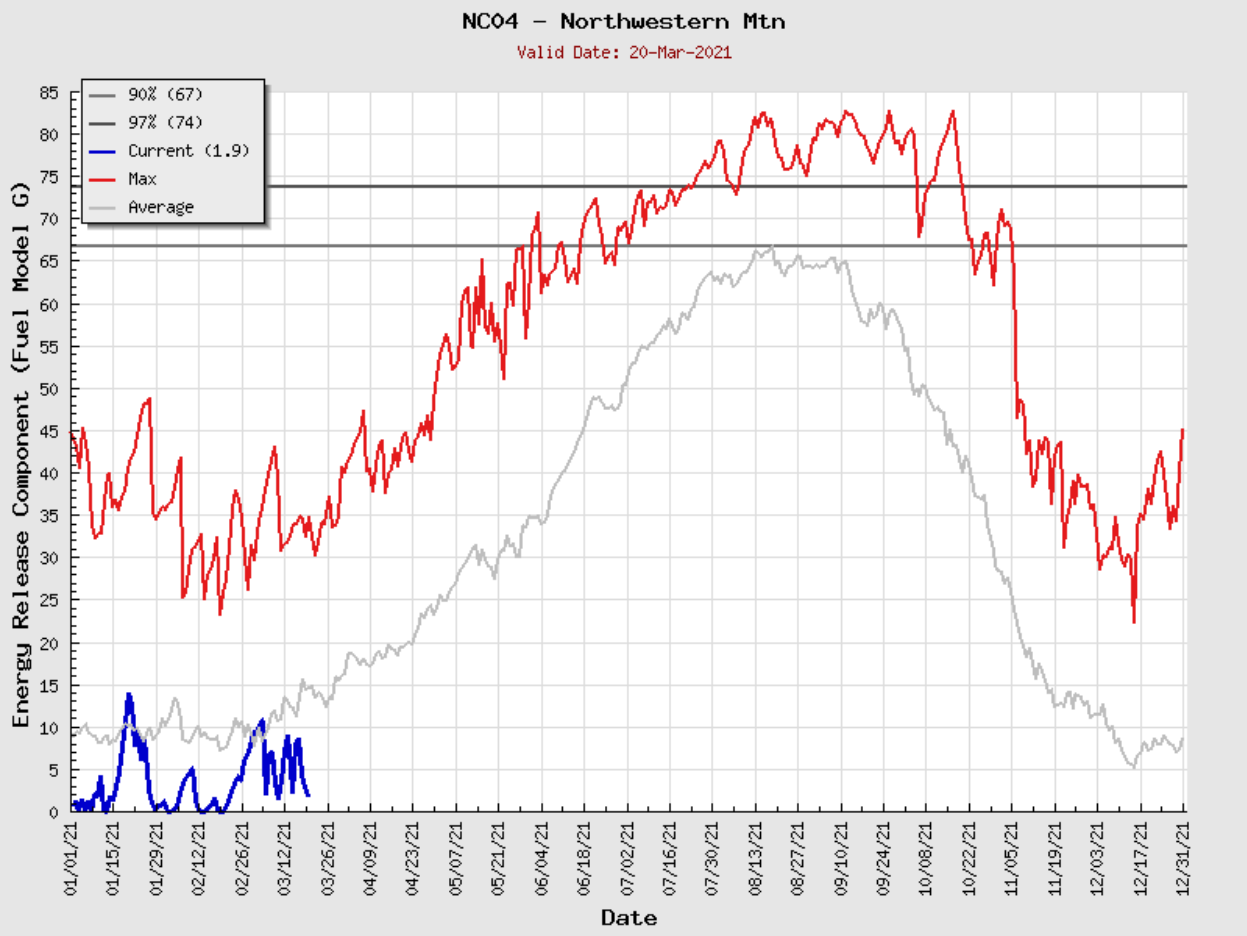


Figure 2 Energy Release Component for the National Fire Danger Rating System Predictive Services Area that includes the Salmon River watershed.

VALUES AT RISK

Human life, property, and the infrastructure that supports them are given highest priority for protection. Aside from these core values, there are several natural resource values that are essential to integrity of the area's unique ecology, as well as to retain community and economic function and potential. The natural resource values, in part, are also essential to the food security and culture of the indigenous peoples that continue to live in the area. These indigenous peoples also hold places in the watershed sacred for ceremonial purposes. Aside from indigenous heritage and cultural concerns, there are also heritage values associated with the period of post-European colonization.

Specific values at risk are identified throughout the text in ***bold italic typeface***.

Individual Property

Secondary to protecting life, residences should be given top priority for protection during wildfires. Many of the residences in the planning area are occupied only seasonally, sometimes for only a few weeks a year (often during summer). For instance, about 40% of the habitable homes in Sawyers Bar proper are not occupied year-round. However, because the duration and timing of occupation fluctuates, it seems imprudent to assign each habitable structure any occupancy value. In practice, wildfire incident management teams should take advantage of the KNF-supported **Community Liaison Program** to help narrow down where homes are most likely occupied, particularly in the event that fire behavior and movement limit the amount of home protection that is feasible.

This CWPP attempts to identify which structures are habitable residences in the neighborhood-level Structure and Water Sources Maps. However, the current versions may be incomplete, and structures may be added or left derelict over time. As such, this CWPP's goal of having a set of online-available, updated maps will seek to regularly update the structures information on the online Structures and Water Sources Map regularly. Because outbuildings are also critical to rural, isolated life, the RECOMMENDED TREATMENTS section includes outbuildings in recommendations to buffer structures with fuels reduction treatments.

Infrastructure

Per-capita, most primary infrastructure in the planning area is installed and maintained by individuals or families. In a few cases, groups of parcels share water systems. Sawyers Bar is the only community that has an official County Water District with a treatment plant and extensive distribution system (see Sawyers Bar Downtown – Structures and Water Sources Map). The electrical grid only comes as far upriver as Oak Bottom—at the end of transmission lines that

come from the Eureka/Arcata area on the coast. Phone and internet are mostly ubiquitous along the main arteries. See corresponding sub-sections below for more details.

Electricity

Upriver from Oak Bottom, there is no connection to electricity grids. The majority of residences have some (often minimal) amount of solar power with fossil-fuel-powered generators for backup and/or running larger appliances. Where creeks are nearby that have significant elevation drop over a pipe-able distance, small hydroelectric systems are also common.

From Somes Bar upriver to Oak Bottom, electricity is provided by Pacific Gas and Electric (PG&E). This area is at the end of a transmission line and, like the nearby town of Orleans, is subject to frequent power outages during winter, often due to storms causing damage to transmission infrastructure. These areas may also be affected by planned outages during significant wind events that might knock down transmission lines and cause fire ignitions. There is an above-ground transmission line that runs from Highway 96 to near Merrill Creek—about 1 mile up Salmon River Road.

Propane

Many residences have large—150- to 500-gallon—propane tanks for cooking and heating water. Campora Propane, out of Willow Creek, currently services the area and re-fills propane tanks regularly. They have a strong track record of willingness to deliver and service properties that are only accessible via poor roads and driveways. See DEFENSIBLE SPACE AND HOME HARDENING section for related discussion.

Water

Domestic water procurement is often a constant struggle in the watershed. Because of steep and rocky terrain, long distances between nearest available creeks and springs, and high costs to bring equipment and operators to many locations, many properties have considerable lengths of above-ground piping. Many properties have a minimal amount of water storage, often in above-ground polyethylene (plastic) tanks, and a steady input of water is required throughout the year to maintain the necessary supply. Given the paucity of electricity at most residences, most domestic water is simply gravity-supplied pressure from the tank location(s) to use locations.

Where landowners have made the information available, the Structures and Water Sources maps show locations of water intakes and storage tanks. The CWPP maps should be updated regularly if and when changes to water systems occur and/or spatial information is made available.

These home water systems are essential for daily life and residential safety both from potential wildfires and residential fires. *Protection of individual water systems during wildfire events is extremely important to community members and public safety.*

Recommendation: The Salmon River Fire Safe Council recommends that all residences have a minimum of 2,500 gallons of water storage exclusively for fire protection. This amount should be significantly increased in areas where water sources (such as engine fill sites) are distant or limited and current water systems and sources during dry months do not allow for the storage to be refilled in less than the time it would take to pump the tank down while using sprinkler systems to protect the residences. If residents/ landowners hope to protect additional structures during structure or wildfire events, the quantity of storage should be increased.

Sawyers Bar Community Water District

Sawyers Bar is the only community in the planning area that has an official municipal water system. See the Structures and Water Sources – Sawyers Bar Downtown Map for locations of infrastructure. Water is supplied by perennial Jessups Creek—across the North Fork Salmon River from the Sawyers Bar core—as well as the Tanners Gulch, which mostly dries up during summer. The Jessups Creek intake is accessible only by foot, via a narrow trail about 0.6 miles long. There is an 18,000-gallon metal tank that serves for settling of sediment and additional storage, less than 1/10th-mile downstream of the intake. Along this 1/10th-mile stretch, the supply pipe is mostly above ground.

The water is filtered and chlorinated as it comes in from the sources. Once treated, water is stored in two metal tanks—one about 37,000 gallons and the other about 12,000 gallons. This water is distributed via gravity-feed throughout the community from these tanks. There are 15 hydrants connected to this system throughout town, with fire hose and fittings co-located in marked red wooden boxes. Just across the North Fork Salmon River off Eddy Gulch Road, there is a pump house that was installed to pump water from the river in the event of fires for which the amount of water stored in the tanks would be inadequate. There is currently no functional pump, which should be remedied, and the system might benefit from additional booster pumps throughout town, located with some hydrants (see RECOMMENDED TREATMENTS and RECOMMENDED ACTION ITEMS SUMMARY). The system is piped through a single conduit, without differentiation between fire water and domestic water. This means that all water that flows through the system, no matter it's end use, must be chlorinated. It also means that if the emergency pump system is put into use, pumping water directly from the river, the entire system becomes contaminated and there is no longer potable water for the town.

Recommendations: Separate the hydrant distribution system from the potable water system for the Sawyers Bar Water District via an infrastructure improvement project. Install a functional pumping system that would allow pumping from the river (currently from near Eddy Gulch bridge) in the case of emergencies with enough pressure to run multiple hydrants at once. Install additional pumps near hydrants further away from the river as needed to boost pressure for firefighting in town.

Communications

Despite being mostly unconnected to the electrical grid, the majority of residences in the planning area are supplied with phone and internet service through Siskiyou Telephone Company, which is headquartered in Etna. Most full or part-time residences along the river corridors have phone, and often internet, service through Siskiyou Telephone. The phone and internet signals are sent wirelessly to Etna Summit and further wirelessly distributed to other points throughout the planning area. From these points, signals are then distributed through line—mostly buried except for an above-ground segment in Sawyers Bar that goes to the intersection of Sawyers Bar Road and Whites Gulch Road.

The exceptions to service by Siskiyou Telephone include residences that are significantly removed from the main arteries, i.e. out of the main river corridor and in outlying areas (e.g., the Bear Country Local Area, Eddy Gulch Neighborhood, and Butler Neighborhood). Of these residences, those that have communication services get them through satellite-based providers, which are much less reliable. Internet is considered "high-speed" on the Siskiyou Telephone systems, but speeds are relatively slow—usually well below 10 Mbps download and <1 Mbps upload. Satellite-provided internet speeds are generally even slower.

Some residences' only communication is through two way CB Radio systems. These systems were historically wide spread within the Salmon River but are now mostly used within the Bear Country Local Area.

Specific communication-infrastructure values at risk are:

- *Dish and related microwave repeater equipment for phone and internet distribution at Etna Summit*, adjacent to the Pacific Crest Trailhead on Sawyers Bar Road
- *Dish and related equipment at Sawyers Bar* that receives signal from Etna Summit and distributes signal locally
    - *Above ground transmission lines* that go from the dish location west to the USFS Sawyers Bar Fire Station and east to intersection of Sawyers Bar Road and Whites Gulch Road.

- *Forks of Salmon Siskiyou Telephone office*
- *Dish and related equipment at Eddy Gulch Lookout*, which receives signal from Etna Summit and distributes to Cecilville area.
- *Dish and related equipment at Steve Adams' residence* along East Fork South Fork Salmon River (a neighborhood of Cecilville community).

There is no cellular reception in the Salmon River Watershed except on Carter Meadows Summit. Options for communication currently are:
1) There are payphones that are free for local and emergency calls; for other calls, a calling card or credit card is needed. These are located at: Nordheimer Campground, Idlewild Campground, Forks of Salmon (adjacent to Post Office), Knownothing neighborhood (just upriver of Knownothing Creek on River side of road), Sawyers Bar (near Post Office—in front of Town Hall).

2) The Salmon River Restoration Council in Sawyers Bar has free Wi-Fi that is on only when employees are working at the office.

3) The Salmon River Outpost in Somes Bar has free Wi-Fi.

Recommendation: The Salmon River Fire Safe Council recommends installation of a publicly accessible pay phone in Cecilville and extension of existing phone lines to outlying neighborhoods (including Eddy Gulch, Bear Country, and Butler neighborhoods as well as other outlying residences). Access to emergency communications are essential in this remote and dispersed community for public safety.

Services

Forks of Salmon: *Forks of Salmon School* is a public school that teaches children from kindergarten through eighth grade. The only other school serving a portion of the planning area is Junction Elementary School in Somes Bar; technically, this school lies outside of the planning area. *Forks of Salmon Post Office* has shipping services and PO boxes for residents and is located next to the local park which contains a public restroom. *Salmon River Volunteer Fire and Rescue* is based in Forks of Salmon with a fire engine and ambulance, located adjacent to the School.

Sawyers Bar: *Sawyers Bar Post Office* has shipping services and PO boxes for residents. The *Sawyers Bar Fire Station* (**USFS**) is staffed during **fire season**. The *Salmon River Restoration Council* offers fax, internet, public computers, copies, and maps.

Cecilville: *Cecilville Station* has a bar ("saloon") and a *gas station*. Gasoline and diesel fuel are available. This establishment also has camp spots and a few small cabins for rent. It also has a Frisbee golf course. Adjacent to the Cecilville Community Center is a small Salmon River **VFR** fire station with an engine and 10,000 gallons of water specifically stored for firefighting. Outside of Cecilville is the *Petersburg Fire Station* (USFS), which is staffed during fire season.

Somes Bar: The *Salmon River Outpost* in Somes Bar is a grocery store and more. They also sell local books, maps, art, coffee drinks, and can fill *propane*. Local postal service boxes are located under an awning in the parking lot and packages are often delivered to the store. The *Oak Bottom Fire Station* is staffed during wildfire season.

Community

Forks of Salmon: Across Salmon River Road from the Forks of Salmon School is the *Forks of Salmon Community Club*. Originally, this was the (single-room) school. Now it is used for community meetings (including SR FSC), musical events/dances, other celebrations, and crafts fairs. Attached is the *teacherage*, an apartment owned by the Forks School District that is often used to house the Forks of Salmon School teacher. There is also a small *Forks of Salmon Park* with picnic tables and an outhouse, adjacent to the Post Office.

Sawyers Bar: *Sawyers Bar Town Hall*, near the Sawyers Bar Post Office, is used for community meetings (including SR FSC), musical events, and celebrations. The historical Sawyers Bar Catholic *Church* holds occasional services.

Cecilville: The *Cecilville Community Center* is mostly used for community meetings (including SR FSC) and social gatherings.

Cultural Resources and Values

Cultural resources, for the purposes of this plan, refer to the integration of cultural practices with those aspects of the native environment that sustain and contribute to the continuity of tribal life. From this perspective, cultural resources are much more than simple "human values" that need to be integrated into watershed planning in order to "balance" human concerns with non-human ecosystem functioning. Indigenous cultural resources currently exist as part of a historically identifiable relationship between land and people. These relationships form an essential component in the restoration of natural disturbance regimes, with low intensity, human-directed fires as a critical component of a restored native ecosystem.

Traditional Ecological Knowledge is a cultural "resource" in itself, and every bit as important to future tribal cultural survival as hunting, fishing, gathering and sacred ceremonial activities. Tribal medicine, basketry and other crafts, foods, ceremonies, spirituality and quality nutrition manifest from utilization of this knowledge, when coupled with the human resources found in the local and tribal community. This knowledge is also a critical ecosystem component in the form of a "human interacted ecosystem maintenance regime" that is at risk of loss from high intensity wildland fire, if not incorporated into the restoration of natural fire regimes.

A substantial proportion of cultural-use plants are fire dependent species. Each of these species requires a specific fire return interval and suitable fire intensity to ensure useable quantities and quality. Tribally significant fish and large game species are cultural resources that require the balanced ecosystem function found in pre-historic natural fire regimes. Tribal cultures maintained the balance of frequent fire throughout much of the Salmon River watershed, ensuring stable, high production of natural and cultural resources. Cultural burning was the primary tool for managing forests at the landscape scale until European settlement, then fire exclusion practices, greatly curtailed indigenous burning.

Natural Resources and Ecological Values

The Salmon River has a particularly diverse suite of natural resource and ecological values. Complex terrain, unique geologic history, a wide elevation range, and a long history of fire use by indigenous peoples are some of the factors that have produced this diversity. Many natural resource values can just as accurately be categorized as Cultural Resources. Some of the specific species, habitat types, locations, and unique resources that have been defined as Values at Risk are:

Anadromous Fish and Their Habitat

The Salmon River and its tributaries host runs of fall-run Chinook salmon, spring-run Chinook salmon ("spring Chinook"), Coho salmon, winter-run steelhead, and summer-run steelhead, along with other anadromous species such a sturgeon and lamprey. This river is one of only two that host spawning wild spring Chinook; the other is the South Fork Trinity River, which has comparatively much lower populations than the Salmon River. Spring Chinook have recently been determined to be a genetic variant with a specific mutation that occurred only once (Thompson et al. 2018, Prince et al. 2017). This mutation causes these salmon to enter the rivers in spring months, allowing them to migrate far up into the Salmon River watershed by late July.

Historically, spring Chinook came up the Klamath in reliable abundance and were an extremely important food source for indigenous peoples after the winter season and associated limited amount of available foods for gathering. Regular watershed-wide surveys for spring Chinook by

SRRC, agency partners, and volunteers have shown drastic decreases in spring Chinook returns to the river and its tributaries over the years (Figure 4). With these factors—genetic uniqueness, cultural importance, and dwindling numbers—the Karuk Tribe and SRRC petitioned to have spring Chinook listed as Endangered at both the Federal and State levels. Because the California Department of Fish and Wildlife (formerly "Fish and Game") regulates commercial fisheries based on the predicted annual return of fall-run Chinook only, spring Chinook may be heavily impacted by fishing during years when fall runs are predicted to be more abundant. On July 16th, 2021, the California Fish and Game Commission voted unanimously to add Klamath Trinity spring Chinook salmon to the endangered species list. The federal listing is still pending.

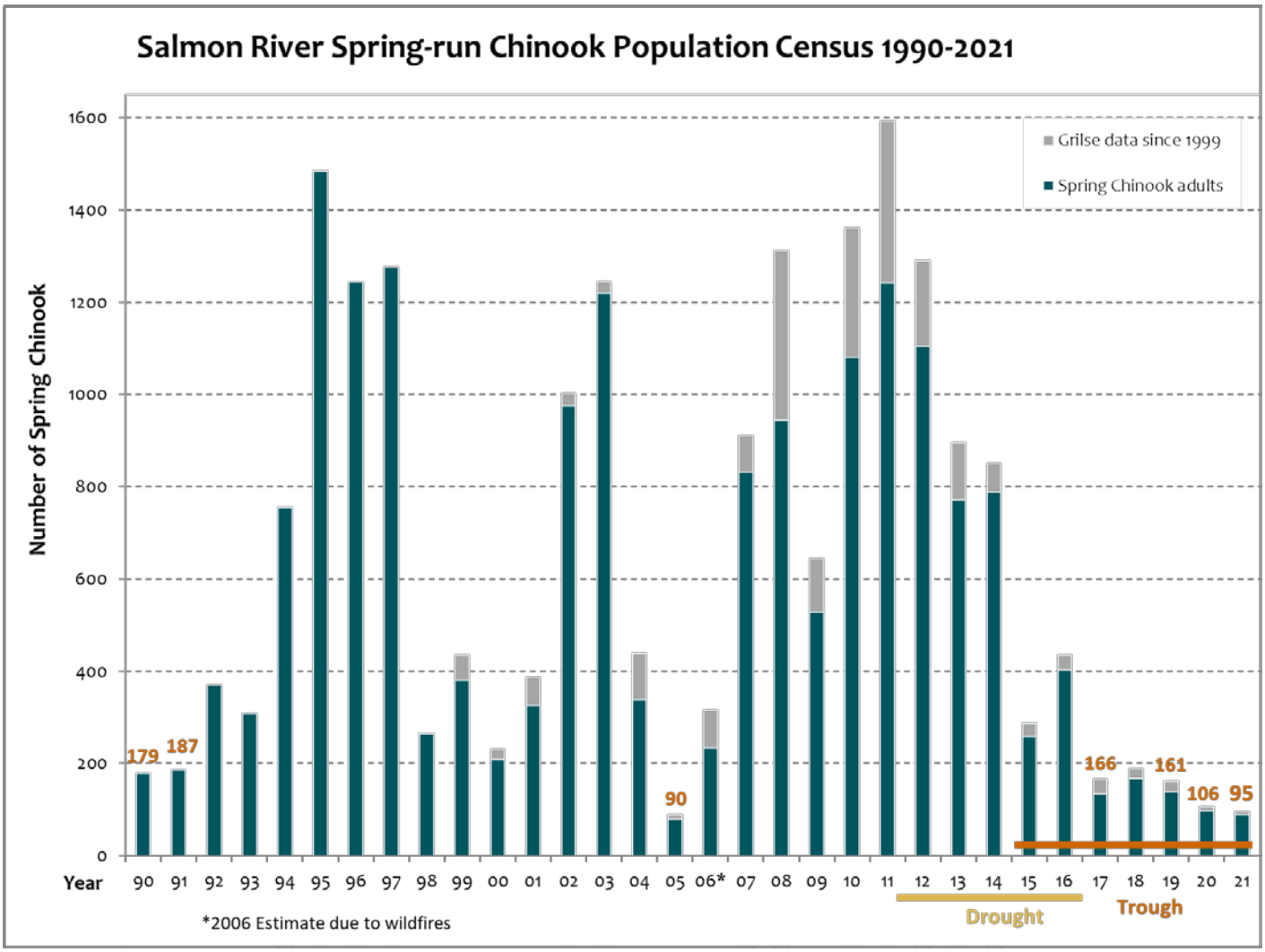


Figure 3 Spring Chinook salmon counts by year, with summer steelhead and grilse data overlaid. Lowest Spring Chinook counts labeled in orange above corresponding bar.

Habitat for spawning anadromous fish species has been heavily impacted by human activities and natural disturbances over the years. Heavy hydraulic mining during the gold rush (starting in

the 1850s) severely altered the Salmon River, generally confining the river's course to narrower channels and greatly simplifying floodplains, to the detriment of fish habitat. Riparian vegetation was also largely denuded, extensively reducing riparian shading that helps keep river temperatures cooler, and the ubiquitous rock mine tailings that now border much of the river are often barren, very difficult to revegetate, and serve as heat sinks that further warm streams.

High severity wildfires also can cause habitat degradation for anadromous fish. Riparian shading gets further reduced, and soil erosion events can be extreme. This can be particularly deleterious to spring Chinook when heavy summer precipitation events occur. After the snow at higher elevations has melted, unstable mineral soils in the wake of high-severity fire are exposed, and heavy summer rains can quickly wash huge amounts of fine sediments into the river. This interferes with the movement of the salmon upriver and can ruin suitable spawning locations.

Although perhaps counter-intuitive, wildfires can also improve fish habitat during hot summers. Warm river temperatures and associated low amounts of dissolved oxygen can be deadly to migrating fish. Wildfires burning during the summer create heavy smoke, which often gets trapped under an **inversion**. Prolonged periods of smoke can drastically reduce daytime high temperatures and cause cooling of streams and rivers, as well as provide an increase in flow due to reduced evapotranspiration from vegetation.

As summer temperatures reach lethal levels for salmon and steelhead more frequently, managed wildfires or large scale prescribed fire could be used in locations where recent adjacent fire footprints reduce the risk of negative impacts of mid-summer fires. Indeed, this is one of the few potential tools available, albeit far-fetched within our current management framework, that has the potential to significantly reduce adult salmon and steelhead mortality during drought events.

Meadows

Meadow habitats make up a very small proportion of the planning area, but they have outsized effects on water supply, wildlife habitat, and cultural resources. **SRRC** is currently seeking funding for a watershed-wide assessment of meadow conditions and initial planning of meadow restoration projects. Wet montane meadows at higher elevations—usually 5,000 feet and above—are central to maintaining cold water flow to streams throughout the dry months. These wet meadows hold enormous amounts of groundwater from snowmelt and deliver it to streams slowly over time, which in turn keep the Salmon River and major tributaries cool. The mouths of wet-meadow-fed streams provide critical cold water refugia for anadromous fish when river temperatures rise.

Like other types of meadows, wet meadows have decreased substantially in the planning area over time. For instance, an SRRC analysis of meadows areas visible in 1944 versus current-day aerial photos shows that the area of meadows in the Stanshaw and Haypress Meadows areas (western Marble Mountains Wilderness) has decreased by over 70%. This loss is partly due to anthropogenic disturbances in the meadows that incise streams and thereby lower groundwater levels, and partly due to encroachment by conifers that establish and grow thickly in the absence of frequent low-intensity fire.

Low- to mid-elevation meadows are uncommon in the planning area. These meadows often intergrade with deciduous oak habitats (see below). In the Bear Country area, there are meadows on the Godfrey Ranch properties, Blue Ridge Ranch, and on KNF near Blue Ridge Ranch. These meadows are mostly dry in the summers, but a few wet patches exist that have contributions from subsurface groundwater and/or outlets of perennial springs. The same is true with a few of the properties of the Upper South Fork Salmon River and nearby Taylor Creek; the properties known historically as the Jordan Ranch, Lor-O Ranch, and Gooley Ranch—all vehicle accessible—have large meadows with small perennially wet patches. The Glacierview Ranch, only accessible by trail and surrounded by Wilderness, also boasts a large meadow. Both the Bear Country and Upper South Fork meadow areas are important areas for deer and other wildlife habitat, and the immediate surroundings attract many hunters during deer season. The Upper South Fork Meadows also see frequent visitation by Roosevelt Elk. Dry meadows also exist on private lands known as Horn Field and Brazille Field, and across the River from Missouri Bar, in the Forks of Salmon area.

Some of the same factors that make meadow habitats valuable for water supply and wildlife also make them especially valuable for cultural resources. Salmon rely on the cold waters supplied by upper elevation mountain meadows. Meadows support an abundance of game, as well as a wide variety of edible plants such as geophytes—plants with underground edible bulbs or corms such as yampah, Brodiaea, blue dicks, and ookow. Both wet and dry meadows support a wide variety of flowering plants important for pollinators, and they also support milkweed species that provide rearing habitat for the Monarch butterfly.

These meadows in proximity to residences provide some of the best safety zones during wildfire events that exist on the Salmon River. Mid to low elevation meadows, especially on south and west aspects, are often conducive to winter prescribed burning, making them good fuel breaks and safety zones during wildfire season.

Recommendation: Use low intensity prescribed fire to burn mid and lower elevation meadows during low-risk winter burn windows to reduce future fire risk, provide for

improved safety zones, and improve wildlife habitat; restore meadow wet and dry meadow habitat at all elevations to increase water storage, improve wildlife habitat, and restore a fire resilient ecosystem. Prioritize meadow systems stewarded by local native families to support cultural fire restoration (e.g. Hensher Homestead on Methodist Creek).

Deciduous Oak Habitats

California black oak and Oregon white oak often grow together, although purer stands of Oregon white oak exist on poor, rocky soils and steep slopes. Both species provide acorns that feed a wide variety of wildlife—deer, elk, black bear, woodpeckers, and squirrels, to name a few. Further, they host an incredibly high diversity of non-pest insects that are important in the food web. Black oak acorns were a preferred staple of indigenous people in the watershed, and remnants of relatively pure black oak woodlands around Blue Ridge Ranch and Godfrey Ranch suggest long-time use and prescribed-fire maintenance. Deciduous oaks may occur as woodlands, where their canopies generally intermingle with each other; many woodlands in the planning area also occur as mixed pine-oak woodland type, with regular ponderosa pine and less frequent components of sugar pine and incense cedar. The deciduous oaks also often occur as savannah habitat (scattered individual trees amongst meadows) or clusters among meadows.

Deciduous oak habitats are extremely vulnerable to being overtaken by conifer forest—especially Douglas-fir—in the absence of regular, short fire cycles that kill establishing conifer seedlings before they grow too large to die from low intensity understory fire. Despite this, deciduous oaks that have been largely overtaken by conifers and have little or no above-ground structure remaining can sometimes remain alive below ground and re-sprout after fire. This is evidenced by some relatively large contiguous areas on Godfrey Ranch and Blue Ridge Ranch growing back to relatively pure oak woodland after the high severity Glasgow Fire of 1987; at that time, many of these areas had become conifer forest with only vestiges of deciduous oaks.

Intact deciduous oak woodlands and savannas are some of the most drought resistant forested ecotypes existing within the planning area. Deciduous oak woodlands and savannas (especially on south and west aspects) are readily conducive to low intensity, low risk, winter burning. We usually get such burn windows during dry spells in January, February and sometimes March within the planning area. When these systems are maintained by frequent fire they are both fire resistant and create excellent natural fuel breaks for wildfires.

Recommendation: Use low intensity prescribed fire in deciduous oak woodlands and savannas during, low risk, winter burn windows to reduce fire risk, create large fuels breaks and improve wildlife habitat; restore deciduous oak woodlands and pine-oak woodlands, by thinning encroaching firs, to restore a drought and fire resilient landscape.

Wilderness Areas

- Trinity Alps Wilderness
- Russian Wilderness
- Marble Mountains Wilderness

Unique Botanical Resources

- Plummer Creek Botanical Area
- Devil's Canyon champion incense cedar (up Devil's Canyon from Cherry Creek Trailhead)
- Serpentine soils are scattered throughout the watershed and host many endemic and rare plants
- Populations of Pacific silver fir (*Abies amabilis*) near Hancock Lake in the Marble Mountains Wilderness (see Kauffmann 2012)
- Area of extremely rich coniferous tree diversity in the Russian Wilderness—Sugar Creek watershed and Little Duck Lake area

Historical

- Sawyers Bar Catholic Church
- Esther Schwartz/Domino Mine (downriver of 3-mile on Sawyers Bar Road)
- Blue Ridge Lookout and associated cabin
- English Peak Lookout
- Fowler Cabin – 10.2 miles up Wooley Creek Trail
- Smith Cabin
- Other Cabin near Morehouse Meadows?
- Orleans Mountain Lookout
- Sagaser's – orchard and shed at 7-mile on Sawyers Bar Road
- O.T. Mason – orchard at old mining claim near 16-mile on Sawyers Bar Road
- Irene Berkery's Cabin - less than 1 mile up Sawyers Bar Road from Forks of Salmon (former mining claim residence)
- Powder house at Forks
- Historic barn at Forks of Salmon (downtown) curve in road
- Knownothing neighborhood registered historic cabin (see corresponding Structures and Water Sources map)

Recreation

Recreation is an important use of the Salmon River watershed. The majority of visitors to the watershed come for the exceptional outdoor recreation. The main forms of recreation in the watershed are: boating; hiking, backpacking, and camping in the three wilderness areas that

make up the headwaters of the watershed as well as within the ample national forest lands; through-hiking on the PCT which traverses the eastern edge of the watershed; camping at developed USFS-maintained and dispersed campgrounds throughout the watershed; hunting for deer and elk, among other game; recreational mining; motorized and non-motorized biking on the main arterial roads; backcountry skiing and snowboarding; catch and release steelhead fishing between November 1 and February 28 (most years); and swimming in the spectacular Salmon River. There is very little in the way of developed recreational facilities in the watershed.

The majority of this recreation takes place during the summer and fall, prime fire season for the area. Recreational use of the watershed both increases the number of people at risk in wildfire events and also increased the risk of human caused fires within the planning area. A significant number of recent fires within the watershed have been started by recreational users. Thankfully these fires, for the most part, have been contained at small acreages.

Below is a list of known recreational site such as campgrounds, trailheads, river accesses. We recommend treatment of roads accessing these highly used recreation locations and around developed campgrounds to reduce the risk both of fires being started from these locations and the risk to individuals using these recreation sites during wildfire season.

Campgrounds:

- Oak Bottom Campground
- Nordheimer Campground
- Red Bank Campground
- Idlewild Campground
- Hotelling Campground
- Matthews Creek Campground
- East Fork Campground
- Shadow Creek Campground
- Trail Creek Campground
- Carter Meadows Horse Camp
- Hidden Horse Campground

Dispersed Campsites:

- Sawpit Flat
- Thomaine's
- Sagaser's

- Whites Gulch
- Mud Lake

Trailheads:

- Wooley Creek Trailhead
- Cherry Creek Trailhead
- Garden Gulch Trailhead (Upper and Lower)
- Jackass Trailhead
- Mule Bridge Trailhead
- South Russian Trailhead
- Music Creek Trailhead
- Taylor Creek Trailhead
- PCT Trailhead at Etna Summit
- Rock Lake Trailhead (High Point)
- Cecil Point Trailhead
- China Creek Trailhead
- Upper South Fork Salmon Trailhead?
- Deacon Lee Trailhead
- Trail Creek Trailhead
- Hidden Lake Trailhead
- Trail Gulch Lake Trailhead
- Long Gulch Lake Trailhead
- Big Flat Trailhead (from Coffee Creek)

River Accesses:
Mainstem Salmon River

- George Geary
- Brannon's Bar
- Butler Creek
- Nordheimer

North Fork Salmon River

- Forks of Salmon Park
- Gallia
- Sawyers Bar
- Idlewild

- Mule Bridge

South Fork Salmon River

- Hotelling
- Windy Bridge
- Methodist Creek
- Mathews Creek
- South Fork Gorge

See Appendix F for full list of River Access locations.

Recommendation: treatment of roads accessing these highly used recreation locations and around developed and dispersed campgrounds to reduce the risk both of fires being started from these locations and the risk to individuals using these recreation sites during wildfire season.

WILDLAND-URBAN INTERFACE (WUI)

Official WUI Definitions

The wildland-urban interface has several definitions. One of the most frequently used, and that captures the essence of the functional idea of WUI, is:
"The WUI is the zone of transition between unoccupied land and human development. It is the line, area or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels." – Federal Emergency Management Agency (FEMA), US Fire Administration (February 2021)
https://www.usfa.fema.gov/wui/what-is-the-wui.html

The second sentence in FEMA's definition is identical to the definition of the National Wildfire Coordinating Group (**NWCG**).

Definitions become more complicated. For instance, the Federal Register (2001) defines three WUI categories, two of which apply to the Salmon River:
"**Category 1. Interface Community**
The Interface Community exists where structures directly abut wildland fuels. There is a clear line of demarcation between residential, business, and public structures and wildland fuels. Wildland fuels do not generally continue into the developed area. The development density for an interface community is usually 3 or more structures per acre, with shared municipal services. Fire protection is generally provided by a local government fire department with the responsibility to protect the structure from both an interior fire and an advancing wildland fire. An alternative definition of the interface community emphasizes a population density of 250 or more people per square mile.
Category 2. Intermix Community
The Intermix Community exists where structures are scattered throughout a wildland area. There is no clear line of demarcation; 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. Fire protection districts funded by various taxing authorities normally provide life and property fire protection and may also have wildland fire protection responsibilities. An alternative definition of intermix community emphasizes a population density of between 28–250 people per square mile."

Defining WUI in the Salmon River Watershed

It is clear that the vast majority of the residences and other utilized private properties within the watershed fall officially into the "Intermix Community" type of WUI, as general guidelines give a minimum density for this category of at least one structure per 40 acres. Only in the downtown cores of Forks of Salmon, Sawyers Bar, and Cecilville does the housing density reach anywhere near the three structures per acre specified in the "Interface Community" definition. Further, many of the watershed's residences are widely scattered and do not fall into these Federal definitions; they are, rather, just considered "rural".

As discussed, the planning area is comprised of a very small percentage of private property intermixed with public lands. Regardless of whether the places Salmon River watershed residents live can by any stretch be referred to as "urban", the SR FSC chooses nonetheless to apply the WUI terminology to the areas surrounding its planning area's residences and improved private lands (henceforth referred to as "occupied private land"). There is high likelihood of fire moving from public land onto occupied private land, and vice versa, during fire incidents in the watershed. Indeed, even past fires started by lightning in remote areas of the surrounding designated Wilderness areas have regularly encroached upon private properties during long fire seasons.

The stated purpose of the Healthy Forests Restoration Act (HFRA) of 2003 was,
"*To improve the capacity of the Secretary of Agriculture and the Secretary of the Interior to conduct hazardous fuels reduction projects on National Forest System lands and Bureau of Land Management lands aimed at protecting communities, watersheds, and certain other at-risk lands from catastrophic wildfire, to enhance efforts to protect watersheds and address threats to forest and rangeland health, including catastrophic wildfire, across the landscape, and for other purposes.*"

The Healthy Forests Restoration Act HFRA (2003) provides a more applicable WUI to communities that do not have a CWPP:
"(i) *an area extending ½ -mile from the boundary of an at-risk community; (ii) an area within 1 ½ miles of the boundary of an at-risk community, including any land that— (I) has a sustained steep slope that creates the potential for wildfire behavior endangering threat-risk community; (II) has a geographic feature that aids in creating an effective fire break, such as a road or ridge top; or (III) is in condition class 3, as documented by the Secretary in the project-specific environmental analysis; and (iii) an area that is adjacent to an evacuation route for an at-risk community that the Secretary determines, in cooperation with the at-risk community, requires hazardous fuel reduction to provide safer evacuation from the at-risk community.*"

See https://www.govinfo.gov/content/pkg/PLAW-108publ148/pdf/PLAW-108publ148.pdf

A majority of the Salmon River planning area's occupied private lands fall into such categories described above in the HFRA. **These HFRA definitions also correspond well with the sentiments of the SR FSC, in that members were in agreement that the WUI should be defined by roads and ridgetops that may make effective fire breaks in the vicinity of occupied private lands.** This is in contrast to simply buffering all occupied private land with a pre-determined WUI distance. In almost all cases, potential firebreaks and evacuation routes identified within areas of likely interaction between private lands and wildlands in the Salmon River planning area fell well within 1 ½ miles of the occupied private lands.

In addition to occupied private lands being defined as WUI, other locations were also designated surrounding WUI area. Values at Risk (see VALUES AT RISK section) were provided separate WUI where they fell outside other designated areas. Care was also taken, when information was available, to include private land water infrastructure that fell outside of the standard ¼-mile buffer or other strategically designated WUI.
Other particular locations were also assigned WUI due to their regular use by locals and visitors:

Designated Campgrounds

- Nordheimer, Oak Bottom - administered by Six Rivers National Forest
- Red Bank, Idlewild, Hotelling, Matthews Creek, Shadow Creek, Trail Creek, and Carter Meadows Campgrounds - administered by Klamath National Forest (KNF)

Popular Dispersed Camping or Other Recreation Areas

- Sawpit, Sagaser's, and Thomaine's on North Fork Salmon River
- Mud Lake on Forest Service Road 39N27
- Blue Ridge Lookout (not currently staffed)

Other

- Petersburg Guard Station (Forest Service fire station)
- Eddy Gulch Lookout (staffed)

Delineation of WUI in the planning area started with applying a ¼-mile buffer to occupied private lands. Then, the extended WUI was delineated: locations contiguous with the ¼-mile buffers, as well as areas surrounding the additional locations listed above, were evaluated in conjunction with maps—topography, aerial photographs, existing and proposed strategic

firelines (see RECOMMENDED TREATMENTS section), and roads (categorized by access type – see EMERGENCY ACCESS AND ROAD CATEGORIES section)—and local knowledge.

Other Considerations in Salmon River WUI Delineation

Steep terrain provides conduit for fire burning in wildlands. Of highest concern are occupied private-land locations above steep terrain, particularly those higher on slopes and/or adjacent to drainages that effectively funnel fire uphill. WUI was expanded downhill of occupied private land where these conditions were met.

Fire also frequently moves downhill in the steep Salmon River terrain, through burning logs and debris rolling downhill and igniting receptive fuels below ("**rollout**"). When rollout occurs, fire can then make runs uphill and create more intense fire behavior than if the fire just continued to back downhill. Because of this, and because human inhabitants may start fires downhill of wildlands that cannot be controlled, WUI was often defined uphill of occupied private lands as well.

Another important consideration in WUI delineation was wind direction and its effects on fire behavior. As discussed in the FIRE HISTORY section, east wind events have been responsible for some of the most extreme fire behavior seen recently in California, including on the Salmon River itself. Thus, where the ¼-mile WUI buffers aligned with drainages to their east, extra WUI was designated to potential firebreak locations to their east sides.

TRAVEL

The Salmon River watershed is accessed by Siskiyou County roads (see Main Arteries) from California State Highway 96 on its western side and California State Highway 3 on its eastern side. There is only one access road from Highway 96, and there are two access roads from Highway 3. In general, the roads are curvy, slow-going, and treacherous, including the main artery roads. Most roads within the watershed, including main arteries are narrow, one lane roads with no division line for traffic. From Highway 96 to Highway 3, via Sawyers Bar or Cecilville, it takes 1.75 or 2.25 hours at minimum (respectively) to drive in a standard passenger car. Large rocks are often present on the roads. **Extreme caution, slow speeds, and alertness are recommended when driving or bicycling on the roads of the Salmon River watershed!**

Main Arteries

The Siskiyou County Public Works/Roads Department maintains the main, paved roads through the watershed. These roads all have regular, significant threats to remaining open and safely navigable, mainly owing to: 1) winter snow accumulation, especially on the two summits; 2) frequent falling of rocks, trees, and debris onto the road from the steep hillsides above; 3) undermining of the road bed in the steep river canyons; 4) semi-trucks (tractor trailers) that get stuck and block roads. The prevailing community sentiment is that the County road maintenance crews do an incredible job keeping the main roads open and surprisingly smooth-surfaced. Particularly during winters of heavy precipitation and/or high winds, the tireless work of these crews is often hailed as heroic.

The three vehicular access routes to the Salmon River watershed—all paved—are:

Salmon River Road

This road provides access from Highway 96 at Somes Bar, near the western edge of the watershed of the Salmon River, where the Salmon feeds into the Klamath River. This road goes to the town of Forks of Salmon—about 17 road miles up the main stem Salmon River. The road follows the river fairly closely, starting eastward then heading generally south-southeast, with mile markers increasing heading upriver. The first seven miles from Hwy 96 have one lane in each direction, at which point the road turns to single-lane status and is of varying width—often not wide enough for two standard passenger cars to pass each other. This is an extremely curvy road and has no guardrails east of the 7-mile point, except at bridges.

The Salmon River Road has the highest frequency of temporary closures due to rock fall and landslide events of the watershed's main artery roads, although such events are not uncommon along the other main arteries. While small amounts of rock and debris are often cleared by

locals by hand, several larger events that require at least a heavy duty pickup truck with plow occur every year, particularly during winter months. The County road crew is able to clear most blockages within a day, but some past events have resulted in closures of several days to several weeks at a time.

Another road closure hazard that has been increasingly common on the Salmon River, although often ignored except by Salmon River residents, is large tractor trailers getting stuck on the roads. Often, some of their rear wheels end up off of the downhill road edge and/or their trailers lodged up against the steep cliffs on the uphill side. There are two locations on the Salmon River Road where this is common: 1) just past the seven-mile marker, there is an extremely narrow road section with steep cliffs on the uphill side and fatal drop-offs on the downhill side (with no guardrails), known as Grant's Bluffs; and 2) near the sixteen-mile marker, where there is an extremely tight curve. See RECOMMENDED ACTION ITEMS SUMMARY, Roads section for related discussion.

It is not technically possible to drive a single axle / semi-truck over 40 feet in total length on the Salmon River Road without damaging the truck or getting stuck and blocking traffic. There is an increasing number of full sized semi-trucks being routed through the Salmon River watershed via their GPS units. Until the road is officially designated with appropriate length limits this issue is likely to increase. This is a serious issue for the area, especially during times of emergency. An oversized fire camp supply vehicle was stuck for nearly half a day on the Salmon River Road during the 2020 Red Salmon Complex, restricting the ability for fire traffic, emergency rescue traffic and risking the lives of the truck drivers. This is an imminently fixable problem.

Recommendation: Siskiyou County / Cal TRANS needs to designate the Salmon River Road with appropriate vehicle length restrictions to prevent further road blockages, and possible deaths.

Sawyers Bar Road

Travelling up the Salmon River (eastward), Sawyers Bar Road begins at Forks of Salmon and follows the North Fork Salmon River, upriver in a generally northeastward trajectory. Mile markers start at zero in Forks of Salmon and increase heading upriver and past the watershed boundary to Highway 3. This road is mostly single-lane and sometimes too narrow for two cars to pass each other. At around the 26-mile marker, just three miles from Etna Summit (eastern edge of watershed), the road becomes two-lane and remains so until it reaches the town of Etna on Highway 3.

Sawyers Bar Road tends to experience road-blocking rock-fall and landslide events much less frequently than Salmon River Road, but its exit out of the watershed to the neighboring Scott (River) Valley and Highway 3 is subject to heavy winter and shoulder-season snowfall. About six miles upriver of the town of Sawyers Bar (near mile marker 21), at Idlewild Campground, Sawyers Bar Road diverges from the North Fork Salmon River and follows its tributary, North Russian Creek. The road climbs much more steeply starting around the 26-mile marker; tire chains are sometimes needed from around this point, as from here the road climbs from 3,000 feet elevation to its highest point of about 6,000 feet at Etna Summit. The road gets plowed regularly during winter snows, but its steepness and tight curves render it extremely dangerous during some storm events and when ice remains on the road.

It is technically feasible, but not advisable, for very experienced drivers to drive larger semi style trucks and trailers on this section of road. However, there is no through route to which vehicles of this size can continue. This is the route that longer vehicles should travel if they are trying to reach Forks of Salmon, such as for fire camp facilities.

Cecilville Road and Callahan-Cecilville Road (Forest Route or "Highway" 93)

Travelling up the Salmon River (eastward), Cecilville Road begins at Forks of Salmon, immediately crossing over the North Fork Salmon River, then the South Fork Salmon River, and then heads generally southeast along the South Fork Salmon River to the town of Cecilville. Mile markers start from zero in Forks of Salmon and increase going upriver. From Cecilville, the road continues toward Carter Meadows Summit (also known as Callahan Summit) and may be referred to as the Callahan-Cecilville Road or Forest Highway 93.

From Forks of Salmon to Cecilville, there are several sections of extremely narrow one-lane road. Many of these sections have precipitous drop-offs to the river on the downhill side and steep cliffs on the uphill side. Despite having less frequent road blockages due to large trucks becoming stuck than Salmon River Road, this section of road is also largely impassable to tractor trailers and is difficult to navigate with long trailers.

Heading upriver from Cecilville, the road diverges from the South Fork Salmon River at its intersection with Caribou Road, and it follows the East Fork South Fork Salmon River to Carter Meadows Summit. This section of the road, from Cecilville to Callahan, is two-lane and is generally wider, less steep, and easier to drive than the equivalent portion of Sawyers Bar Road that goes over Etna Summit. The road crosses Carter Meadows Summit at around 6,200 feet elevation. Despite being a reasonably gradual climb and getting plowed regularly, some winter

storm events require closure of the road over the summit (usually only for a day or so), and conditions can be icy and treacherous.

Recommendation: Siskiyou County / Cal TRANS needs to designate the Cecilville Road with appropriate vehicle length restrictions to prevent further road blockages, and possible deaths.

EMERGENCY ACCESS AND ROAD CATEGORIES

Roads in the planning area provide access to residences and other improved private ownerships, as well as to a myriad of recreation locations and access points. The SR FSC sought to categorize roads, and even some trails, according to priorities for access and escape during wildfires and other emergencies (see the Local Area Locator map, community-based Local Area maps, and neighborhood-level Structures and Water Sources maps). As discussed in the RECOMMENDED TREATMENTS – Standardized Recommended Treatments section, different access categories are assigned different priorities in terms of their importance and urgency.

We worked from the overarching premise that the protection of human lives and well-being is the highest priority. Along with having homes that are amenable to sheltering in place in event of the worst-case scenario that all escape routes are cut off, the highest priority is to have access/escape routes that are passable during most fires, save for the most extreme wind-driven fire types. Henceforth, we discuss roads and trails as "Access Routes", but all such routes are equally important as escape routes in event of emergencies. Tables A1-A4 (Appendix A) detail access categories for roads, with exception of the Firefighting Access Roads category. All categories are shown on the Recommended Treatments Map.

Primary Access Routes

All of the main-artery County roads discussed above have been defined as primary access routes. In addition to these main routes that cross the watershed and eventually connect to highways, access to private residences and/or improved properties with regular visitation (occupied private lands) includes other County roads and many roads through public lands that are under US Forest Service jurisdiction. Because of the likelihood that any access route may be cut off due to fire or other road blockages, it is imperative that all such lands have at least two primary access routes identified, where existing. Where only one access route exists, it is recommended that extra fire hazard mitigation treatments are completed (see FIRE HAZARD ASSESSMENT and RECOMMENDED TREATMENTS sections).

It is noteworthy that a few private properties are accessible only by trails. These trails have also been identified as Primary Access. In addition to private properties, other location types were identified as being top priority for access, and their access roads and/or trails were categorized as Primary Access:

- Values at Risk (see Values at Risk section)
- Roads to, and within, designated campgrounds
- Fire engine or tanker fill sites

- Community water sources and infrastructure (central sources serving a town or neighborhood)
- Communications sites and access points to associated transmission lines
- Eddy Gulch Lookout

Recreation Access Routes

Hundreds of miles of trails exist in the planning area, and many of their trailheads are within the planning area and/or accessed from it. All of these trails are on US Forest Service lands, and all are thus allowable locations for overnight hiking-camping use; trails in the three designated Wilderness areas are particularly likely to have people hiking and recreating, often distant from trailheads and in fire-prone areas. As such, it is important that access roads to trails are well-maintained and provide for reliable escape routes and safe access for emergency responders (medical, firefighting, and search & rescue). Routes to trailheads were categorized as Recreation Access routes and prioritized for recommended fire hazard mitigation treatments. Similarly, a few roads that are not already identified as Primary Access are regularly used for hunting, dispersed camping, mining, etc.; these roads were also identified as Recreation Access. Treatments are recommended for Recreational Access roads.

Secondary Access Routes

Secondary Access routes were selected that may serve as contingency routes that connect Primary Access routes. These routes may be useful if, for instance, a Primary Access is being used to evacuate during a fire, but that Primary Access becomes blocked at some point.

Firefighting Access Routes

Firefighting Access routes were generally categorized using input from Klamath National Forest on routes that are needed to access fire control lines (firelines) and strategic ridgelines that would likely be used for future firelines during wildfires and/or prescribed burning. This category includes a substantial portion of the roads that were not categorized as Primary, Recreation, or Secondary Access routes. Treatments are recommended for these roads but are of a lower priority, and a narrower treatment buffer on these roads is recommended, than for Primary, Recreation, and Secondary Access Roads.

Burn Control Roads

Burn Control roads are mostly those roads that form a continuum with previously used firelines, where the fireline (dozer line or hand line) is discontinuous. Many such segments have been designated "Road as Completed Fireline" in previous wildfire incidents. These road segments are treated the same as strategic fuels breaks in the treatment recommendations section.

FIRE HAZARD ASSESSMENT

Intrinsic Hazards Assessment

Intrinsic hazards to human life, private properties, and other values at risk are determined by position on the landscape (steepness, slope position, aspect) and availability of escape routes. Other hazards are due to factors that are more likely to change themselves and/or are easier to treat, e.g. fuels, vegetation, and attributes of structures (*i.e.*, "home hardening" can be done). As such, a scoring rating for private properties was developed based on the following criteria and scores, with higher scores translating to higher fire hazard.

Methods

To assess intrinsic hazards for each private parcel, we manually digitized a zone of fire influence, based on the location of at least one residence per parcel, and called these "**Individual Risk Zones (IRZ's)**". Where multiple residences were located on a single parcel, the parcel with likely the highest terrain-driven risk was used for the IRZ. In some cases, two IRZ's were created for a single parcel—when different residences on that parcel were likely to have different zones of fire influence. Because the area that directly affects how fire will behave around a given home will be largely determined by what is below (in elevation) and immediately surrounding where people live, the individual hazard zones were delineated (using contour lines as guides) to include a 200-foot buffer (home ignition zone, or **HIZ**) drawn around the residence (home) and a zone on contour and downhill of the structure itself. The downhill and side-hill ends of each HIZ were drawn to a natural fireline (e.g., river or stream), potential control feature (e.g., road), or other terrain feature (e.g., two gullies branching off below). This results in many overlapping individual hazard zones. For properties with improvements but no habitable structures, larger IRZ's were delineated to include most of the parcels themselves.

Slope

In the absence of strong downslope winds, fire moves fastest uphill because it preheats the fuels above and causes uphill drafting of air from below, drawing more oxygen to the fire. Generally, the steeper the slope, the faster the uphill spread. While steeper slopes don't necessarily translate to higher fire severity, more rapid rates of spread mean less time to set up home defenses and to evacuate. Average slope was calculated for the individual hazard zones to determine scoring.

To determine scoring, BEHAVE 6.0 was used to examine predicted rate of spread (**ROS**) vs. percent slope over a range from 0-100% slope. Medium-load timber litter (TL3) and low-load dry climate timber understory (TU1) fuel models were run with an upslope wind speed of 1 mph

and fuel moisture at 3, 5, and 7% for 1-hr, 10-hr, and 100-hr fuels, respectively. Graphs were examined, and ranges of slope were visually defined that showed a relatively steady rate of increase in ROS. The midpoint ROS of each category was taken and compared to the ROS at 0% slope. The ROS at 0% slope was given 1 point, and the approximate ratio of other categories' midpoint ROS to that of 0% slope determined its number of points. Ratios were fairly similar for the two fuel types modeled. The resultant slope category scores were:

- 0% to <20% slope – 1 pt.
- 20% ≤ slope < 35% - 1.5 pts.
- 35% ≤ slope < 50% - 2.5 pts.
- 50% ≤ slope < 70% - 4 pts.
- 70% ≤ slope < 80% - 5.5 pts.
- 80% ≤ slope < 90% - 7 pts.
- 90% ≤ slope <100% - 8 pts.
- ≥100% slope – 10 pts.

Slope Position

In 2006 fires occurring mostly within the planning area, Estes *et al.* (2017) found similar effects of increased fire severity for middle 1/3 and upper 1/3 slope positions, compared to the lower 1/3 slope. For this hazard score, the same structure for each parcel that was used to define the corresponding **IRZ** was used to determine slope position. Those structures sitting above the lower 1/3 slope position were given 5 points.

Solar Radiation

Solar radiation has substantial effects on fuel moisture conditions. At a given latitude, **aspect** is generally the most important factor controlling how much solar radiation a location gets. Latitude, slope, and topographic shading also affect the amount of solar radiation experienced. Annual solar radiation was calculated in Arc GIS 10.8 Spatial Analyst for the planning area, which takes into account all of the factors mentioned. The Natural Breaks method was used to classify insolation into five categories, with increasing numbers of points given for greater solar insolation (i.e., possible score of 1-5). If August-through-September solar radiation was more than 423,611 w/m^2, an additional point was added; this was the threshold above which Estes et al. (2017) found solar radiation to be consistently positively related to fire severity.

Located in a Chimney

A chimney is a box- or steep-v-shaped canyon (usually an at-least intermittent water course) that draws air in from below and creates strong upslope drafts. Chimneys will often cause extreme fire behavior within the canyon and nearby. If an individual hazard zone overlapped

with a chimney below, and the defining structure was in the upper 2/3 slope, then the slope score was multiplied by 2.

Access/Escape Routes

Properties only having vehicular access to one primary access route leading in a single direction within 0.2 miles were given 5 points. These properties are identified in the neighborhood-level Structures and Water Sources maps and are listed below.

Additionally, properties with only trail access are given 8 points as access and time of escape are greatly increased.

Somes Bar to Butler Creek Local Area

- Private property up Camp Three Road (Somes Bar to Oak Bottom map); escape in the northerly direction has not been possible since a washout of the road during the 2017 Haypress Fire
- *Trail Access Only* – Wooley Camp (Wooley Creek Trail)

Sawyers Bar Local Area

- Rainbow Mine (Finley Camp, Rainbow Mine, and Snowden map)
- Taylor Hole properties (Taylor Hole Map)
- Mt. Laurel Mine up Eddy Gulch (Eddy Gulch, Whites Gulch and Uncle Sam map)
- Lease cabins along the Mule Bridge access road (Forest Road 40N47)
- Residences up Eddy Gulch Road just before the first switchback; while not strictly a single-access location, fire coming from below could easily cut off escape in the uphill direction as well, as the road switches back steeply above these residences.
- *Trail Access Only* – Abbot Ranch (North Fork Salmon River Trail)

Forks of Salmon Local Area

- Karuk Allotment property and nearby private property near the mouth of Negro Creek (Knownothing map)
- *Trail Access Only* - Property across and down river from Knownothing Creek (Knownothing map)
- Nordheimer Creek properties (Crapo, Nordheimer, to Morehouse Creek map)
- "Bloomer Mine"—property with driveway across Salmon River Road, just downriver from Nordheimer Campground (Crapo, Nordheimer, to Morehouse Creek map)

Bear Country Local Area

- Black Bear Ranch (Blue Ridge Ranch and Black Bear Ranch map)
- Eastern-most parcel at Godfrey Ranch (Godfrey Ranch and Harris Ranch map)

Cecilville Local Area

- All properties up Caribou Road, including the USFS Petersburg Fire Station (Cecilville Upper South Fork map)
- The "Gooley Ranch"—furthest property up Taylor Creek (Cecilville East Fork South Fork map)
- The four southern-most of the parcels flanking the East Fork South Fork Salmon River; the northernmost is close to Cecilville-Callahan Road
- *Trail Access Only* – Trail access properties in the upper South Fork Salmon River

Other Properties / Residences

- The Josephine Lake property and other properties accessed via Coffee Creek

Table 4 summarizes the range of points available for each category of the intrinsic risk analysis. The range of calculated scores for **IRZ**'s was divided into quantiles (five categories with equal numbers of IRZ's based on scores arranged from lowest to highest) to determine the relative hazard categories shown for each applicable parcel on the Intrinsic Fire Hazard Assessment Map.

Results – Intrinsic Hazards Assessment

See the Intrinsic Fire Hazard Assessment Map. Properties along the river corridors tend to be relatively lower risk according to this analysis, which is expected given the weighting of terrain factors that have substantial effects on fire behavior. Along the river corridors, several properties were put into higher risk categories because they have longer private access roads/driveways that may make escape more difficult during a rapidly spreading wildfire; in the event that fire had already spread to these escape routes, residents could be trapped, and/or firefighters would not be able to access homes for protection.

Table 4 Scoring criteria for the Intrinsic Fire Hazards Assessment.

Intrinsic Hazard	**Available Points**	**Range-Actual Points Calculated for IRZ's**
Slope (includes multiplier for location in **chimney**)	1 to 20	1 to 5.3
Slope Position (lower 1/3 or above)	0 or 5	0 or 5
Solar Radiation (5 categories plus 1 for above severity threshold)	1 to 6	2.2 to 5.5
Single Road Access Only	0 or 5	0 or 5

Single Trail Access Only	0 or 8	0 or 8
Total Available	2 – 44	4.5 to 28.0

Current Conditions Hazard Assessment

Vegetation is one of the most important factors defining fire hazard. The current condition of vegetation is largely dependent on land management history and fire history. Of course, it is also dependent on an array of other factors, such as climate, elevation, topography, soils, and other (non-fire) disturbances. As mentioned, altering vegetation is one of the primary means by which fire hazards can be mitigated.

A central means by which fire hazard can be mitigated is by managing fuels. This includes both live vegetation and dead fuels. Dead surface fuels—wood, litter, and duff—can be directly measured. This is often most helpful when accounting for the **fuel loading** before and after a fuels treatment, or before and after wildfire. When fire professionals use tools to predict **fire behavior**, they often use a series of **fuel models**, which describe the general vegetation type and an array of average fuels conditions for each type.

Methods

To model the current-conditions hazard across the planning area, FlamMap 6.1.0 was used to predict fire type (**surface**, **torching**, or **active crown fire**), **flame length, and rate of spread (ROS)**. The data used by FlamMap include elements used at least indirectly in the Intrinsic Hazards Assessment (elevation, slope, and aspect), but it also uses vegetation and fuels data. The LANDFIRE data include the following additional inputs, which are used by FlamMap to model fire behavior:

- Fuel Model
- Canopy Cover
- Stand Height
- Canopy Base Height
- Canopy Bulk Density

Because an analysis was desired that would help prioritize where treatments are the most urgent within the planning area, the fire model was not run under very extreme conditions. If, say, 97th-percentile conditions had been used instead of 90th-percentile, predicted fire behavior would likely be extreme for a much greater proportion of the properties in the area.

The current-conditions hazard assessment used a FlamMap model based on the following data:

- Landfire 2016 re-map with limited updates for larger disturbances (wildfires) through 2019 (LANDFIRE "2019L" data)
- Fuel models were changed, using a set of rules, to represent recent consumption of fuels where RAVG data indicated low-severity fire effects in the Red Salmon Fire footprint. These data indicate a majority of unchanged or low-severity fire effects within a mile of the potentially affected properties in the Knownothing Neighborhood, etc.
- Fuel models were changed, using a set of rules, where the USFS or SRRC had completed fuels reduction treatments from 2016 to present.
- 90th-percentile fuel moisture conditions, as calculated using **RAWS** data from the area, plus weather conditions for a 7-day period for fuels conditioning that historically correspond with similar fuel moistures.
- 20-foot (height) wind speed of 20 miles per hour

Table 5 shows the scoring categories for IRZ's based on FlamMap outputs. These categories are based on scoring methods used in the recent Wheeler Crest, California CWPP; these methods rely largely on implications of the three fire behavior metrics (flame length, rate of spread, and fire type—**surface fire**, **passive crown fire**, **active crown fire**) to fire suppression efforts (Andrews and Rothermel 1982). The flame length (in feet), plus the rate of spread (**chains** per hour), plus three categories of fire type (assigned 10, 20, and 30 points, respectively) provides the total analysis score, which is then divided into five Suppression Resistance Categories. These categories provide a relative measure of how difficult fire is likely to be to control.

Table 5 Scoring criteria for the Current Conditions Fire Hazard Assessment. IRZ = Individual Risk Zone, a zone of fire influence for each individual improved property.

Flame Length (feet)	**Rate of Spread** (chains/hr)	**Fire Type**	**Total Analysis Score**	**Suppression Resistance Category**	**Proportion of IRZ's**
0 to <4	0 to <5	Surface (10)	Less than 19	Low	45.6%
4 to <8	5 to <10	Surface (10)	19 to <28	Moderate	42.8%
8 to <11	10 to <20	Passive Crown (20)	28 to <51	High	9.4%
11 to <20	20 to <40	Passive Crown (20)	51 to < 80	Very High	2.2%
20 +	40 +	Active Crown (30)	80 +	Extreme	0%

Results – Current Conditions Hazard Assessment

Somewhat surprisingly, none of the Individual Risk Zones (**IRZ'**s) associated with residences or other values fell under the Extreme Suppression Resistance category. The vast majority of **IRZ**'s fell into the Moderate or Low risk categories. However, many IRZ's did have portions where the Extreme rating applied. See the Current Conditions Hazard Map and the maps showing predicted fire behavior under 90th-percentile weather and fuel moisture conditions (Flame Length, Rate of Spread, and Fire Type maps). Because the composite fire behavior scores were given risk categories based on another CWPP (Wheeler Crest), the Current Conditions Risk Assessment may under-represent relative risks in the Salmon River watershed; the Wheeler Crest area has high proportions of dry shrub fuel types that experience very high rates of spread, and this aspect of fire behavior calculates prominently into risk scores there.

The majority of residences in the planning area are located along the river corridors, where topographic effects on fire intensity tend to be minimal. **IRZ**'s in the river corridor tended to be given smaller areas designated for which fire activity would be predicted to directly affect the homes included. As such, a few of these IRZ's may have been given spuriously high scores due to one or more of the FlamMap inputs lending to predictions of very small areas of more intense fire behavior. It is recommended that properties called out as High or Very High risk in the Current Conditions Assessment be evaluated on the ground for consistency with the modeled conditions (i.e., actual risk).

Warning must be heeded that the weather conditions employed in this analysis are not extreme. A 20 mile-per-hour wind is indeed significant, but sustained winds and gusts associated with such destructive fires as the Tubbs and Atlas Fires of 2017 (Sonoma and Napa Counties) and the Slater Fire of 2020 (Happy Camp area, Siskiyou County) were much more extreme. Similarly, the extremely low humidity and fuel moisture associated with those fire weather events was also more extreme than modeled in this scenario. **Low or moderate risk in this analysis should not be taken as a reason for complacency!**

In all locations, the presence of a grass fuel type near dwellings tended to predict very high rates of fire spread under the significant wind conditions used in the modeling. This rapid spread is indeed likely, and dangerous, if wild grasses are allowed to grow in the absence of grazing and/or mowing. Many of the properties with dry grass fuel types, which are relatively rare in the watershed, actually do incur regular grazing and thus are likely less hazardous than these types of models would indicate. However, where this is a real threat, protection of homes and other important values can be relatively easily achieved by mowing tall grasses. This requires more regular effort than shrub and timber types, but the effort is much less intense than fuels

reduction efforts in those types. Also see RECOMMENDED TREATMENTS – Treatment Types section for related discussion.

Residential Hazard Assessments

While a residential hazard assessment was not completed for this CWPP, the SR FSC and SRRC are currently developing a set of evaluation criteria and scoring that can be filled out on a tablet, smartphone, or paper form. With aid from Coalitions and Collaboratives, Inc., trainings will be made available for residents who want to complete the assessment on their own properties. Results and associated hazard maps will be stored and available online. For residents not able or willing, SRRC or SR FSC staff will be available to conduct these evaluations where property owners are amenable. Completion of these surveys is highly recommended, as they can help prioritize actions for the most hazardous locations where the other more generalized analyses may have identified lower risk and/or exclude pertinent risks. Examples of some of the evaluation criteria are:

- Driveway/private road access—minimum width, clearance height to vegetation and other obstacles, length to first turnaround, availability of turnarounds per unit length, and road surface conditions. These items evaluate the safety of access and escape for both residents and for fire engines. The PRC states that driveways must be at least 10 feet wide and have 15 feet vertical clearance. Local CAL FIRE knowledge suggests it's best to shoot for 15-feet wide and 20 feet vertical clearance; vegetation grows back rapidly, so following more stringent criteria makes treatments more durable and allows vehicles more wiggle room.
- Distances of firewood storage and propane tanks to home.
- House (including roof) and deck construction materials and vulnerabilities.
- Presence of steep slopes and rapid slope changes.
- Cleanliness of roof, deck, under deck, gutters, and other places of potential debris accumulation.
- Water sources and amount of water available (access, flow, recharge).
- Presence and functionality of fire sprinkler systems.
- Presence and visibility of address signs.

FIRE HISTORY

Historical Fire Regimes

The past fire regime, prior to European settlement, within the Salmon River watershed is described as having frequent fires (1-25 year intervals). Two recent fire history studies looked at fire regimes for two vegetation types found in the Klamath National Forest. Wills (1991) did a fire history study on Hotelling Ridge, located in the South Fork Salmon River watershed. This study revealed a pre-suppression fire return interval of 10-17 years in Douglas-fir/hardwood stands. In the Thompson Ridge area on the Happy Camp Ranger District, Taylor and Skinner (1994) have estimated pre-suppression fire return intervals for Douglas-fir/sugar pine between 15 and 25 years. Lightning and indigenous burning were the causes of ignition. Stand-replacing events were common in the sub-basin, occurring when vegetative conditions were susceptible and ignition and weather opportunities were presented. However, they were only a few acres in size to a few hundred acres.

In many areas within the watershed traditional cultural practices included indigenous burning at much higher return interval, such as around village sites, oak groves, meadows, hunting grounds and ceremonial areas, ranging from every year to every 7 years depending on desired outcome and available fuels. Table 6 shows the area burned by how many fires have burned over the same area since 1910 (**FRAP** data).

Table 6 Planning area acreage covered by number of wildfires since 1910.

Number of Fires Since 1910	Total Acres	% of Planning Area
0	130,749	27.2
1	158,268	32.9
2	130,506	27.2
3	52,399	10.9
4	7,679	1.6
5	849	0.2
6	0.3	0.0

The **Fire Return Interval Departure** (**FRID**; Safford and Van de Water 2014) is a useful tool that provides the best complete estimate of fire regimes before European settlement and how departed more recent regimes are from those historic norms. This tool is based on an extensive effort to summarize fire return intervals three to four centuries before Angloamerican

colonization, using a robust review of literature that used dendrochronological and charcoal deposition records to calculate the historic fire return intervals (Van de Water and Safford 2011). Van de Water and Safford (2011) defined 28 **Presettlement Fire Regimes** (**PFR**'s) for California that each lump several vegetation types with similar **fire regimes**. For the planning area, there are 61 Regional Dominance Types identified by CALVEG (CALVEG 2011), and these have been included into 13 PFR's for the same area. Table 7 shows the dominant species in the planning area included in each PFR and the amount of area in the watershed covered by the ten types that cover at least 0.1% of the planning area. It also shows the median historic fire return interval for each PFR.

The **FRID** data illustrate that fire has been much less frequent over the past 110 years than it was prior to Angloamerican colonization. Analysis of the 2019 FRID data estimate the average pre-settlement FRI for the planning area to be 17.3 years, and the current average FRI (since 1910) is 50 years. The Fire Return Interval Departure Map shows estimated departures for the planning area and surroundings. Inherent in the FRID calculations are the number of overlapping fires that have occurred since detailed spatial records were kept; the number of overlapping fires are depicted in the Number of Overlapping Fires Map. Note that while the Number of Overlapping Fires Map includes the fires of 2020, the FRID Map does not; the FRID data that include the previous fire season's incidents are typically not released until at least into the following fire season, so the data available for this CWPP only included through 2019.

The extent and historic fire regimes of deciduous oak-dominated habitats are perhaps given one of the least accurate representations in the available scientific data. As noted in the VEGETATION section, the mapping of current deciduous oak woodlands by CALVEG and others based largely on remote sensing tends to be fairly inaccurate and extremely under-representative of the actual distribution. The area accounted for in the FRID data as oak woodland probably represents only 10-15% of the current actual distribution of deciduous oak-dominated habitats in the planning area. Further, the median historic FRI for the oak woodland type, 12 years, probably underestimates the fire frequency needed to maintain these woodlands in the face of conifer encroachment.

Table 7 Pre-settlement Fire Regime (PFR) attributes in the Salmon River Watershed.

Pre-settlement Fire Regime	**Dominant Species in Planning Area**	**Acres**	**Percentage of Planning Area**	**Pre-settlement Fire Return Interval**	**Current (since 1910) Fire Return Interval**
Mixed evergreen	Douglas-fir, tanoak, canyon live oak, Pacific madrone, bigleaf maple	171,542	35.7	13	45
Dry mixed conifer	Ponderosa pine, sugar pine, incense cedar, white fir, CA black oak	110,820	23.0	9	52
Moist mixed conifer	White fir, Douglas-fir, incense cedar, ponderosa pine, sugar pine	86,401	18.0	12	56
Montane chaparral	Manzanita species, *Ceanothus* species, bitter cherry, CA hazel, Brewer's oak	39,825	8.3	24	47
Red fir	Red fir (locally also known as Shasta fir), white fir, western white pine	39,144	8.1	33	50
Chaparral and **serotinous** conifers	Buckbrush, deerbrush, knobcone pine	10,429	2.2	59	50
none	N/A	10,386	2.2	N/A	N/A
Subalpine forest	Mountain hemlock, western white pine, Shasta fir (red fir), lodgepole pine, foxtail pine, whitebark pine	7,327	1.5	132	66
Yellow pine	Ponderosa pine, Jeffrey pine, sugar pine, CA black oak	3,351	0.7	7	77
Oak woodland	CA black oak, OR white oak	1,531	0.3	12	59

frequency required to keep oak woodlands from being overtaken by conifers. For instance, Agee (1993) concludes that return intervals must be less than 10 years to prevent conifers from overtaking CA black oak woodland, and fire every 5-10 years would be necessary to maintain OR white oak woodlands. The recent, regular application of prescribed fire in OR white oak habitats in the Bald Hills area of Redwood National Park suggests that low intensity fire must be applied every 4-6 to substantially reduce numbers of Douglas-fir seedlings in oak woodlands before they become too large to treat with fire (Eamon Engber, RNP Fire Ecologist, pers. comm.).

Recent Fire History

CAL FIRE hosts, and helps to maintain and update, a database of fire perimeters through their Fire and Resource Assessment Program (FRAP). This database covers fires as far back as 1878, where reasonable data can be found (FRAP 2020). These data include input from many other agencies, the most notable of which are **USDA** Forest Service Region 5 and the primary **USDI** agencies—the Bureau of Land Management and the National Parks Service. For fires overlapping the Salmon River watershed, these data contain fire perimeters that go back to 1910. It is highly likely that some fires occurred during the 1878-1910 period in the watershed, but no detailed records were available for their occurrence. The Wildfires by Name and Year Map shows fires ≥500 acres since 1950 for the Salmon River watershed and its immediate surroundings.

Since 1910, wildfires have covered an **absolute footprint** of 349,930 acres within the Salmon River watershed (Table 8). This footprint covers 73% of the 480,830-acre total watershed area. In the same time period, the **wildfire incident total area** covers 611,785 acres in the watershed; this total includes areas that have burned more than once since 1910 within the 349,930-acre absolute footprint. The largest decadal increases in the absolute footprint occurred in the 1970's, 1980's, 2000's, and 2010's.

For the 1970's and 1980's, these increases in absolute fire footprints were driven primarily by 1977 and 1987, respectively (Table 9). The 1977 Hog Fire burned 58,365 acres, and the combination of three large fires in 1987—the Yellow, Glasgow, and Hotelling Fires—burned over a total of 81,571 acres. While the Megram Fire of 1999 burned a significant area (125,000 acres) directly adjacent to the planning area, fire activity within the planning area in the 1990's was relatively minimal; the largest fire in the 1990's the was the Specimen fire (8,378 acres) in 1997. The 2000's decade saw significant fires in 2006 and 2008, with fires burning over 133,253 acres in the watershed; 50,067 of these acres had not been previously burned in recorded history.

Table 8 Wildfire statistics by decade. [1]Absolute fire footprint specifies the actual landscape footprint over which fire has burned; this number will be less than the sum of the Acres Burned columns to the left. [2]The decadal increase in absolute footprint specifies number of acres burned in that decade where fire had not burned prior (since 1910).

	Fires Within or Overlapping Salmon River Watershed		**Only Portions of Fires Within Salmon River Watershed**		**Absolute Fire Footprint[1] to Decade End - Salmon River Watershed (Acres)**	**Decadal Increase[2] in Absolute Footprint (Acres)**	**Percent of Absolute Footprint**
Decade(s) or *Year*	**Acres Burned**	**Percentage of Total**	**Acres Burned**	**Percentage of Total**			
2020	143,840	12	38,117	6	349,930	12,240	3.5
2010s	295,305	25	160,005	26	337,690	67,568	19.3
2000s	248,480	21	133,253	22	270,122	50,067	14.3
1990s	135,860	11	10,792	2	220,055	7,198	2.1
1980s	168,919	14	91,936	15	212,857	54,871	15.7
1970s	67,702	6	67,469	11	157,986	52,259	14.9
1960s	467	0.04	467	0.08	105,727	322	0.09
1950s	12,347	1	8,175	1	105,405	8,336	2.4
1910-1950	126,499	11	101,571	17	97,609	NA	27.7
Total	**1,199,419**		**611,785**		**349,930 in 2020**		

Table 9 Acres burned in planning area for the ten years with the greatest area burned (since 1910).

Year	Acres Burned	Fire Names
1987	91,876	Yellow, Hotelling, Glasgow, St. Claire
2008	80,038	Ukonom Complex (Haypress, Jake, Merrill)
2017	72,206	Salmon August Complex (Wallow, Island); Haypress
1977	58,365	Hog
2014	48,780	July Complex (Whites, Log); Happy Camp Complex (Frying Pan)
2006	44,173	Uncles Complex (Hancock, Uncles); Orleans Complex (Somes); Bake-Oven
2020	38,117	Red Salmon
2013	37,186	Butler, Salmon Complex
1917	18,039	No fire names available
1918	7,624	No fire names available

The 2010's also saw an unprecedented amount of area burned in the watershed—160,005 acres, 67,568 acres of which burned outside the footprint of any previous fires since 1910. Statistics for other major fires in the planning area are detailed in Appendix C, Table C1. https://frap.fire.ca.gov/mapping/gis-data/

Over the past several years in California, many of the most destructive fires we have experienced have been pushed by strong east winds. Winds from this direction have historically been infrequent during fire season outside of Southern California, but east winds tend to be warm and extremely dry, forcing rapid desiccation of fuels. Strong east wind events were largely responsible for the extreme fire behavior and associated loss of life and property associated with the Tubbs, Atlas, and Nuns fires of Sonoma County in 2017. Similar wind events drove the extreme fire events during the Whites fire of 2014 and the 2017 Wallow Fire on the Salmon River, as well as the devastating 2020 Slater Fire in Happy Camp—not far from the Salmon River watershed, where nearly 200 homes were destroyed. This fire started on September 8, 2020, and burned over 157,00 acres, with around 90,000 acres burning in the first 24 hours and over 130,000 acres by the morning of September 10th!

Property Loss Due to Fire

Only a few planning area fires in recent history have been particularly serious in terms of loss of human property. The 1987 Glasgow Fire was the most destructive, particularly at the Godfrey Ranch and Blue Ridge Ranch areas. It burned nine of thirteen structures at Godfrey, including six homes and two barns, and at least two residences at Blue Ridge. The fire burned through parts of Black Bear Ranch as well but only burned one habitable structure—a historic and inhabited cabin—out of the many that existed on the property at the time. Many credit the relatively minimal losses at Black Bear to a couple of factors: 1) many consecutive years of woodcutting and maintenance by a variable, but sometimes numerous, group of residents, and 2) regular grazing by goats that kept understory vegetation cover low for at least a 1/3-mile buffer around the property. The 1977 Hog Fire also burned one of the homes at Godfrey Ranch.

In 2014, one house and one outbuilding burned down in the Whites Fire. The above-ground phone lines going upriver from Sawyers Bar were also burned in this fire.

Fire Severity

Fire severity describes the effects of fire on the landscape, while **fire intensity** describes fire behavior. While high intensity fire often does result in high severity, this is not always the case. A high-intensity fire, for instance, may have high flame lengths because it is burning through shrubs in a relatively open forest, but the mature trees may have a high survival rate because they have thick bark and their canopies start substantially above the flame height of the burning shrubs. Conversely, a low intensity fire that has a long residence time in certain types of surface fuels may have very low flame lengths, but it might kill most of the trees due to killing roots and/or prolonged heating of trees' conductive tissues in the inner bark (**cambium**) of the lower bole.

Fire severity is generally measured in a few stages after a wildfire. First, Burn Area Emergency Response (**BAER**) estimates soil burn severity by satellite image analysis as soon as possible after fire containment. This allows response teams to focus on repairing areas that will be particularly in danger of severe disruption in following weather (especially heavy precipitation) events, e.g. debris flows, landslides, and excessive sedimentation into watercourses that would threaten aquatic life. Soil burn severity is not always indicative of a fire's effect on vegetation, however, particularly where soil burn severity is lower. Fire may kill the majority of trees and other vegetation but have less serious effects on soil; for instance, when trees are killed by crown fire (rather than scorch from below and/or prolonged heat on root systems), soils may not be severely affected.

After BAER measures are taken, burn severity is measured by other methods that largely reflect how severely vegetation was affected. These methods also use analysis of satellite imagery, namely Landsat imagery, to compare pre- to post-fire conditions. The Rapid Assessment of Vegetation Condition after Wildfire (**RAVG**) method uses imagery taken 30-45 days after fire containment and provides estimated canopy loss, basal area (a proxy for tree volume) loss, and a composite burn index. RAVG data are currently available back to 2007. While similar to RAVG, the Monitoring Trends in Burn Severity (**MTBS**) Program instead uses post-burn imagery taken well into the next growing season following the fire. Thus, MTBS includes second-order fire effects, or responses to fire that aren't immediate. MTBS data are available back to 1984.

Severity of Recent Fires in the Planning Area

Using MTBS data back to 1984 for all fires in the watershed, overall fire severity proportions within wildfire footprints in the planning area were:

- 23.7% Unburned to Low Severity
- 40.7% Low Severity
- 21.7% Medium Severity
- 13.6% High Severity

The Fire Severity Map shows fire severity of the most recent fire for the planning area and its surroundings. Associated area burned by severity class is shown in Appendix C, Table C2. Table 10 shows proportional area burned by fire severity class for the six fire years that are among the ten highest in terms of greatest area burned (see Table 9 above) in the watershed and have MTBS data available (the other four years are prior to 1984). The Fire Severity – Yellowjacket and Crapo Map shows two areas on south **aspects** that each burned twice in years with available MTBS data. Table C4 (Appendix C) shows that there was a higher percentage of high severity fire in the second burn for each area. The spatial pattern of severity does not suggest that severity in the first fire (1987 for both areas) was predictive of severity in the second (2008 for Crapo and 2013 for Yellowjacket Ridge). Both areas also burned in the 1977 Hog Fire, for which severity data are not available.

Table 10 MTBS fire severity (% of total area burned) for six of the top ten fire years (MTBS data not available for other four) in the watershed.

Year	Unburned to Low	Low	Moderate	High
1987	31.4	43.3	17.5	7.8
2006	29.9	43.6	18.2	8.3
2008	27.5	34.0	22.0	16.4
2013	9.8	42.4	30.1	17.7
2014	16.7	33.7	21.8	27.8
2017	16.6	49.9	25.7	7.8

The Whites Fire of 2014 stands out in having a high proportion of high severity fire—29% of the total area burned. This is over twice the average percentage (13.7%) for all of the top-ten historic fire years for which MTBS fire severity data are available (1987, 2006, 2008, 2013, 2014, and 2017). Huge swaths of nearly 100% tree canopy mortality were caused by the Whites Fire, which are still starkly visible as mountainsides of blackened snags today from Sawyers Bar Road.

Surprisingly, a substantial portion of the high severity part of the Whites Fire occurred where the fire was driven downhill by strong east winds on August 10, 2014. These winds were accompanied by extremely low relative humidity. After the downhill run, fire quickly spread across the North Fork Salmon River and up Tanners Peak. This day of fire activity created a pyro-cumulus cloud that then caused several more lighting strikes in the Happy Camp area, starting a wildfire complex that burned over 133,000 acres around Happy Camp, with 15,406 of those acres moving back into the northern portion of the Salmon River watershed in the Marble Mountain Wilderness. This underscores the importance of taking into account the potential devastating effects of east wind events on fires within our planning area, especially where winds and drainages align, when undertaking fire planning.

The Glasgow Fire of 1987 was notable in that one of its large high-severity patches was centered on Godfrey Ranch, a 185-acre private inholding of seven parcels surrounded by Klamath National Forest land. Prior to this fire, the private lands had mostly escaped the 1977 Hog Fire that surrounded it, leaving the neighborhood an island of green in a moderately burned landscape. In 1987, the treed portions were mostly comprised of fairly dense conifer forest. Approximately 95% of the vegetation was killed by the 1987 fire, with only one small patch of mature conifers (<2 acres) and a few scattered individual mature trees that survived. Despite having been top-killed, or nearly so, by the dense conifers prior to the fire, several areas on the Godfrey Ranch parcels saw strong regeneration of California black oak and Oregon white oak trees from surviving below-ground portions. Currently, there are several areas at Godfrey Ranch where these deciduous oaks dominate as woodlands.

The **RAVG** data show the following percentages of area burned by the Red Salmon Fire, within the planning area, by composite burn index (estimate of vegetation change): 27% unchanged, 47% low severity, 14% moderate severity, and 10% high severity. Given the extremity of drought experienced in the 2020 **water year**, it will be informative to see the **MTBS** data on severity, which will take into account the vegetation mortality that occurs during the 2021 growing season. There is speculation that the interactive effects of drought and the subsequent fire will result in higher tree mortality than initial estimates of severity indicate.

Ignition History

The Fire Program Analysis' Fire Occurrence Database (FPA-FOD; Short 2017) summarizes fires by ignition type and size for the years 1992-2015. This dataset provides the best available estimate of ignition locations (see Ignitions Map). The FRAP fire perimeters database also records causes for fires.

The vast majority—92.9%—of acres burned in the Salmon River watershed and surrounding areas have resulted from lightning ignitions. Dry lightning storms are very common in the watershed during summer months—particularly during late July. These storms often ignite several fires in the watershed in a single event—often within a few hours.

Of the total fire ignitions, 42.4% were attributed to human causes, but these fires tend get started in more easily accessible locations and are therefore easier to extinguish before they become too large to control. The area burned due to human-caused fires is 50,746 acres, or only 7.1% of the total acres burned, and the bulk of this area was comprised of two arson fires started on the same day in 2013—the Butler Fire, which burned 22,445 acres, and the Boulder Fire (which became part of the Salmon Complex), to which 12,365 burned acres are attributed to the arson. Together, these two fires account for 69% of the total area burned by human-caused fires that were within or overlapped the watershed between 1992 and 2019. In 2002, there was a fire started by a resident debris burning in June in the town of Forks of Salmon that grew to 1,388 acres before containment.

The Red Salmon Complex of 2020, which burned a total of 143,840 acres (38,117 acres within the Salmon River watershed) was the result of two lightning strikes on July 27, 2020. Many lightning ignitions occurred on the same evening throughout the watershed, but the two that caused the Red Fire and the Salmon Fire (which later joined and were called the Red Salmon Complex) were the only fires that did not get contained within a few days by responders (mostly hotshots or smokejumpers). The Red Salmon ignitions occurred just outside of the Salmon River

watershed, in the Trinity Alps Wilderness, and the fire spotted over the dividing ridges into the watershed in several locations during the proceeding months.

Defensive Firing and Unintended Consequences

Defensive firing is a critical tool for containing wildfires or, often, at least minimizing impacts to values at risk. Most often, firing is used by incident teams during wildfire to burn areas adjacent to **control features** at times when a fire is more amenable to control. Defensive firing is often conducted at times of higher humidity—often even at night where feasible—and usually involves ignitions starting from higher elevations of a target area and worked downward in an intentional way. Defensive firing often works to at least substantially reduce the momentum and intensity at the fireline or other control feature from which defensive firing has been conducted, making it less likely that movement of the wildfire through the already fired area will produce extreme fire behavior near the line and **spot** or **slop** beyond into unburned area. Defensive firing is also often conducted immediately adjacent to structures before imminent arrival of a wildfire front for similar reasons; the wildfire may continue to burn near and around the structure, but the risk of fire behavior that will ignite the structures is mitigated by consuming fuels before the front hits.

This issue is discussed briefly here because residents repeatedly voice concerns about negative effects of defensive firing, especially when new wildfires start and incident management teams come in from the outside. There is a suspicion, although not a prevailing one, that incident teams will intentionally keep fires going for one reason or another. Local residents that work on local wildfires are quick to dispel this particular suspicion. With very few exceptions, for better or worse, the policy of **KNF** is often to take full-suppression tactics on all fire starts. Once a wildfire goes beyond the point of easy containment, there is often simply no means by which humans can safely stop it, and a significant change in weather, such as a major precipitation event, or bumping up against a recent fire footprint, are usually the only ways the fire will become manageable enough for it to eventually be "put out". These "**campaign**" fires will then often involve use of defensive firing to moderate fire at critical points. However, there are other, valid concerns than many planning area local residents share in terms of defensive firings.

Unfortunately, there have been recent fires in which incident management teams' defensive firing activities have been implicated in creating high intensity fires that have resulted in high severity fire effects. One example: in 2008, it is fairly widely accepted that defensive ignitions during the Jake Fire were applied too low in the Little North Fork Salmon drainage and too far from the active fire, north of the Cherry Creek Road (40N33). Fire from these intentional ignitions then ran quickly uphill and burned substantial tracts of rare old growth forest at high severity within and bordering the Marble Mountains Wilderness, heading toward English Peak.

Ostensibly, this defensive firing was targeted at stopping the fire from moving down into the populated areas of the North Fork Salmon River—closest being the Little North Fork Salmon residences, but the wildfire would have been at least 3 miles from these residences and far above them in elevation at the time. It would be hard to reconstruct the reasoning behind this application of fire at the time, and whether it was pushed by a desire to end the fire at the earliest possible moment or from a perception that this was the best time to initiate the firing operations. Often there is extreme pressure to "button up" a wildfire incident within an Incident Management Team's 14- to 21-day assignment. Whatever the cause for the decision, this particular application of defensive fire use cost a huge loss of considerable natural resource values. Locally this incident is widely viewed as a tragic loss of local natural resources and has understandably led to a distrust of defensive firing from fire teams.

While firing operations conducted by wildfire teams have improved over the decades and become noticeably more judicious, past actions from much more aggressive backfiring techniques have left a lasting impression. Accounts from locals describe that an incident team during the 1987 fire conducted backfiring in the lower elevations of the watershed, on the north side of the South Fork Salmon near the Knownothing neighborhood, in ostensibly an attempt to reign in the fire moving upriver. Winds then shifted unfavorably and blew the defensive fire eastward along the river corridor, where it then burned quickly and at high intensity up the Negro Creek drainage to the Godfrey Ranch, where the private lands burned at high severity and many residences were destroyed. This run of the fire up the drainage was exacerbated by heavy fuels—slash that had been left behind from salvage logging after the 1977 Hog Fire and flammable brush growing up through it.

Solutions exist for minimizing unintended consequences associated with defensive firing in the planning area. First, experienced local **Fire Use Modules**, such as the SRNF team stationed at Oak Bottom, should be used for firing operations in local wildfires whenever possible. These teams have strong local and institutional knowledge, extensive firing experience, and their core of local residents bring a better understanding of ecological/natural resource values at risk and sense of responsibility than out-of-area fire teams might. The Oak Bottom Fire Use Module was on the Red Salmon Complex for more than two months in 2020, and despite extensive defensive firing throughout the campaign, there were no major "blowups" or high severity runs associated with defensive firing.

Tribes, many local community members, and non-profit organizations have deep knowledge about values as risk, fire history, and fire behavior within the Salmon River watershed. When the right individuals are included in the planning and operations discussions around fire suppression and management efforts better and more place appropriate actions can be taken. For this

reason, the Salmon River Fire Safe Council made a proposal to the Klamath National Forest in 2007 (after the 2006 wildfires) to start a Salmon River Community Liaison Program. Initially this concept was disregarded, however, after the long and arduous 2008 fire season the program gained traction and was encouraged by Klamath National Forest line officers. Incorporating local knowledge and information sharing into the fire management process has been quite successful at assisting in more appropriate, placed based management actions, including judicious defensive firing techniques. It also gives a conduit for community members and fire teams to express their concerns and have them heard by the other group. For a more detailed description of the Community Liaison Program, see the PLANNING AREA section, under Incident Response.

Cooperation between incident management teams and Community Liaisons is highly supported by KNF. Funding for this program is unstable; **no** money comes from fire incidents to the Community Liaisons, and any funding for the program's operation usually comes as parts of small grants (from various sources) for community outreach.

RECOMMENDED TREATMENTS AND FIRE-SAFING

Home Hardening

Research on home ignitions during wildfires, largely spurred by the extremely destructive 2017 Tubbs Fire (Santa Rosa, CA) and the 2018 Carr Fire (Redding, CA) and Camp Fire (Paradise, CA), have recommended an additional zone to the standard two defensible space zones (see below). This newly-defined zone is the area from the house out to just 5 feet away. This zone should be completely non-ignitable. Options for this zone are pavers, crushed rock, or short, well-watered lawn. See https://ucanr.edu/sites/fire/Prepare/Building/ . An updated brochure with a diagram that summarizes house construction weak points and solutions is provided at the end of Appendix D, courtesy of University of California Cooperative Extension Humboldt County and collaborators.

Several home construction attributes and associated maintenance are extremely important in determining the likelihood that fire will ignite a home. See the low-cost retrofit list and content from ReadyForWildfire.org in Appendix D. Some of the most important items are:

- **Roof** material and condition: wooden shingles significantly increase ignition hazard. Rated asphalt shingles or metal are much better choices.
- **Vents**: vents (attic, ceiling, under-house or deck) should be of metal mesh and have a maximum opening size of 1/8 inch. Embers entering through vents are one of the top causes of home ignition.
    - Special vents (e.g., Vulcan brand) are also now available that close up when exposed to flames or extreme heat, preventing embers from crossing.
- Open **eaves** with vents are more susceptible to lodging of embers. Consider closing in eaves (i.e. soffits).
- **Gutters**: gutters should be of non-combustible material and kept clean of debris.
- **Chimneys** should have spark arrestors (1/8-inch metal mesh).
- **Wooden fences**: combustible fences should not be attached to houses; if fence continuous to house is required, build out of non-combustible material for at least 10 feet from intersection with house.
- **Decks**: non-combustible deck materials should be used in new decks if feasible. For treated wood decks, space in between decking boards should be increased to ¼" to prevent flammable vegetative debris accumulation between the boards. Combustible materials should not be stored under decks, and debris should be cleaned from beneath decks regularly.
- **Windows**: fewer panes and larger sizes are more hazardous, breaking more easily in extreme heat. Use multi-pane tempered glass if possible.

It is also recommended that residents affix rainbird-type **sprinklers**, of metal construction, to the roof peaks of important structures. These should be plumbed in with galvanized metal pipe. If connected in to a reliable gravity-feed system, the pipe can simply be connected below-ground to the distribution pipe. Above-ground plastic pipes can quickly be rendered useless during wildfire (melting). If no reliable, below-ground gravity-fed water distribution is available for the sprinklers, use an adapter on the metal pipe such that a standard ¾" garden hose thread (GHT) will connect. Figure 5a shows an example; the pipe is ½" galvanized steel and has a swivel adapter at its base to accept the GHT on ¾" firefighting hose ("p-line"). Figure 5b shows a similar sprinkler set up on a fence post to water down the area adjacent to the home in event of fire; this is set up to attach to a 1" firehose at its base, which in turn connects to a 1 ½" firehose trunkline that is fed by a pressure pump.

a)

b)

Figure 4 a) rainbird-type sprinkler affixed near house roof peak has swivel connector for ¾" GHT (garden hose) connector for use with ¾" "p-line" firehose. b) similar sprinkler on fencepost near house and outbuildings; bottom of standpipe tees into fitting for 1" firehose. Pipes must be metal, not plastic!

In the absence of a gravity-fed supply with fairly high pressure (at least 60 psi), a pump will be needed to distribute water if there are several sprinklers to feed. Keep in mind that each of these

sprinkler heads uses around 5 gallons/minute. So, for instance, 5 sprinklers will drain a 2,500-gallon tank in about 100 minutes. BE SURE to run clean water through hoses and pipes before attaching them to the sprinklers; the jets in these sprinklers are small and clog easily from debris coming from a water source or remaining in a hose from previous use or storage. If dealing with a dirty source, it is a good idea to have a disc- or screen-type filter (from irrigation supply store) upstream of your sprinklers.

It is common that incident management teams will install temporary sprinklers on peoples' homes during wildfires. However, time may be limited, and with many large fire incidents happening state-wide and nationally, resources may be spread thin. If teams have time, they'll install more sprinklers at a home that already has its own set up, and this will make the home even more safe!

Contact SRRC: fire@srrc.org or 530-462-4665 for advice on pumps, fittings, and hoses.

Vegetation and Fuel Treatment Types

Not all treatments function the same in how they affect fire behavior. Treatments will not, and should not, always follow the same prescription. The details of treatments will differ widely depending on location and the attributes of the vegetation, terrain, and nearby values at risk that are the subjects of protection. Further, funding sources (grants and cost share programs) for treatments that function to mitigate fire hazards will have different ranges of objectives and funds available per unit area (e.g., acre).

Defensible Space

Defensible space is essentially a buffer that should be created between a home and the flammable/combustible elements on the property and wildland areas surrounding it. California State Public Resource code (PRC) for defensible space requires compliance with Public Resource Code 4290 (Building codes) and Code 4291 (100-foot defensible space). These codes apply to all parcel owners with habitable structures. Pertinent parts of these codes and links to their entireties can be found in Appendix D. Also in Appendix D is content from ReadyForWildfire.org's online guide providing details on defensible space recommendations, which currently can be found at:
https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/

Generally, the zone (Zone 1) from the home out to 30 feet from it should be aggressively treated and regularly maintained. Many consider that this zone should effectively be a "fire exclusion zone", where there simply is not the necessary continuity and amount of fuel necessary for fire to move from the surroundings toward the home or other structures for which protection is

essential. Wood piles should be moved outside of Zone 1, and propane tanks should ideally be outside this zone as well. Beyond Zone 1, the next 70 feet out from the home (i.e., from 30 feet away to 100 feet away, Zone 2), also should have low fuel loading and continuity. Some general guidelines are detailed in Appendix D (distance between trees for different slopes, etc.). The central concept for Zone 2 is that fire behavior should be substantially lessened compared to the area beyond it.

The defensible space zones are not equivalent to what we discuss as the Home Ignition Zone (HIZ; see RECOMMENDED TREATMENTS - Standardized Treatment Priorities section). Given the many factors that make fire hazards generally high throughout the planning area—steep terrain, hot dry summers, heavy fuel loadings, remoteness from emergency response centers, and recent history of extreme wildfire behavior—the HIZ recommended for treatment goes well beyond the 100-foot defensible space required by the Public Resources Codes.

Shaded Fuel Breaks

Creation of **shaded fuel breaks** is a standard way to moderate the behavior, and potential severity, of wildfires. This type of treatment is applied in forested habitats, and a central objective of these treatments is to maintain some minimal level of tree canopy cover while reducing the continuity and amounts of horizontal (**surface**) and vertical (**ladder**) fuels. The actual recommended tree canopy cover retained often ranges from 50% to 60%, and the importance of shade is so that the amount of sun hitting the ground is not sufficient to support quick and vigorous growth of brush; such re-growth of brush is common following high-severity wildfire, for instance, and poses dangerous conditions in the event of a wildfire following several years after the first. Part of shaded fuel break treatments usually entails cutting a portion of shrubs, and/or shrubby forms of trees, in the understory as well—essential to breaking up fuel continuity.

An effective shaded fuel break can be created across a wide variety of treatment methods. If an area has a high current risk of active crown fire, an objective of treatment might be to reduce the density of trees up through the main upper crown layer, i.e., cutting **co-dominant trees** in addition to the smaller, shaded understory and intermediate trees. This reduces the crown bulk density, which can prevent fire from spreading through the crown. Reduction of density of trees in the upper crown is most pronounced in logging treatments where merchantable timber is removed; otherwise, cutting larger trees results in heavy surface loading of coarse woody debris, as the materials are usually too big to pile-burn with other cut materials. If large amounts of coarse woody debris are left, the goal of reducing crown fire activity might be achieved, but likelihood that remaining trees will be killed in a following fire is high because those heavy fuels will burn hot and for prolonged periods.

"Pre-commercial thinning" is a term often used to describe thinning of young conifer forests (often plantations) that have potential to yield merchantable timber in the future, and these treatments also may involve taking out some of the upper-canopy trees. This type of treatment is also more commonly implemented on private lands, even if extraction of trees for lumber is not a future objective. For instance, many treatments that SRRC has implemented on private lands include cutting trees up to 8" or 10" diameter at breast height (**DBH**), and such trees often reach up into the upper canopy but are not merchantable for lumber. The prescription for a given location is dependent on the tree species composition and density, with consideration given to how much cut material will be generated and how it can be dealt with.

Treatment of Activity and Surface Fuels

"**Activity fuels**" refers to vegetation that has been cut or otherwise altered (e.g. pruned, masticated) as part of a treatment. In logging operations, this is often referred to as "slash" and consists of tree tops and limbs that are left on the site. Fire hazard mitigation treatments must ensure removal, or consumption by controlled burning, of these fuels. Where terrain is more gentle, it is standard to use ground-based equipment (tractors, etc.), after removing merchantable timber, to consolidate activity fuels in large piles for later controlled burning. Whole-tree-yarding (to nearest road/landing) techniques are recommended where terrain is too steep to subsequently move remaining activity fuels. This is equally important in salvage (i.e., post-wildfire) operations; the leaving of too much post-salvage slash has been implicated locally in extreme behavior of proceeding fires.

"Manual" methods of fuels reduction usually simply refer to chainsaw use for cutting vegetation. Most of the treatments in the planning area have, and should, involve consolidation of these types of fuels, as opposed to leaving them scattered on the ground. Hand-piling of fuels to small piles—usually 4 x 4 x 4 feet—is recommended in areas where retained tree density is higher. In openings, piles can be slightly larger (e.g. 6 x 6-foot footprint). In larger treatment areas, e.g., more than a couple acres, the most efficient method is to cover piles and let them undergo a summer season of curing before burning; the burning of piles is most efficient and requires less intervention to ensure piled fuels are consumed than burning piles "green". However, leaving piles over a summer may also create heightened fire danger during the curing period, and burning of piles close to values at risk before letting them cure through a fire season is often warranted.

Piles are currently covered with polyethylene plastic on the Klamath National Forest, citing studies that show piles covered in plastic have less smoke emissions than piles covered with wax paper. The Karuk Tribe opposes the use of polyethylene plastic because of the health impacts to

fire personnel burning these piles, as well as the extensive introduction of micro-plastics to the watershed. Increased agency burn programs and integration of cooperative prescribed burn programs such as TREX on public lands can help the Klamath NF deal with its backlog of piles, and begin covering piles with wax paper and burning them in 1-2 years before the paper is compromised. It is not a good practice, given the amount of arson from old piles and the loss of wildlife that moves into piles over time, to let piles sit more than a couple years.

During treatments, it is also recommended to pile (or otherwise remove) a significant portion of existing dead and downed woody (surface) fuels. For instance, prescriptions might specify that 70-80% of existing surface fuels over 1" diameter be lopped, if necessary, and piled along with the live vegetation being cut and piled.

Mastication and Chipping

Mastication is a method by which a piece of equipment cuts vegetation and immediately crushes or grinds it into small pieces, generally leaving those pieces scattered on the ground. This type of treatment is also sometimes called "bull-hogging". Larger masticators consist of a tracked excavator with long articulated arm, with an attached rotating head with teeth (instead of a bucket). These types are physically capable of dealing with trees 12" and greater, although often thinning by this method will specify 8" or 10" upper diameter due to feasibility issues. These large machines can be surprisingly nimble and capable of treatments where desired spacing of retained trees is 20 feet or greater. Smaller masticators often consist of a skid-steer or crawler-tractor with a horizontal rotating drum attached to forward-facing arms that houses the teeth. These are very efficient at removing brush and small trees. Masticators vary, but the material left is mostly in 10-hr or 100-hr fuel time lag categories (0.25-1" or 1"-3" diameter, respectively) and of varying lengths.

Mastication has advantages and disadvantages. In shrub types with few trees, it is often considerably faster and cheaper than manual work. However, mastication does not remove the cut material nor leave it in a state amenable to piling and burning. Mastication tends to reduce **rate of spread** of proceeding wildfires, which may help suppression efforts; however, **flame length** may remain relatively high and result in mortality of residual trees (Knapp et al. 2011). Knapp et al. (2011) found that raking the masticated material away from retained trees prior to prescribed fire did not lessen the probability of their mortality, and tree mortality was most influenced by crown scorch (associated with longer flame length). Reiner et al. (2012) suggested that both flame length and rate of spread were predicted by fire behavior models to be higher during wildfire conditions in a masticated stand than an untreated one, unless the masticated area was subject to a prescribed broadcast burn under desired conditions. However, Knapp et al.

(2011) showed that standard fuel models used to predict fire behavior do not apply well to mastication, often over-estimating rate of spread and underestimating flame length.

There is limited history of mastication in the planning area, and there have not been any follow-up studies conducted on recent treatments. Klamath National Forest and SRRC have both implemented mastication treatments over the past three years, but prescribed broadcast burns have not yet been applied to these locations. It is recommended that smaller, experimental prescribed burns are soon implemented in these masticated areas, as Reiner et al. (2012) showed that this follow-up treatment would greatly increase the treatment benefit in terms of fire hazard mitigation.

Chipping is another means by which cut fuels can be rearranged. Traditionally, tow-behind chippers are used for defensible-space treatments and leave much smaller material behind than masticators. Often chips are ejected directly into trucks for transport to where they are useful. More recently, chippers on tracked equipment have been used in forestry, which requires that vegetation is manually cut and fed into the chipper (some have a self-feed arm) or fed by a feller-buncher or similar equipment. The fuel beds left behind consist of much smaller chips than what is left by mastication, which is promising for reduction of flame length in subsequent wildfire. However, scientific evaluations of post-chipping fire behavior and leave-tree mortality are not yet available.

Salmon River Volunteer Fire and Rescue (SR VFR) owns a robust chipper, but the local chipping program has not been functional over the past several years. One reason for this is simply a lack of human resources (volunteers) in the organization. It is recommended that SR VFR, in conjunction with the Salmon River Fire Safe Council, work on recruiting more volunteers and plan re-activation of the neighborhood chipping program. This would help property owners with maintaining defensible space.
See the following CAL FIRE document for a summary of types of equipment used and their applications:
https://www.fire.ca.gov/media/umkhhdbs/fuels-reduction-guide-final-2021-print.pdf

Understory Burning

As discussed in the FIRE HISTORY section, the planning area historically experienced much more frequent fires prior to Angloamerican colonization, and more frequent fire is key to mitigating the severity of wildfires. Understory broadcast burning, often simply called “underburning”, completes essential components of reducing surface fuel continuity and **loading**. Cutting and piling treatments, plus burning of piles, are often essential in getting an area ready to do prescribed underburning. These activities remove a substantial portion of the fuel buildup that

has often occurred due to lack of frequent fire that would have happened historically due to myriad lightning ignitions during the summers and intentional burning by indigenous peoples.

Even after a thorough treatment of thinning and brushing, piling of activity and surface fuels, and pile burning, a critical component of ground fuels reduction is often still needed. The litter and duff layers also accumulate flammable material in the absence of fire. Along with finer woody surface fuels that are not feasible to pile and burn, these fuels often form continuous conduits for fire through the landscape and can contribute to high fire severity (e.g., high tree mortality) where accumulation is especially heavy. Broadcast prescribed fire, under appropriate weather and fuel moisture, removes buildup of these fuels and breaks up their continuity, making it more likely that future wildfires will be reduced in intensity and perhaps patchier across the large fire footprint.

With such an enormous landscape of highly complex terrain to manage, managers are beginning to use prescribed fire as a 1st-entry treatment in locations where risk of spread to values at risk is low. For instance, the **WKRP**'s Somes Bar Integrated Fire Management Project is treating most USFS lands along roads and around private properties prior to introducing prescribed underburning, but many patches that are surrounded by these other treatments will have prescribed fire alone as a treatment.

In fall of 2017, once the Salmon August Complex was mostly finished burning nearby, KNF conducted a ~1,500-acre broadcast burn on the north side of Sawyers Bar in an area that mostly had not had previous treatment (except directly along Sawyers Bar Road) nor recent wildfire. Aided by **firelines** that were installed or refreshed during the summer's wildfire for protection of the town, along with strategic **hoselays**, this was completed over about one week. After initial firing of the edges manually, a helicopter was used to drop incendiary "ping pong balls" into the unit interior—much faster, more efficient, and safer in such steep terrain. In 2020 and 2021, drones have been used extensively for targeted ignitions in defensive firing, instead of helicopters or on-ground personnel. Much of the terrain burned in the 2017 prescribed fire around Sawyers Bar would have been prohibitively steep to do manual thinning and piling, as are many other locations in the planning area. This type of prescribed fire is recommended where threat to life and property are minimal.

Oak Restoration Treatments

Deciduous oak woodlands and savannas (see VEGETATION section) often require different treatment prescriptions than other forest types. To foster oak habitats that produce abundant acorn crops for both wildlife and cultural (indigenous food and spirituality) resources, trees must generally be maintained at much lower densities. Many areas in the watershed that have

potential as deciduous oak woodlands currently have an overabundance of encroaching conifers. Once a majority of these conifers reach about 1.5 times the height of the taller oak trees, the health of the oaks has usually significantly declined and their mortality rates have substantially increased (Quinn-Davidson, Twieg, & Valachovic, unpublished data - UC Cooperative Extension, Humboldt). Functional oak woodlands tend to only have a handful of mature conifer stems per acre.

Oak restoration treatments should focus first on removing conifers and also should remove flammable brush from beneath oak canopies. When a conifer has overtopped an oak and would severely damage the oak if fallen, girdling of conifers is effective. Proper girdling technique reliably kills conifers and results in the snags slowly falling from the top down as they decay, preventing damage to oaks (Kane et al. 2019). Deciduous oaks can co-exist with ponderosa pine and incense cedars in some parts of the planning area in a more stable state, i.e. without loss of most oaks over time. However, the density of conifers should generally not be higher than that of the oaks.

Another very beneficial aspect of having deciduous oak woodlands scattered throughout the planning area is that they are easier to maintain by regular prescribed broadcast burning. Especially on south and west aspects, deciduous oak habitats can be burned during sunny windows in winter months when surrounding forests simply will not burn (e.g., Engber et al. 2011); this creates opportunity for the most efficient and safest type of controlled burning, as extensive **firelines** and firefighting resources are not needed. To re-establish areas of oak **woodland** or **savanna**, follow-up treatments of re-planting with native grasses, such as California fescue (*Festuca californica*) and blue wild-rye (*Elymus glaucus*), may also be desired. These native species provide good wildlife forage if burned regularly, and thatch buildup from the fescue can help make prescribed fire more effective in killing encroaching conifers. Native grass cover will also inhibit shrubs from growing back to pre-treatment abundance.

Standardized Treatment Priorities

These treatment priorities are based on standard buffers around structures, roads, and strategic ridges. Areas (acreages) have been calculated that fall within each Priority level, with no spatial overlap between successive priorities. These areas are shown in Appendix E, Table E1, further broken down by private lands, non-Wilderness USFS land, and Wilderness (which is also USFS Jurisdiction).

It is unlikely that priority areas in designated Wilderness—mostly strategic ridgelines for fire control—will actually be treated, due to restrictions on activities in Wilderness (chainsaw use, etc.). However, there is currently a movement to introduce prescribed broadcast burning

treatments into wilderness, particularly from ridgetops. Shasta-Trinity National Forest drafted **NEPA** for such a project in the Trinity Alps, but it had not been approved before the Red Salmon Complex wildfire burned most of the potential project area in summer 2020. Some residents of the planning area are strongly in support of prescribed fire in Wilderness, with the understanding that fire has been actively suppressed in these areas for decades; many lightning-ignited fires are extinguished by hotshots or smokejumpers annually in the planning area. Indigenous people have a history of burning in areas now designated as wilderness as well.

Priority 1 – Around Homes and Primary Access

1a Home Ignition Zone: 0 to 200 feet from buildings

1b Primary Access Roads and Trails - 150 feet either side of centerline

1c Expanded Home Ignition Zone: >200 feet to 500 feet from buildings

Priority 1 recommended treatment locations are essentially defensible space and primary access routes. The highest priority is to attain and maintain defensible space around homes and other buildings. Through the **WKRP** process, local fuels specialists and planners have widely agreed that defensible space of 100 feet around structures is not nearly adequate, given terrain steepness and complexity, heavy fuel loading, and remoteness of the planning area. As such, a 200-foot "**home ignition zone** (**HIZ**)" was designated as the general minimum amount of defensible space that should be targeted for fire hazard reduction treatments. In calculating the potential cost of treating the HIZ, a corrective multiplier of 0.75 was applied because 1) the 200-ft buffer on structures includes non-vegetated areas or areas otherwise suited to excluding fire; or 2) initial fire hazard mitigation treatments have already been completed in some of these areas (see COMPLETED TREATMENTS section and associated Map), and regular maintenance is much cheaper than the initial treatment.

In many places within the planning area, even a 200-foot wide HIZ is unlikely to adequately make homes and installations defensible from wildfire. As such, the area between 200 feet and 500 feet from structures was designated as the "expanded HIZ"; this zone is recommended as nominally lower priority than treatment along primary access routes. As with the core HIZ, the expanded HIZ was multiplied by a factor of 0.75 to come to an estimate of actual treatment cost.

Recommended hazard reduction treatments along primary access roads and the other road categories (recreation access, secondary access, and firefighting access) were assigned a basic treatment buffer simply to estimate the amounts of treatment potentially needed. In practice, it may be more effective on steep slopes to treat to a further distance below the road and less above it. In other instances, e.g. where fuel loads are especially high, treatments should extend further from the road than 150 feet in both directions. In some areas, slopes will be too steep to

facilitate work within the desired buffer, and/or sparse vegetation and fuels due to soil conditions may render treatment unnecessary. However, given that primary access roads may need treatment beyond 150 feet to maintain safe access and egress, no correction factor is applied to this category to adjust estimated acreage needing treatment.

Priority 2 – Around Private Property Boundaries and Recreation Access Roads

2a "Greenline" Treatments – from private property boundaries out into the public lands – 500 feet

2b Recreation Roads – 150 feet either side of centerline

Priority 2 recommended treatments include treatments in a buffer around private property boundaries and treating along recreation access roads. The recommended 500-foot buffer of reduced fire hazard around private properties is often called a "**greenline**" treatment. Because the core WUI area was defined as the area up to ¼-mile (1,320 feet) around private property boundaries, the greenline treatments consist of the inner portion of public lands that comprise the core WUI. Often, because structures may be relatively close to the private-public boundary, the expanded HIZ also often extends out into the greenline zone. Recreation roads are also an important consideration in the planning area because a significant number of out-of-area visitors may be using Wilderness areas that these roads access during wildfire season. As with Priority 1 areas, a 0.7 multiplier was applied to estimated area needing intensive treatment in the expanded HIZ, but no reduction in area was assumed for road-buffer treatments because they may need to extend further in some locations.

Priority 3 – Firefighting Access Roads and Strategic Fire Control Lines

3a Firefighting Access Roads – 50 feet either side

3b Strategic Firelines, Strategic Ridges, and Burn Control Roads – 330 feet either side

While recommended treatment Priorities 1 and 2 focus mainly on the safety of residents and visitors during wildfires, as well as protection of their property, Priority 3 treatments seek to make control of fires safer and more efficient for responders, incident management teams, and prescribed fire practitioners. As per the KNF District **FMO**, there are many roads that serve to access potential strategic control features and other access points during firefighting. Many of these have significant encroachment by brush and tree limbs into the roadway, making them extremely dangerous to drive if fire is flanking them.

Besides firefighting access roads, a critical piece of managing fires—both wildfires and prescribed burns—is to have features on the landscape that serve as control lines. The **WKRP** has consolidated spatial information and local knowledge on firelines constructed during fires

that have occurred over the past several decades in their planning area, which includes the Salmon River Watershed. This has included extensive consultation with fire professionals from the Karuk Tribe, **SRNF**, **KNF**, and community members. Empirical evidence from fires in the planning area and other studies (reference) suggest that firelines may only be effective at containing wildfires under more severe conditions when they are flanked by considerable buffers with reduced fuel loadings. As such, the recommended treatment buffer on firelines and strategic ridges is 1/8th-mile on either side. In some cases, it will make sense to slightly extend this buffer distance where the treated area can meet a nearby road.

Fire professionals from KNF provided extensive input on locations of existing and potential firelines (strategic ridges) that could be important in managing fires. The Wildfires by Names and Years with Strategic Firelines and Ridges Map shows the locations of these fires, with the years that existing firelines were used during wildfires. These existing and potential firelines are also shown on the Recommended Treatments Map.

Because much of the area surrounding the community of Cecilville has experienced no fires in the last 110 years (see Wildfires by Name and Year Map or Number of Overlapping Fires Map), fuel loading is generally high where treatments have not yet occurred, and fire behavior could likely be extreme and effects severe under appropriate weather conditions. As such, stakeholder input indicates strong support for prioritizing treatments around this community, including along strategic firelines. Important strategic control lines in this area include the ridges flanking Crawford Creek—separating Matthews Creek to the west and the East Fork South Fork Salmon River and Shadow Creek to the east. Some treatments have been partially or wholly completed in the vicinity of Cecilville (see Completed Treatments Map and COMPLETED TREATMENTS section). Current draft plans for the KNF Bear Country Project include treatment along most of the ridge separating Crawford Creek from Matthews Creek.

Priority 4 – Secondary Access Roads

Secondary Access Roads and Trails – 150 feet either side

Priority 4 calls for treatment along secondary access routes. Only a few such routes have been identified:

- Forest Service Road 38N17 (also known as 4th of July Road), from the intersection of Cecilville Road to its intersection with Road 39N23 (also known as Crawford Creek Road, Bacon Rind, or Eddy Gulch Road).
    - Road 39N64, which branches from 38N17 and reaches near Black Bear Creek; the connecting trail to residences at Black Bear is the second of two primary access routes to Black Bear Ranch.

- The trail going uphill from Black Bear Ranch to the 39 Road (aka Picayune Road).
- Forest Service Road 39N20, from its start at Callahan-Cecilville Road (Forest Highway 93) near Shadow Creek Campground, to the intersection with the 39 Road (also known as 6-Mile Road or Picayune Rd).
- A road connecting the Villeponteaux residence with Sawyers Bar Road (see Little North Fork Structures and Water Sources Map); this road is only accessible by driving across the North Fork Salmon River. The primary access to this residence is via a suspension bridge shortly downriver that is only large enough for an ATV to drive across.

Priority 5 – Young Plantations

Young (15- to 50-yr-old) Plantations Contiguous with other Recommended Treatment Areas

Priority 5 recommended treatments are for plantations on National Forest that are currently 15 to 50 years of age and contiguous with other priority treatment areas. Stands managed as plantations and in this age class are frequently dense, and self-pruning and self-thinning often result in unusually heavy loads of dead and down woody fuels. The base of tree crowns in this age range of plantations is often low, making torching and crown fires more likely.

Management of Unplanned Ignitions

Particularly in Wilderness areas, and sometimes on other public lands that are distant from human habitation, KNF and SRNF may sometimes exercise the option to not immediately try to extinguish a fire. This has only rarely happened in the past in the planning area and its neighboring mountains. In 2017, the Island Fire started (by lightning) near Lake of the Islands in the Marble Mountains Wilderness. This was managed without the usual aggressive suppression tactics, and most accounts say that this worked well; fire behavior was not intense, and most areas burned experienced low severity. Early WKRP meetings in 2017 highlighted opportunities, including location and timing, for managed wildfire with Klamath NF fire managers and local leaders. Presentations by retired Forest Service fire ecologist and geographer Carl Skinner provided examples of where and when managed wildfire could be used as a tool with little risk. One of the areas identified was the 2017 Island Fire footprint.

However, another fire started by lightning later in the summer in the area east of this fire quickly became larger and with more extreme behavior (the Wallow Fire). An extreme east wind event followed, resulting in the Wallow Fire then merging with the Island Fire and becoming known as the Salmon August Complex. It is impossible to assign blame for the more severe parts of the fire that followed this merging and further westward movement. Coming into the wind event,

the Wallow portion had been behaving more extremely than the Island Fire, but that they merged and then went on to burn a sizeable footprint (including re-burning areas of the Island burned earlier in the summer) renders somewhat moot any analysis of the managed wildfire portion of the Island.

Managed wildfire is often contentious, and it will likely continue to be so. In any case, it is a fact that fires will start in the planning area almost every year, and likely the most destructive of those will be from ignitions that immediately grow too rapidly to control. The potential of using managed wildfire to reduce dangerous fuel buildup when conditions are right will be more acceptable when a large portion of fire hazard mitigation treatments have been completed on and around private lands; communities will be more buffered from unintended increases in the intensity of fire behavior, and stakeholders can learn together from future managed wildfires. The Nickowitz Fire of 2015, which burned largely in Del Norte County on SRNF lands, was treated more as a managed wildfire because it was very distant from human habitation, and this fire is generally thought to have done good fuels reduction work without being destructive of valued resources.

Specific Treatment Priorities

Specific treatment priority recommendations are made based upon particularly important values at risk for communities, conservation or restoration of ecosystem types that are relatively rare in the planning area, and for some individual private properties based on high fire hazard rating (see FIRE HAZARD ASSESSMENT section).

Cecilville Community

While many of the individual properties have relatively low inherent risk and show likelihood of low intensity fire behavior, the immediate surroundings are primed for high intensity wildfire. This area has the largest contiguous areas of the watershed that have not burned in the last 110+ years, and fuel loadings are high. Despite the low risk of properties when considered individually, fire moving through more densely populated areas can quickly become erratic if structures burn. As such, the HIZ areas and access routes in the core of Cecilville should be highest priority for treating accumulations of live and dead fuels.

All of the strategic ridges identified around the community should be high priority for future KNF projects. Currently, the Bear Country Project (see Fig. 6) plans to treat an important ridge south of Matthews Creek, leading up over Canyon Mountain and following the west side of the Crawford Creek drainage. This is an important step. Recent work on the Petersburg Pines project has greatly improved the ridges flanking Cecil Creek in terms of acting as potential fire breaks. Finishing treatments in the Petersburg Pines project are high priority. Then, the ridge forming the east side of the Crawford Creek drainage, as well as Grasshopper Ridge to the east of that, should be considered for treatment.

The planned KNF South Fork Project (see Fig. 7) shows draft areas for treatments along access roads and greenline (around private boundary) treatments. These should also be high priority treatments. It is recommended that local residents voice support for portions of this project that are designed to reduce fire hazard to the community—particularly for residents along the Cecilville-Callahan Rd.

Sawyers Bar Community – Maintenance of Fuel Breaks

Both KNF and SRRC have done substantial work around Sawyers Bar—much of it in 2014, followed by the 1,500-acre underburn conducted by KNF in 2017. The residences on the uphill side of the road border areas that are extremely steep and tend to re-grow shrubs and canyon live oak quickly. As such, the area upslope of the town should be regularly re-treated with manual cutting, piling, and pile burning as often as possible.

SBCWD Jessups Creek Intake and Water Plant Fuels Reduction

Fuels reduction treatments should be done to buffer the town water intake and keep its access trail navigable. The footprint of treatments to the W and SW from the intake should tie in with the planned units of the KNF Jess Project. At the water treatment and storage plant on the opposite side of the North Fork Salmon River, manual thinning & brushing, piling, and pile burning should be done to protect the chlorine-treatment shed and keep the steep access road open; this includes some KNF land between the Sawyers Bar Road private properties below and the water district plant property. As discussed earlier, the infrastructure improvements to the water system for fighting fire in the town of Sawyers Bar should also be prioritized.

Individual High-Priority Private Property Treatments

Eddy Gulch

Inherent hazards to these properties are high, especially given the potential for entrapment and the potential for the gulch to act as a chimney. In more extreme weather conditions (more extreme than modeled in the Current Conditions Hazard Assessment), a crown fire could move rapidly from the North Fork Salmon River up through the continuous canopy cover of Douglas-fir. This area has not experienced fire in recorded history (past 110 years) and has high fuel loading. More aggressive fuels reduction treatment downslope of these residences is recommended with urgency.

Little North Fork Neighborhood Trail-only Access

This property had some fuels treatments facilitated by SRRC in 2010. However, the area along the historical road going south to a river ford, including the non-private WUI area along this route, should be a treatment priority. The current suspension bridge—the main access—is only passable by an ATV, and is vulnerable to being rendered useless in a wind-driven fire. Thus, the alternative access should be improved, and the area around the home (the HIZ) should also be prioritized for maintenance of the best possible safety in the event that the occupants become trapped by fire.

Black Bear Ranch

In addition to its lack of safe access routes in event of fire, flame length predicted under 90th-percentile fire weather conditions is very high to extreme for portions of the property, including directly around one residence. Significant patches of active crown fire are also predicted on this property—more than on any other private property in the watershed. Greenline treatments are planned in the KNF Bear Country Project (see Fig 6), and concurrent treatments should tie in on the private-land side to make a continuum of hazard reduction to houses on the property.

Blue Ridge Ranch

The current-conditions fire hazard assessment for Blue Ridge shows relatively low risk, likely because many recent fuels reduction treatments have been done on and adjacent to this property. However, the intrinsic hazards (upper 1/3-slope, in a chimney) are high for this property. Thus, maintenance treatments are recommended, and oak restoration treatments should be expanded. Oak restoration should include following up with prescribed underburning. In particular, as discussed above, burning should be experimented with in the masticated treatment area along the northern portion of the property, where KNF concurrently had the adjacent public land masticated.

Larger contiguous meadow areas should also have locations selected for more intensive, regular mowing (or controlled grazing) of grass, which could serve as important local safety zones for residents and incident teams during fires.

Godfrey Ranch

Recent treatments, plus the presence of **firelines** ringing a large portion of the private footprint, make this a good candidate for prescribed underburns in the near future. Modeling indicates that the current conditions hazards (i.e. predicted fire behavior) are not extreme for the private lands themselves, but more intense fire behavior is predicted for the public lands immediately adjacent. The southern part of the property has areas with a greater proportion of passive crown fire predicted, as it has not been treated since the high severity fire of 1987; this portion of the ranch is recommended for fuels reduction treatment prior to broadcast burning.

Larger contiguous meadow areas should also have locations selected for more intensive, regular mowing of grass, which could serve as important local safety zones for residents and incident teams during fires.

Bear Country Recommendation: It is recommended that the USFS and private landowners work together to maintain and improve the firelines created during the 2020 Red Salmon Complex at Godfrey Ranch.

Rainbow Mine

As shown in the Base Map, **Expanded WUI** was designated in additional areas beyond the ¼-mile private-lands buffer. Because this property has residences mid-slope on a steep mountainside and has only one access route, it is recommended that at least some of the following area on KNF land is treated: to the west of the portion of private property, bounded by the 40N54 Road to the south, Sawyers Bar Road to the west, the northern boundary of the

additional WUI-designated area, and the standardized **greenline** treatment to the east. This is a large area, totaling over 660 acres. However, ridgetop treatments could be prioritized: 1) from the west side of private land to the intersection of 40N54 and Sawyers Bar Rd., and 2) the connecting ridge running NW to Sawyers Bar Rd. (northern boundary of Expanded WUI). Such ridgetop treatments might total 100-200 acres and provide significant protection.

Taylor Creek Properties (E Fork S Fork Salmon) and Jordan and Lor-O Ranches (Upper South Fork Salmon

These ranches all have significant components of meadows and woodlands. The woodlands are regularly visited by deer and Roosevelt Elk, which are rare in the lower elevations of the planning area, for grass and acorn forage. Conifers are becoming established in the oak woodlands, and fir and pine are both establishing in meadow areas. Removal of conifers and brush surrounding the deciduous oaks should be conducted at and around these properties, and this should be followed up by prescribed underburning at regular intervals. The south aspect of much of these properties should be conducive to winter burning where the oaks (and their litter) are more dominant.

The meadow areas also have high predicted fire rate of spread in the current-conditions analysis. Mowing or controlled grazing should be implemented going into fire season on an annual basis. Further, planting of native grasses and other plants (e.g., milkweed) after treatments would be helpful in setting these properties up to be maintained by low-intensity, regular prescribed fire and continue to be a boon for wildlife.

Larger contiguous meadow areas should also have locations selected for more intensive, regular mowing of grass, which could serve as important local safety zones for residents and incident teams during fires.

Old Post Office Road Properties, Forks of Salmon

The Tribal Allotments at the beginning of the 39 Road in Forks of Salmon were only partially treated in 2011. These properties should be given high priority for manual fuels reduction because the area above is steep and predicted to see more intense fire behavior. Most of the residences here also have longer access driveways, increasing the danger to the inhabitants. Treatments should focus on the wider HIZ and on the access routes.

Underburning at Recently Completed Fuels Reduction Locations

Following is a list of fuels reduction projects completed by SRRC since 2011. Prescribed underburning under the right conditions would help remove some of the buildup of these fuels that has occurred in the absence of any fire within recorded history.

- Black Bear Ranch – re-underburn of 2015 TREX unit.
- Blue Ridge Ranch-fuels reduction treatments completed from 2011, 2014, and 2018; prioritize burning deciduous oak woodland portions, and experiment with underburning in masticated woodland
- Butler Creek – remove buildup of coarse woody fuels from tanoaks falling in recent snowstorms; re-underburn units burned in TREX 2015 and burn 2020-treated fuels reduction units in tanoak forest.
- Cecilville Fuels Reduction – fuels reduction units completed in 2010-2012 window may still be available for underburn, at least with light prep and some fireline construction
- Forks of Salmon Fuels Reduction – some units treated in downtown core and Horn Field in 2012; may need light fuels reduction prior to underburn; Otter Bar and Outer Bar units treated with fuels reduction in 2015 are likely ready.
- Harris Ranch – burn in areas of open hardwood forest after completion of cut, pile, and pile burn in 2019. This will be the most efficient way to curtail heavy re-growth of brush. SRRC has identified a good candidate unit for the TREX program to underburn.
- Rainbow Mine- units were underburned during TREX events in 2014 and 2015. These will be ready to underburn again soon and will help mitigate fire hazard on this high-hazard property. Dozer line from 2014, property roads, and previous handlines are available for burn units.
- Taylor Hole (properties en route to Taylor Lake near Etna Summit) - SRRC recently completed pile burning of a 115-acre treatment area, and portions of this should receive a follow-up broadcast burn. Accumulation of duff here is particularly heavy—common in the white fir forest type in the absence of and recent fire.
- Uncle Sam Mine – this is a strategic ridge, and some fuels reduction was done circa 2010, prior to the Whites Fire burning the portion of the property on the east side of the ridge. This area should be maintained by a combination of further fuels reduction work and prescribed underburning.

COMPLETED TREATMENTS

Significant fire hazard mitigation treatment work has been done since the 2007 Salmon River CWPP. See the Completed Treatments Map. Several of the KNF projects have been ongoing since that time. Since around 1997, when SRRC began incorporating fuels reduction and defensible space treatments into its restoration work, SRRC and the Salmon River Fire Safe Council which is oversees, has completed over 1,300 acres of fuels reduction work within the Salmon River watershed. Almost all of this work has been completed on private lands. The increased local understanding of the importance of fuels reductions and defensible space treatments has also created a cultural shift among landowners, resulting in many landowners completing significant amounts of fuels treatments on their own. Here, treatments are discussed that have been completed within the last 15 years.

Forest Service Projects

Jess Project

Much of the service work (i.e., fuels reduction without merchantable timber component) has been completed. This includes manual thinning and year-2020 mastication along the 39N27 ("Lewis Memorial") Road and some minor roads that intersect this main forest road. Logging will likely occur in the very near future.

Eddy LSR Project

This project is partially completed. It has treated a fairly extensive portion of primary access routes-from Black Bear Summit eastward to the part of the ridge flanking the northwestern portion of Crawford Creek drainage, and continuing eastward along the 39 Road ("6-Mile" or "Picayune" Road) to its intersection with Callahan-Cecilville Road. This project also covered much of the length of the road up White's Gulch (40N61), although the quality of that work was different than planned because the destructive 2014 Whites Fire happened in this part of the project area before the work was implemented. The service work (fuels reduction without merchantable timber component) for this project has mostly been completed, and a small portion of mastication is yet to be completed. Funds are being sought for this work. The extensive prescribed broadcast burn portions of this project have not been completed, along with some of the preparations needed to complete these burns.

Petersburg Pines Project

This project is on the south side of the upper South Fork, across from Cecilville and beyond, has mostly been completed. There are still some unburned piles remaining as well as all of the

prescribed fire portion of the project. In undertaking the FIRE HAZARD ASSESSMENT, it was noted that the footprint of this project that occurred prior to the most recent **LANDFIRE** re-map (2016) was very obvious in its effects on the attributes that strongly affect fire behavior. The LANDFIRE analysis of the area showed the parts of the project along the ridges above Cecil creek having much lower fuel loading, lower crown bulk density, and higher crown base than the surrounding, untreated areas. These attributes are reflected in the predicted fire behavior for the area (see Flame Length, Rate of Spread, and Fire Type Maps).

Westside Salvage Project

Following the high severity 2014 Whites Fire and concurrent Happy Camp Complex, KNF implemented a salvage project. This included taking snags and trees along the road that may have later died, mostly along Sawyers Bar Road and Whites Gulch Road, continuing up the 40N61 Road to the top of the ridge. It also included some work along the flanks of the private Rainbow Mine property, and a small area at the north end of the Finley Camp neighborhood (near Idlewild Campground). It also treated along the 40N54 and 40N54A roads to the Music Creek and South Russian Trailheads.

SRRC Fuels Reduction Projects

SRRC estimates that it has had nearly 900 acres treated in the planning area since 2006. The organization had implemented many treatments prior, as well, but treatment durability does not tend to last much beyond 15 years in the area, particularly if cut, pile, and pile burned treatments were not followed up with underburning (most have not).

Somes Bar Local Area

Butler Creek

After the Butler Fire of 2013, **SRRC** spearheaded fuels reduction just below the ditch-line where the wildfire stopped. The Klamath River Prescribed Training Exchange (**TREX**) then (fall 2015) conducted a prescribed underburn where the fuels reduction was done. SRRC then facilitated further **manual** fuels reduction and pile burning, with help from contractors and TREX, near two of the residences and in a swath above the ditch-line in 2020/2021. See Completed Treatments Map.

Forks of Salmon Local Area

Forks of Salmon Projects

SRRC and SR FSC facilitated treatment of part of the Old Post Office Road allotment circa 2011, but the treatment only covered part of the HIZ for one house. Around 2012, treatments were

done on part of the first property on the downriver side of the Cecilville Road after crossing both of the River Forks from Forks of Salmon. Around this time, some of the area known as Horn Field was also treated—forest and woodland habitat, some adjacent to the one current residence in this area. The owners also completed a thinning of several acres on their own, with the help of an NRCS funding program.

Downriver, some treatments were completed ca. 2011 on the two properties above Salmon River Rd, just downriver of the County Road Maintenance Yard. Then, in 2015, several acres were treated around Otter Bar (formerly used as a river kayaking school and lodge) and neighboring "Outer Bar".

Cecilville Local Area

Several small areas were treated in the Downtown Cecilville area and the cluster of properties along the East Fork South Fork Salmon (near the mouth of Taylor Creek). These treatments were done around 2010. Some of these treatment areas should be refreshed with light-intensity manual fuels reduction, and prescribed underburning could be used as a follow-up treatment on several of these properties.

Sawyers Bar Local Area

Taylor Hole

Under US Forest Service Stevens Authority Funding, SRRC planned and contracted 115 acres of fuels reduction brushing, thinning, and limbing, spanning eight private parcels. **Manual** cutting and **hand-piling** was done in fall 2019; all of the cut material and a portion of the dead and downed woody fuels were piled and covered. The piles were then burned in late fall, 2020. This project included treating along Forest Service Road 41N18, which passes through the treated parcels to access the Taylor Lake Trailhead of the Russian Wilderness.

Finley Camp

Using the same Stevens Authority funding as for Taylor Hole, two properties on the south end of the Finley Camp neighborhood were treated. One property had just over 2 acres that had burned at high severity in the 2014 Whites Fire. Abundant snags were fallen to protect water lines and access roads. In the remaining unburned area (~7.5 acres) standard fuels reduction thinning/brushing/piling was completed in the vicinity of three houses.

Sawyers Bar

The few properties on the south side of the North Fork Salmon River in Sawyers Bar—those that access the trail for the Jessups Gulch community water intake—received treatment in

2010/2011. The north side of town, just upslope of the portion with the densest housing, was treated most recently in 2014. The Flapjack Bar property, just upriver from Sawyers Bar downtown, was treated through and SRRC project in 2004; the owners of this property do an excellent job maintaining defensible space, but more work may be useful in the expanded HIZ.

Two of the properties at the Little North Fork Salmon River neighborhood received fuels reduction treatments most recently in 2010. As per the RECOMMENDED TREATMENT section, one of these is high priority for follow-up treatment due to its difficult access creating a high-risk situation.

Bear Country Local Area

Godfrey Ranch

Using US Fish and Wildlife Service Partners Program funding, SRRC planned and contracted 29 acres of fuels reduction—manual brushing, thinning, limbing, and hand-piling—in spring 2020. This work was done on the northernmost three parcels of the Godfrey Ranch. The piles were burned in February 2021, using grant funds from the California Fire Safe Council. A re-entry cut & pile treatment is planned for a 3.5-acre unit in the project that started with especially heavy cover of knobcone pine. Much of the treatment was geared toward deciduous oak restoration.

Blue Ridge

In 2018, SRRC planned and contracted **mastication** on 25 acres using US Fish and Wildlife Service (USFWS) Partners Program Funding, and the Ranch owners covered another 6 acres of adjacent mastication work. Like the work at Godfrey Ranch, much of this work at Blue Ridge focused on deciduous oak restoration goals.

Harris Ranch

Under the same USFWS funding used at Blue Ridge in 2018, SRRC planned and contracted 28 acres of manual brushing, thinning, limbing, and hand-piling. This work was completed in fall of 2018. The piles were then burned using USFS Stevens Authority funding in December 2019.

PLANNED TREATMENTS

Ikxariyatuuyship (Offield) Project

This project is being planned by the Western Klamath Restoration Partnership (**WKRP**) on Six Rivers National Forest managed lands. The Project plans to treat the landscape with a combination of culturally appropriate fuels reduction, thinning and cultural and prescribed fire within a 13,000-acre project footprint in the Merrill Creek and Rogers Creek areas on the lower Salmon River and Mid Klamath. Planning for this project is still in the early stages and the scoping period has not yet begun. An Environmental Impact Statement will be drafted for the **NEPA** process.

The Purpose and Need of the project is:
"The purpose for the Ikxariyatuuyship (Offield) Project is to help fulfill the Karuk's right to define and practice their cultural identity relating to a portion of their ancestral territory, now administered by the Six Rivers National Forest as the Cottimien Cultural Area (Management Area 8 – KNF Plan 1995).

There is a need for restoring social, economic, and ecological conditions conducive of community-based restoration and maintenance burning, vital to the perpetuation of Karuk culture, while supporting the ceremonial and subsistence pruning, burning, and coppicing activities of the Karuk People. Cultural burning and access to freely practice religion and associated indigenous management practices/principles under the governance of the Karuk Tribe's traditional knowledge, practice, and belief systems is critical to achieving this need."

KNF Bear Country Project

This project is currently in its **NEPA**-drafting phase; the draft Environmental Assessment (EA) was released for comments in late September 2021. It is expected that this project will be finalized and signed in 2022. KNF provided the SR FSC with GIS data on proposed treatments to date in late February, 2021. This draft shows a total treatment footprint of 18,837 acres, with 9,986 acres overlapping the CWPP standardized recommended treatment areas (Recommended Treatments Map). KNF states that the area affected by this project will be over 40,000 acres. Many of the proposed project treatments are specifically geared to treat along access roads and reduce fuels in the WUI. The Bear Country project's current draft plans include logging, non-commercial thinning, other fuels reduction brushing and thinning, piling and pile burning, and prescribed underburning—after fuels reduction treatments or as a first-entry treatment. See the Bear Country Proposed Action Map, created 2/24/2021 by KNF, for details (Fig 5).

The Purpose and Need for Action from the project proposal is:

- ” Enhance opportunities for community protection and firefighter and public safety:
    - Reduce wildfire threats to communities.
    - Ensure safe ingress and egress travel routes.
    - Establish strategic control features for long-term fire management.
- Protect, promote, and enhance a diversity of seral stages and habitat types throughout the project area:
    - Protect high value northern spotted owl habitat from threats of wildfire.
    - Maintain and improve the condition of existing late-successional habitat.
    - Promote forest health and resilience.
    - Restore beneficial fire effects to fire adapted ecosystems.
- Complement and enhance previously planned treatments within adjacent project areas to provide for continuity and effectiveness of landscape scale strategic fuel breaks.

There is a need to close the gap between the existing and desired condition, the initial proposed treatments are designed to meet the purpose and need for the project. Through ongoing interdisciplinary team review and public input these treatments are subject to change through the alternative development process following the public scoping period.”

KNF Bear Country Project Documents can be found online at:
https://www.fs.usda.gov/project/?project=54255&exp=overview

The KNF Bear Country Project includes plans for treating the following areas that overlap with the CWPP Standardized Treatment Priorities:

- 1a – HIZ: 173 acres
- 1b – Primary Access Roads and Trails: 2,351 acres
- 1c – Expanded HIZ: 365 acres
- 2a – Greenline Treatment: 707 acres
- 2b – Recreation Access Roads: 11 acres
- 3a – Firefighting Access Roads: 378 acres
- 3b – Strategic Firelines and Ridges: 2,226 acres
- 4 – Secondary Access Roads and Trails: 208 acres
- 5 – Young (15- to 50-yr-old) Plantations Contiguous with Higher Priority Treatments: 3,577 acres

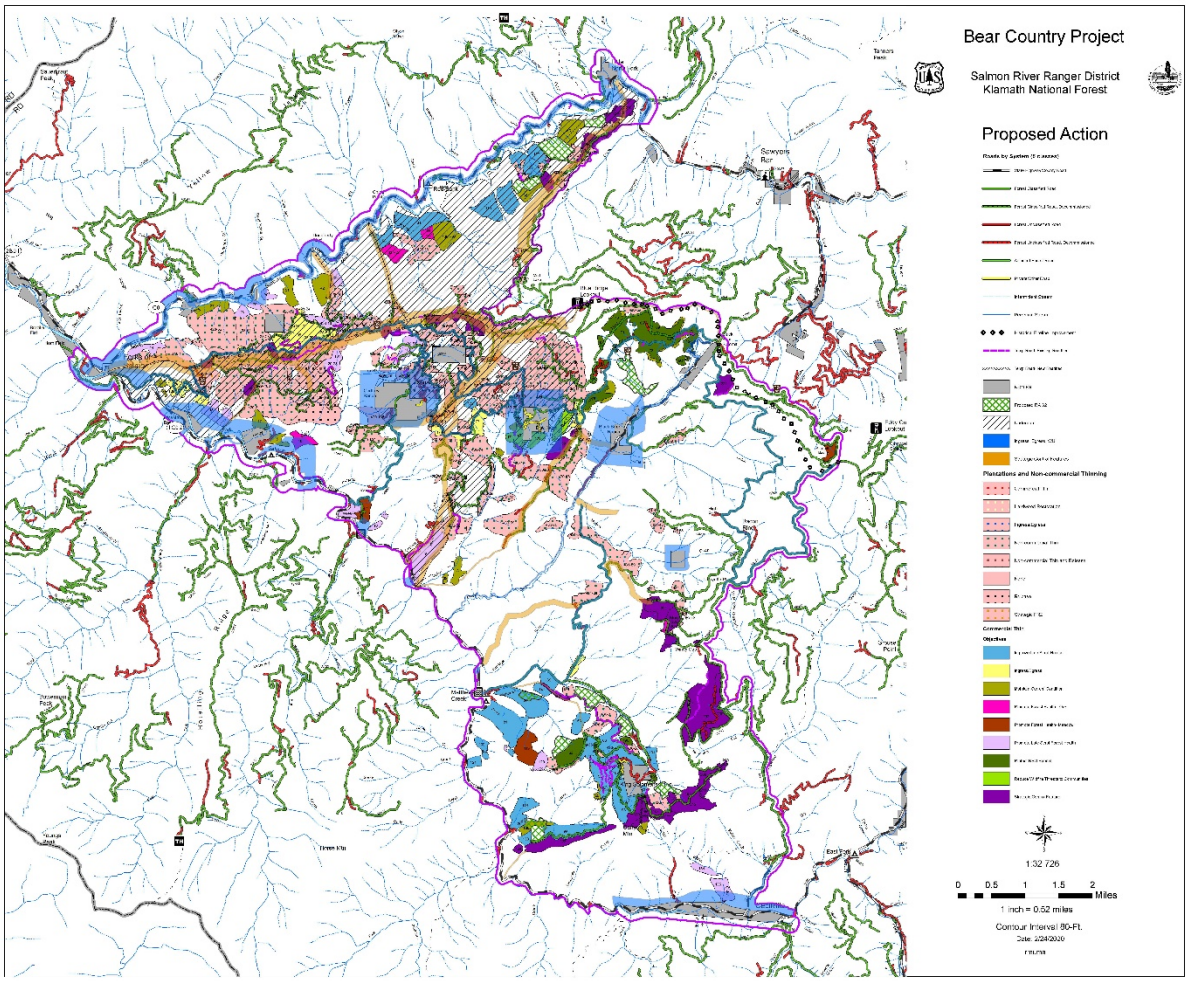


Figure 5 Map of current (March, 2021) draft treatments for the Klamath National Forest Bear Country Project. Southermost extent of project is WUI area bordering north side of Cecilville. Northernmost project boundary is confluence of Little North Fork Salmon River with North Fork Salmon River. Eastern boundary follows Crawford Creek Road over the Bacon Rind, then to Black Bear Summit.

South Fork Project

This planned KNF project is located in the East Fork of the South Fork Salmon watershed, with treatment focused in a swath around the Callahan-Cecilville Road, from Carter Meadows area downriver to Cecilville. Current draft treatments include greenline treatments around the private properties bordering the Callahan-Cecilville Road and/or the East Fork South Fork Salmon River. Treatment is proposed on about 3,320 acres total within a 7,690-acre project boundary (See South Fork Project Proposed Action Map; KNF 2020; Fig. 6). Planning of this project is currently

set at lower priority than planning for the Bear Country Project, which is further along. The stated Purpose and Need for Action from the Project Proposal is to:

- Provide safe ingress and egress for public and firefighting resources.
- Improve and promote the health and resiliency of forested lands to insects, disease and the potential effects of climate change.
- Reduce risks to forest and private lands from negative effects of large-scale wildfire.
- Restore degraded meadow structure due to conifer encroachment and absence of fire.
- Reduce the risk of overhead hazard impacts to the public in recreation areas and along forest roads.

Documents for the KNF South Fork Project are available at:
https://www.fs.usda.gov/project/?project=56565

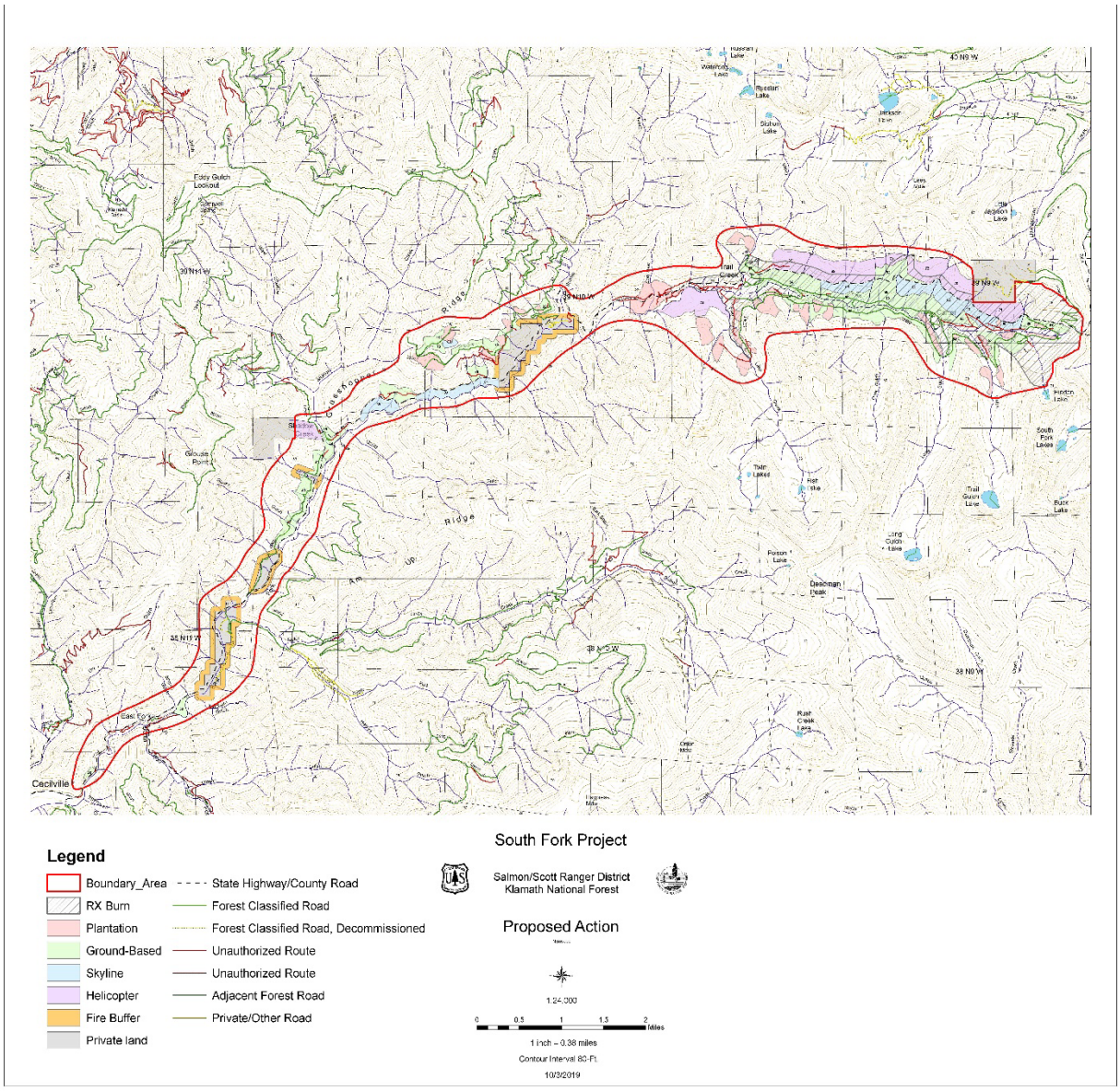


Figure 6 Klamath National Forest South Fork Project draft map. Western end of project boundary is Cecilville; eastern end is Callahan/Carter Meadows Summit.

SRRC Projects

Currently, the US Fish and Wildlife Service (**USFWS**) Partner's Program is providing funding for the South Fork Salmon Wildlife Habitat Enhancement Project. This project will provide fuels reduction—manual thinning, brushing, and piling—in areas of three properties in the South Fork Salmon River watershed near Cecilville. These fuels reduction activities will be focused in areas where deciduous oaks are a significant component of forests and woodlands, and treatments

will follow the Oak Restoration methods and objectives described in the RECOMMENDED TREATMENTS – Treatment Types section above. The project treatments are also mostly strategically located along access roads and/or strategic fire-break locations. SRRC will continue to work with landowners, managing agencies, local Tribes, and partner organizations to plan and complete priority and strategic fuels reduction and prescribed fire treatments on private lands and surrounding WUI and Ingress/Egress zones.

RECOMMENDED ACTION ITEMS SUMMARY

Priority Fuels Treatments

Treat High Priority Areas

See **RECOMMENDED TREATMENTS AND FIRE-SAFING** section above for detailed treatment priorities. We need to increase the pace and scale of fuels treatments on our landscape if we are going to have a chance at protecting our communities, residences, and forests in our current climate and fuels paradigm. As we experience increasing numbers of neighborhoods and communities with heavy losses during wildfire events, it has become clear that we need to start at the structures themselves, with home hardening and defensible space, but also that we need to continue to move out to a much larger scale around residences, neighborhoods and communities to achieve adequate safety.

Priority 1 – Around Homes and Primary Access

1a Home Ignition Zone: 0 to 200 feet from buildings

1b Primary Access Roads and Trails - 150 feet either side of centerline

1c Expanded Home Ignition Zone: >200 feet to 500 feet from buildings

Priority 2 – Around Private Property Boundaries and Recreation Access Roads

2a "Greenline" Treatments – from private property boundaries out into the public lands – 500 feet

2b Recreation Roads – 150 feet either side of centerline

Priority 3 – Firefighting Access Roads and Strategic Fire Control Lines

3a Firefighting Access Roads – 50 feet either side

3b Strategic Firelines, Strategic Ridges, and Burn Control Roads – 330 feet either side

Priority 4 – Secondary Access Roads

Secondary Access Roads and Trails – 150 feet either side

Priority 5 – Young Plantations

Young (15- to 50-yr-old) Plantations Contiguous with other Recommended Treatment Areas

See **Specific Treatment Priorities** section above for neighborhood-based priorities.

Recreation: treatment of roads accessing these highly used recreation locations and around developed campgrounds to reduce the risk both of fires being started from these locations and the risk to individuals using these recreation sites during wildfire season.

Wilderness Properties: It is recommended that particular focus be made on performing fuels reduction, home hardening, communications such as satellite internet, and in maintaining safety zones where feasible on wilderness inholding properties. The isolated locations and slow trail access make rapid evacuations and active fire protection particularly difficult.

Maintain High Priority Treatments, Firelines and Improvements

Maintaining high priority treatments is critical to keeping our communities and forests safe and healthy. High priority treatment areas should be put into a maintenance treatment schedule wherever feasible to maintain public safety and ecosystem health.

Maintain recent neighborhood firelines: It is recommended that the USFS and private landowners work together to maintain and improve the strategic firelines and control features created to protect communities and outlying neighborhoods over the last 8 years of wildfires. The work has already been put in, thus maintaining and improving these features will come at reduced costs and greatly improve fire preparedness for future fires. These strategic lines, if maintained, can also be used as strategic control features for safely conducting controlled burns for further protection. During the 2020 Red Salmon Complex and 2021 River Complex strategic firelines were put in around multiple neighborhoods and properties, such as Knownothing and Godfrey Ranch, that should be maintained.

Increase Pace and Scale of Prescribed Fire

While we increase fuels reduction treatments around communities and residences, and along critical access routes, we need to be completing these treatments with prescribed fire as much as possible. It is increasingly clear that fuels treatments alone, without the inclusion of prescribed or managed fire, is not a complete treatment within our planning area. Recent fire footprints continue to be one of the most effective tools at moderating fire behavior and stopping fires' progression. Prescribed fires offer the best opportunity to get fire on the landscape, especially around communities, in a controlled manner within lower risk burn windows.

To be effective, and give the most protection to communities and outlying neighborhoods in the planning area, we need to greatly increase the pace and scale of prescribed fire.

- Address barriers to prescribed fire
- Work with landowners to increase comfort with prescribed fire
- Use Klamath TREX and AHAL resources to help to implement safe controlled burns
- Work with USFS to plan and conduct cross boundary burns where ideal control features cross jurisdictional boundaries
- Use recent burn footprints as safe backstops for prescribed fire
- Use prescribed fire in recent fire footprints to take advantage of the work that wildfire is already doing and help reset a healthy fire return interval and fire adapted forest system
- Use prescribed fire as a maintenance tool after other fuels treatments are complete
- Initiate a local Prescribed Burn Association (PBA) where there is interest, or join the Siskiyou PBA to give landowners more resources to use prescribed fire safely

Implement Winter and Shoulder Season Prescribed Burning

As discussed, deciduous oak woodlands and immediate meadow surroundings are some of the best candidates for using broadcast underburning to reduce future risk during wildfire, while enhancing the quality and maintainability of these unique areas.

Meadows Recommendation: Use prescribed fire to burn mid and lower elevation meadows during low-risk burn windows to reduce future fire risk, provide for improved safety zones, and improve wildlife habitat. Restore wet and dry meadow habitat at all elevations to increase water storage, improve wildlife habitat, and restore a fire resilient ecosystem. Prioritize meadow systems stewarded by local native families to support cultural fire restoration (e.g. Homestead on Methodist Creek).

Oaks Recommendation: Use low intensity prescribed fire in deciduous oak woodlands and savannas during, low risk, winter burn windows to reduce fire risk, create large fuels breaks and improve wildlife habitat. Restore deciduous oak woodlands and pine-oak woodlands, by thinning encroaching firs, to restore a drought and fire resilient landscape.

Increase Use of Managed Wildfire

Given the remote rugged terrain, and high percentage of National Forests and Wilderness areas within the planning area, wildfire will almost certainly continue to treat the vast majority of acres in the area and have the greatest effects on the landscape. Currently over 97% of fire starts are being suppressed in the region and only those fires that start at the times of greatest fire risk –

driest, hottest times of year – become large wildfire events. Most fires that start in **shoulder seasons**, winter, spring and fall, are easily suppressed due to less combustive fuels conditions. These fires are also the fires that are most likely to have positive impacts on the land. In this way it can be argued that we are selecting for increasingly devastating fire impacts.

We need to assist forest and fire managing agencies in having the support and decision space needed to increase the use of managed wildfire in times and places where risk is low and potential outcomes are more likely to be positive for communities and the environment.

Home Hardening

Home hardening is a critical component to fire safety and the survival of structures during wildfire events, especially in this remote planning area. While most residents may not be financially able to conduct expensive retrofits it is worth reviewing the home hardening resources mentioned and summarized in this document and prioritizing home hardening techniques where feasible. All new structures should be built with home hardening and fire safety as a top priority. Additionally, new funding opportunities are arising that could help with the costs of home hardening, particularly for high risk areas.

See the low-cost retrofit list and content from ReadyForWildfire.org in **Appendix D**. Some of the most important items are:

- **Roof** material and condition: wooden shingles significantly increase ignition hazard. Rated asphalt shingles or metal are much better choices.
- **Vents**: vents (attic, ceiling, under-house or deck) should be of metal mesh and have a maximum opening size of 1/8 inch. Embers entering through vents are one of the top causes of home ignition.
    - Special vents (e.g., Vulcan brand) are also now available that close up when exposed to flames or extreme heat, preventing embers from crossing.
- Open **eaves** with vents are more susceptible to lodging of embers. Consider closing in eaves (i.e. soffits).
- **Gutters**: gutters should be of non-combustible material and kept clean of debris.
- **Chimneys** should have spark arrestors (1/8-inch metal mesh) and be cleaned annually.
- **Wooden fences**: combustible fences should not be attached to houses; if fence continuous to house is required, build out of non-combustible material for at least 10 feet from intersection with house.
- **Decks**: non-combustible deck materials should be used in new decks if feasible. For treated wood decks, space in between decking boards should be increased to ¼" to prevent flammable vegetative debris accumulation between the boards. Combustible

materials should not be stored under decks, and debris should be cleaned from beneath decks regularly.
- **Windows**: fewer panes and larger sizes are more hazardous, breaking more easily in extreme heat. Use multi-pane tempered glass if possible.

Roads

See **Standardized Treatment Priorities** section in main body of the document above.

Ingress/Egress

Primary Access Roads and Trails are the highest priority for treatment throughout the planning area. It is highly recommended that all residences have two primary access routes. Residences with only one primary access route have increased risk in emergency events and need special attention to ensure that the properties and access routes are adequately treated, and that potential safety zones are identified and treated where feasible.

Recreational and highly used USFS roads and secondary access routes are also a priority for treatment at a slightly lower ranking than primary access routes.
In addition to treating fuels along access routes, it is also essential that roadbeds themselves be repaired and maintained. This is particularly true where only one access route to a residence exists. All Primary Access routes should be prioritized for road maintenance as needed to assure safe ingress and egress for residents and fire personnel during emergency events.

Vehicle Size Restrictions

It is highly recommended that Siskiyou County undertake an analysis of the main County Road arteries that will allow explicit restrictions for certain vehicle classes. Stretches of these arteries—particularly the section of the Salmon River Road upriver of the 7-mile marker and the Cecilville Road between Cecilville and Forks of Salmon—are simply impassable by full-size tractor trailers. Almost every year, one to several of these vehicles get stuck and block primary access for residents and others. This is a serious safety hazard that needs to be dealt with.

Water Infrastructure

For both Sawyers Bar and Forks of Salmon, it is recommended that more foolproof delivery of water for firefighting be provided for, in case of fire in the town core areas. In these areas, structure fires could easily start other structure fires.

In **Forks of Salmon**, an important step is to upgrade the currently non-functioning hydrant system, including putting in a new section of water line to bypass the broken water line under

the Post Office so that the tank on the slope above can be filled from the community water source. Additionally, a pumping system needs to be developed at the river below the Forks of Salmon Post Office. These upgrades will need USFS cooperation for environmental compliance.

In **Sawyers Bar**, the treated potable water distribution system should be separable from firefighting water, such that firefighting needs that outstripped the storage capacity could switch over to pumping water from the North Fork Salmon River, without fouling the potable-water distribution system. Install a functional pumping system that would allow pumping from the river (currently from near Eddy Gulch bridge) in the case of emergencies with enough pressure to run multiple hydrants at once. Install additional pumps near hydrants further away from the river as needed to boost pressure for firefighting in town.

Residential Water Storage:

All residences should have a minimum of 2,500 gallons of water storage exclusively for fire protection. This amount should be significantly increased in areas where water sources (such as engine fill sites) are distant or limited and current water systems and sources during dry months do not allow for the storage to be refilled in less than the time it would take to pump the tank down while using sprinkler systems to protect the residences. If residents/landowners hope to protect additional structures during structure or wildfire events, the quantity of storage should be increased accordingly.

Bear Country: Given the long distance from reliable water sources during dry months, it is recommended that properties in the Bear Country Local Area (and other water remote and water deficient inholdings in the planning area) develop extensive winter water storage exclusively for fire protection. It is recommended that 5,000-10,000 gallons be stored per residence, to allow for adequate water resources for exterior sprinkler systems as well as fire protection services during a wildfire event.

Residential Waters System Upgrades: Many residential water systems within the planning area are above ground. This poses a risk of loss of water during wildfires and adds substantial protection needs from fire personnel during wildfires and prescribed fires. It is recommended that where possible water systems be buried to reduce risk to residents and fire personnel.

As drought and wildfire interact to reduce instream flows and destroy above ground gravity fed water systems, residents are forced to pump out of mainstem rivers and large side creeks, with potential for fuel spillage and increased costs. Funding could be sought to install buried water systems and additional water storage for our most at-risk and needy residents and

neighborhoods, throughout the watershed. This would reduce the impacts of burned plastic in tributary streams, and provide critical water delivery for both residents and fire suppression.

Communications

The Salmon River Fire Safe Council recommends installation of a publicly accessible pay phone in Cecilville and extension of existing phone lines to outlying neighborhoods (including Eddy Gulch, Bear Country, and Butler neighborhoods as well as other outlying residences). Access to emergency communications are essential in this remote and dispersed community for public safety.

Emergency Services and Response

Salmon River Volunteer Fire and Rescue

Efforts should be made to bolster the number of human resources available for the SR VFR. This could make it more likely that resources would be available closer to an incident, particularly in the communities of Cecilville and Sawyers Bar. Cecilville already has much of the needed infrastructure (engine and engine bay, tanks dedicated for fire water), but no year-round VFR residents staff the town. In Sawyers Bar, expansion of SR VFR might also require acquiring a dedicated engine, as well as recruiting new volunteers in the town. Increased capacity at our local SR VFR is critical for safety during wildfires and structure fires, especially for initial response, as well as any medical emergency in this extremely remote area where response time and qualified responders can easily be the difference between life and death.

CWPP Updates

Mapping

While many map layers will likely remain accurate for the foreseeable future (streams, topography), certain data layers such as fire history, completed treatments, and structures will change with changing events and treatments. These data layers and accompanying online maps will need to be updated periodically.

We recommend updating the structures and fire history as needed, or every 2 years. Updating USFS completed and planned treatments is a more involved process that will take considerable coordination with USFS fuels personnel. These elements should be updated at least every 3-5 years. This effort will require additional funding.

Document Updates

To continue to serve its purpose over time it is important that the Salmon River CWPP be updated periodically and with any major changes in landscape and fire risk conditions, such as after large wildfire events. It is recommended that pertinent sections of this document be updated every two-three years to reflect changes in priority and on the ground conditions, such a fires, completed fuels treatments, and structures. The Salmon River CWPP should have a full review and update at least every five years. Additional funds will be needed for this update process.

GLOSSARY

Absolute footprint – The actual footprint of area burned on the ground, does not count overlapping acres separately, in other words, the union of all overlapping fires within a given area and time period.
Active crown fire – A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other. (NWCG glossary)
Aspect – A position facing a particular direction, as in a slope with a southern aspect.
BAER – Burned Area Emergency Response
BAER is an emergency risk management response process, that occurs during or immediately following a wildfire event, to assess the post fire conditions and the risks posed to humans, infrastructure, and the environment. It assesses these risks and determines emergency management actions that need to happen within a limited period of time, usually one year after the fire year, to reduce risks to people, infrastructure and the environment, such as flooding, debris flows, mud flows, invasive species spread, etc. These risk assessments are usually conducted by an interdisciplinary team of the lead managing agency and include specialists in various fields, such has hydrology, soils, botany, cultural resources, and engineers. A BAER plan is developed based on the risk assessments and burned area land management objectives. The BAER Plan identifies the most effective treatments to address the identified risks.
CALVEG – "Classification and Assessment with Landsat of Visible Ecological Groupings" – The CALVEG system, initiated in 1978 by a USFS Region 5 Ecology Group, is a means of classifying existing California vegetation communities for use in statewide resource planning.
Cambium – a thin formative layer between the xylem and phloem of most vascular plants that gives rise to new cells and is responsible for secondary growth (Merriam-Webster)
Campaign (fire) – A large wildfire that lasts over such a long period of time that a rotation of multiple different Incident Management Teams are needed to manage the fire.
Chain - a unit of length equal to 66 feet (about 20 meters) (Merriam-Webster)
CLP – Community Liaison Program
Co-dominant trees – Trees of the primary upper canopy layer that receive sunlight from above and partially from the side.
Control Feature – a fireline or natural feature that can be used to surround a fire or any spot fire and from there reduce its burning potential to a point that it no longer threatens further spread or resource damage under foreseeable conditions. (NPS.gov fire-wildfire-definitions)
DBH – Diameter at Breast Height (4.5-ft), is a standard method of expressing the diameter of the trunk or bole of a standing tree, and is used for many forestry calculations and assessments
Defensible space – the buffer a homeowner or resident creates between a building on their property and the fuels (grass, trees, shrubs) or any wildland area that surround it. Defensible

space ins important in slowing or stopping the spread of a wildfire and can help to protect the home form catching on fire from direct flame contact and/or radiant heat. Defensible space is also important in keeping firefighters safe while protecting a home. If there is not adequate defensible space, firefighters may choose not to defend a property or home from an oncoming fire.

DPA – Direct Protection Area, assigns the responsibility of first response to fires (agency)

EMT – Emergency Medical Technician

ERC – Energy Release Component: The computed total heat release per unit area (British thermal units per square foot) within the flaming front at the head of a moving fire. (NWCG glossary)

Fire behavior – The manner in which a fire reacts to the influences of fuel, weather, and topography. (NWCG glossary)

Fire Intensity – the amount of energy produced by a fire, often described by flame height or rate of fire spread (http://www.nwfirescience.org/sites/default/files/publications/Fire%20Severity.pdf)

Fire season – Period(s) of the year during which wildland fires are likely to occur, spread, and affect resources values sufficient to warrant organized fire management activities. Also, a legally enacted time during which burning activities are regulated by federal, state or local authority. (NWCG glossary)

Fire Severity – "Fire severity refers to the effects of a fire on the environment, typically focusing on the loss of vegetation both above ground and below ground but also including soil impacts. Often the term fire severity is incorrectly used interchangeably with fire intensity; fire intensity is the amount of energy produced by a fire, often described by flame height or rate of fire spread. Fire severity and burn severity are synonymous, and are sometimes separated out into vegetation burn severity and soil burn severity. For example, fire and forest ecologists measure the vegetation burn severity of a fire by observing the degree of scorch on tree trunks and limbs, the amount of vegetation burned, and the percentage of vegetation that is dead." (http://www.nwfirescience.org/sites/default/files/publications/Fire%20Severity.pdf)

Fire Use Module – "A fire use module is a 7–10 person team of firefighting personnel dedicated to planning, monitoring and starting fires. They may be deployed anywhere in the United States for resource benefits (fire use), prescribed fire and hazard fuel reduction projects.
As inter-agency national resource personnel, fire use modules have expertise in the areas of fire monitoring, ignition, holding and suppression, prescribed fire preparation and implementation support, hazard fuels reduction, and fire effects monitoring." (Wikipedia)

Fireline – The part of a containment or control line that is scraped or dug to mineral soil. (NWCG glossary)

Flame length – The distance between the flame tip and the midpoint of the flame depth at the base of the flame (generally the ground surface), an indicator of fire intensity. (NWCG glossary)

FMO – Fire Management Officer (USFS position)
FRID – Fire Return Interval Departure: an analysis that quantifies the difference between current and presettlement fire frequencies. This analysis allows managers and fire and forest practitioners to target areas with altered fire regimes from prehistoric regimes.
FS – Forest Service as in the United States Forest Service
Fuel loading – The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area. This may be available fuel (consumable fuel) or total fuel and is usually dry weight. (NWCG glossary)
Fuel model – Simulated fuel complex for which all fuel descriptors required for the solution of a mathematical rate of spread model have been specified. (NWCG glossary)
Greenline – The area outside of private property boundaries into the surrounding public lands.
Hand-piling – Manual piling/stacking of fuels accumulated in fuels reduction efforts, usually with the intention of burning them at a safe time after the fuels have cured (sufficiently dried out to burn well)
HIZ – Home Ignition Zone: The area where the factors that principally determine home ignition potential during extreme wildfire behavior (high fire intensities and burning embers) are present. The characteristics of a home and its immediate surroundings within 100 feet comprise the HIZ. (NWCG glossary)
Hoselay – Arrangement of connected lengths of fire hose and accessories on the ground, beginning at the first pumping unit and ending at the point of water delivery. (NWCG glossary)
IC – Incident Commander: The incident commander is the person responsible for all aspects of an emergency response; including quickly developing incident objectives, managing all incident operations, application of resources as well as responsibility for all persons involved. (Wikipedia)
ICS – Incident Command System: A standardized on-scene emergency management concept specifically designed to allow its user(s) to adopt an integrated organizational structure equal to the complexity and demands of single or multiple incidents, without being hindered by jurisdictional boundaries. (NWCG glossary)
IMT – Incident Management Team: The incident commander and appropriate general and command staff personnel assigned to an incident, usually a fire.
Inversion – an increase of temperature with increasing height through a layer of air, often causing a cooler layer where smoke accumulates lower in the atmosphere. During wildfire events, inversion layers result in thick layers of smoke lower in the atmosphere, which can have moderating effects on fire behavior by decreasing air temperature, increasing humidity, and decreasing winds and solar radiation, resulting in slow fire movement and low flame lengths. (NWCG glossary)
IRZ – Individual Risk Zones: An area designated around each private property that centers on home(s) and defines a zone of likely influence in the event of a wildfire.
KNF – Klamath National Forest (USFS)

Ladder fuel – Fuels which provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. They help initiate and assure the continuation of crowning. (NWCG glossary)
LANDFIRE – Landscape Fire and Resource Management Planning Tools, is a shared program between the wildland fire management programs of the U.S. Department of Agriculture Forest Service and U.S. Department of the Interior, providing landscape scale geo-spatial products to support cross-boundary planning, management, and operations. (www.landfire.gov)
Manual (fuels reduction) – Fuels reduction that is done by hand and chainsaw that does not include heavy equipment for removal of fuels.
MTBS – Monitoring Trend in Burn Severity
NEPA – National Environmental Policy Act
NWCG - National Wildfire Coordinating Group
The National Wildfire Coordinating Group provides national leadership to enable interoperable wildland fire operations among federal, state, local, tribal, and territorial partners. Primary objectives include:

- Establish national interagency wildland fire operations standards. Recognize that the decision to adopt standards is made independently by the NWCG members and communicated through their respective directives systems.
- Establish wildland fire position standards, qualifications requirements, and performance support capabilities (e.g. training courses, job aids) that enable implementation of NWCG standards. (https://www.nwcg.gov/)

Passive crown fire – A fire in the crowns of trees in which trees or groups of trees torch, ignited by the passing front of the fire. The torching trees reinforce the spread rate, but these fires are not basically different from surface fires. (NWCG glossary)
PFR – Pre-settlement Fire Regime: uses the best available research to establish fire regimes for vegetation types that occurred 300-500 years before Anglo American settlement.
RAVG – a rapid initial assessment of post-fire vegetation condition following large wildfires on National Forests
RAWS – Remote Automatic Weather Station: A weather station that transmits weather observations via GOES satellite to the Wildland Fire Management Information system. (NWCG glossary)
Rollout – When burning debris roll downhill, and have potential of starting to burn vegetation separated and bellow the main fire front. This can often lead to higher intensity fire behavior as the fire gains speed and energy burning back up hill.
ROS – Rate of Spread: The relative activity of a fire in extending its horizontal dimensions. It is expressed as rate of increase of the total perimeter of the fire, as rate of forward spread of the fire front, or as rate of increase in area, depending on the intended use of the information.

Usually it is expressed in chains or acres per hour for a specific period in the fire's history. (NWCG glossary)

Safety Zone – A safety zone is a location where a threatened firefighter or community member can find adequate refuge from an approaching fire. The safety zone is the area where a firefighter or other person can survive a wildfire passing through without using a fire shelter. The deployment site is used when fire conditions are such that escape routes and safety zones have been compromised.

An area cleared of flammable materials used for escape in the event the line is outflanked or in case a spot fire causes fuels outside the control line to render the line unsafe. Safety zones may also be constructed as integral parts of fuel breaks; they are greatly enlarged areas which can be used with relative safety by firefighters and their equipment in the event of blowup in the vicinity.

Savanna – An ecosystem type with single trees well spaces within a matrix of grasses or herbaceous plants and shrubs, where canopies generally are not touching (less than 10% tree canopy cover).

Serotinous – Remaining on a tree after maturity and opening to release seeds only after exposure to certain conditions, especially heat from a fire. Used of the cones of some gymnosperms. (www.thefreedictionary.com)

Shaded fuelbreak – Fuel breaks built in timbered areas where the trees on the break are thinned and pruned to reduce the fire potential yet retain enough crown canopy to make a less favorable microclimate for surface fires. (NWCG glossary)

Shoulder Season – Seasons other than the hottest, driest months of summer, when prescribed fire can be conducted with less risk and with more beneficial results. These times can also be periods of time when wildfire could potentially be managed for resource benefits with less risk of detrimental impacts.

Slopover – A fire edge that crosses a control line or natural barrier intended to confine the fire. (NWCG glossary)

Spot (fire) – Fire ignited outside the perimeter of the main fire by a firebrand. (NWCG glossary)

SR VFR – Salmon River Volunteer Fire and Rescue

SRNF – Six Rivers National Forest (USFS)

SRRC – Salmon River Restoration Council:

The Salmon River Restoration Council (SRRC) is a non-profit organization that has been serving California's Salmon River watershed and its community since 1992. SRRC has a permanent staff of about twelve plus additional seasonal project staff, field crews, and a large, dedicated group of volunteers and members. The SRRC is a chief promoter of cooperative actions within the local community and among the stakeholders of the Salmon River watershed.

SRRC's mission is to assess, protect, and maintain the Salmon River ecosystem with the active participation of the local community, focusing on the anadromous fisheries resource and the development of a sustainable economy.
Through cooperative management activities, the SRRC addresses the distinct needs of the Salmon River watershed that arise due to the impacts of past catastrophic fires and fire management, timber harvest, road construction, mining, grazing, floods, residential and recreational use, as well as the inherent challenges faced in the remote, rugged mountain environment. SRRC manages the Salmon River Fire Safe Council
Surface fire – a forest *fire* that burns only *surface* litter and undergrowth, the tree canopy may be scorched but does not burn to the extent that it will carry a fire.
Surface fuel – dead and down woody fuels, litter and duff that is lying on the ground
TREX – Prescribed Fire Training Exchange:
"TREX cooperative burns provide experiential training that builds robust local capacity for fire management and offers professional fire practitioners a more holistic perspective—while implementing treatments that support community and landscape objectives.
The TREX strategy does what no one else is doing: it provides a cooperative burning model that services the needs of diverse entities, including federal and state agencies, private landowners and contractors, tribes, academics and international partners—while incorporating local values and issues to build the right kinds of capacity in the right places." The TREX concept was developed within the Fire Learning Network of the Nature Conservancy.
(https://www.conservationgateway.org/ConservationPractices/FireLandscapes/HabitatProtectionandRestoration/Training/TrainingExchanges/Pages/fire-training-exchanges.aspx)
Underburn – a prescribed broadcast burn, that generally consumes surface fuels but not the overstory canopy.
Underslung line – A fireline below a fire on a slope. Should be trenched to catch rolling material. Also called undercut line. (NWCG glossary)
USDA – United States Department of Agriculture
USDI – United States Department of Interior
USFS – United States Forest Service
VFR – Volunteer Fire and Rescue
Water Year – the 12-month period October 1, for any given year through September 30, of the following year. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1999 is called the "1999" water year. (https://water.usgs.gov)
Wildfire incident area total – The sum of acres burned in wildfire incidents of a given period, i.e. double count acres where fires overlap during the given period of time.
WKRP – Western Klamath Restoration Partnership: The Western Klamath Restoration Partnership is an open group comprised of the Federal, Tribal, and Non-Governmental

Organization (NGO) participants with the inclusion of facilitators and additional invitees. This Partnership allows diverse stakeholders to come together to accomplish work by identifying Zones of Agreement where all parties agree upslope restoration needs to occur. In 2013, WKRP with support from the US Fire Learning Network invited USFS leadership to participate in a series of workshops to define mutual all-lands fire management and ecological restoration goals. Together they created a shared vision for restoring fire resilience at the landscape scale, founded upon Traditional Ecological Knowledge (TEK) and practices and concepts outlined in the National Cohesive Wildland Fire Management Strategy. This vision incorporated social, ecological, economic and cultural values spatially across a 1.2-million-acre landscape to determine where restoration treatments would yield the most results with the least amount of impacts. WKRP has several current pilot projects on the ground at various stages of planning and implementation.

Woodland – A forest ecosystem type with lower tree density where tree canopies often touch but trees aren't competing for light. (An oak cluster type is an ecosystem intermediate between woodland and savannah where small clusters of a few individual trees, often oaks or other deciduous trees, are spaced out and surrounded by a grass type.)

WUI – Wildland Urban Interface: The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetation fuels. (NWCG glossary)

APPENDICES

Appendix A: Access Roads

Table A 1 Primary Access Roads – County Maintained

Road Name	Segment	Access To	Miles	Drive Time (mins)
Main Arteries – County Roads (all Primary Access Routes)				
Salmon River Road	Hwy 96 to Forks of Salmon	Somes Bar, Merrill Creek residences, Oak Bottom, Butler Creek Community, Nordheimer Campground, Nordheimer Creek residences, Crapo Creek residences, Forks of Salmon	17.3	30-35
Sawyers Bar Road	Forks of Salmon to Sawyers Bar Post Office	Lower North Fork residences, Yellow Jacket Ridge, Red Bank, Little North Fork, Sawyers Bar	14.7	30-35
Sawyers Bar Road	Sawyers Bar Post Office to Etna Summit	Eddy Gulch, Whites Gulch, Finley Camp, Idlewild Campground, Rainbow Mine, Taylor Hole properties	14.6	30-35
Cecilville Road	Forks of Salmon to Cecilville	Knownothing neighborhood, Hotelling Campground, Matthews Creek Campground, Cecilville	17.5	40-45

Road Name	Segment	Access To	Miles	Drive Time (mins)
Callahan-Cecilville Road	Cecilville to Carter Meadows Summit	Petersburg neighborhood, South Fork Salmon River, East Fork Campground, E Fork S Fork and Taylor Creek residences, Shadow Creek Campground, Trail Creek Campground	18.1	30-35

Table A 2 Other County-Maintained Primary Access Roads

Road Name	Segment	Access To	Miles
Other Primary Access County Roads			
Eddy Gulch Road	Sawyers Bar to USFS 39N27 Rd	Eddy Gulch residences, Black Bear Ranch (via USFS and Black Bear Rd)	2.7
Black Bear Road	Intersection of USFS 39N60, 39, and 39N23 Roads (Black Bear Summit) to Black Bear main house	Black Bear Ranch	2.9
Whites Gulch Road	Sawyers Bar Road to residence	Private ownership	0.5
Crawford Creek Road	Cecilville to USFS 39N23 Road (aka the "Bacon Rind"; also sometimes called "Eddy Gulch Road"	Cabins and grounds associated with Cecilville Station	0.9

Road Name	Segment	Access To	Miles
Caribou Road	Callahan-Cecilville Road intersection to end	Petersburg Guard Station, South Fork Salmon River, Jordan Ranch and Loro Ranch (residences), trail-only access from road end to Stefanki property, Glacier View Ranch, Lakeview Ranch, and Menzies property	6.1

Table A 3 Primary Access Roads – Forest Service-Maintained

Road ID	Common Name	Segment	Access To	Miles
Primary Access Roads – US Forest Service Jurisdiction				
15N17	Camp Three Road	Salmon River Road to intersection of 12N46	Weigel property	2.6
12N46	Merrill Off Road	Intersection of 15N17 to private	Weigel property	1
15N17	Camp Three Road	Intersection of 12N46 to intersection of 12N18	Private property just W of watershed boundary	1.1
12N18	Homestead Road	Intersection of 15N17 to private	Private property just W of watershed boundary	0.7
11N22	Old 96	Highway 96 to cabin	Seasonal cabin	0.8
10N17	Horn Creek Road	Cecilville Road to furthest private	"Bull Barn" and Horn Creek properties—Cressey & Harding, Horn Hollow LLC, Seeger	1.3

Road ID	Common Name	Segment	Access To	Miles
10N10Y	Nordheimer Creek Road	Salmon River Road intersection to private	Nordheimer creek residences	1.2
39	Picayune (or "Grasshopper Picayune") Road	Cecilville Road to 39N67 intersection	"Post Office Rd" residences at segment start; Godfrey Ranch via 39N67	6.4
39	Picayune (or "Grasshopper Picayune") Road	Intersection of 39N67 to Black Bear Summit (intersection of 39N23, 39N60, and Black Bear Rd)	Blue Ridge Ranch, Black Bear Ranch	9.7
39	Six-Mile Road (also sometimes same as other 39 segments)	Black Bear Summit to Callahan-Cecilville Road	Eddy Gulch Lookout, egress toward Callahan	16.2

Table A 4 Recreation Access Roads

Forest Service ID	Segment	Access To	Miles
Recreation Access Roads			
38N27	Intersection with 37N02 to intersection of 37N04	Cecil Point Trailhead	6.3
37N04	Intersection with 38N27 to trailhead	Cecil Point Trailhead	0.9
40N51	Sawyers Bar Road to 40N33	Cherry Creek Trailhead	2.6
40N33	Intersection of 40N33 to trailhead	Cherry Creek Trailhead	5.2
37N07	Intersection of 37N02 to trailhead	China Gulch Trailhead	5.5
39N58	Intersection of 39 road to trailhead	Deacon Lee Trailhead	2.1
40N51B	Intersection of 40N51 to trailhead	Garden Gulch Trailhead – upper access (also can be accessed directly from Sawyers Bar Rd.)	0.7
15N17	Salmon River Road to watershed boundary	Haypress Trailhead	3.1
13N04	Intersection of 15N17 to trailhead	Haypress Trailhead	2.1
10N04	Cecilville Road to 10N07 intersection	High Point Trailhead	8.8
10N07	Intersection of 10N04 to intersection of 10N07B	High Point Trailhead	4.5

Forest Service ID	Segment	Access To	Miles
10N07B	Intersection of 10N07 to trailhead	High Point Trailhead	1
10N16	Cecilville Rd. to intersection of 39N32	Hotelling Trailhead	5
39N32	Intersection of 10N16 to trailhead	Hotelling Trailhead	6.4
40N54	Sawyers Bar Road to trailhead	Music Creek Trailhead	9
40N54	Sawyers Bar Road to intersection of 40N54A	South Russian Trailhead	4.5
40N54A	Intersection of 40N54 to trailhead	South Russian Trailhead	1

Appendix B: Fire Hazard Analysis-Related Data

Energy Release Component

Fuel Model G is used for the Northwestern Mountains Predictive Services Area for calculation of the **Energy Release Component** (**ERC)**. Description of fuel models used for the National Fire Danger Rating System's ERC's can be found at (NWCG 2009): https://fam.nwcg.gov/fam-web/helpdesk/wims/nfdr.htm

The description for Fuel Model G at the above-referenced website is:
"Fuel Model G is used for dense conifer stands where there is a heavy accumulation of litter and downed woody material. Such stands are typically overmature and may also be suffering insect, disease, wind, or ice damage -- natural events that

create a very heavy buildup of dead material on the forest floor. The duff and litter are deep and much of the woody material is more than 3 inches in diameter. The undergrowth is variable, but shrubs are usually restricted to openings. Types meant to be represented by Fuel Model G are Hemlock-Sitka spruce, Coast Douglas-fir, and windthrown or bug-killed stands of lodgepole pine and spruce."

FlamMap

The LANDFIRE 2019L (limited) dataset with the 2016 re-map was used for the primary inputs to the model; these data include disturbances through 2019.
See https://www.landfire.gov/index.php

Appendix C: Fire History and Severity

Table C 1 Larger wildfires in planning area in recent history, arranged by year with most area burned first (alphabetical within years).

Fire Name	Year	Total Acres	Acres in Salmon River Watershed
Fires with Majority or All of Area Burned in Salmon River Watershed			
Glasgow	1987	13,864	13,864
Hotelling	1987	16,647	16,647
St. Claire	1987	8,832	8,832
Yellow	1987	51,060	51,060
Specimen	1994	8,378	8,378
Hancock (Uncles Complex)	2006	21,866	21,866
Rush	2006	4,872	4,872
Somes (Orleans Complex)	2006	15,506	8,967
Uncles (Uncles Complex)	2006	3,832	3,832
Caribou	2008	13,126	13,126
Haypress (Ukonom Complex)	2008	13,665	13,509
Jake (Ukonom Complex)	2008	38,417	38,417
Merrill (Ukonom Complex)	2008	8,839	7,562
Butler	2013	22,445	22,401
Salmon Complex	2013	14,786	14,786

Fire Name	Year	Total Acres	Acres in Salmon River Watershed
Whites (July Complex)	2014	33,794	33,494
Island (Salmon August)	2017	1,594	1,594
Wallow (Salmon August)	2017	63,785	54,927
Haypress	2017	21,318	13,568
Fires with Majority of Area Burned Outside of Salmon River Watershed			
Megram	1999	125,072	4
Bake-Oven	2006	65,050	1,781
Panther	2008	44,497	5,311
Frying Pan (Happy Camp Complex)	2014	133,177	15,406
Red Salmon	2020	143,840	38,117

*Table C 2 Acres in each MTBS Fire Severity category listed by MTBS fire perimeter name. *The MTBS-assigned fire name often does not correspond to the more commonly used Incident Name in the multi-agency-contribution FRAP data. See Table C3 for crosswalk.*

	MTBS Fire Severity				
***MTBS Fire Name**	**High**	**Low**	**Moderate**	**Unburned to Low**	**Grand Total**
BEAR WALLOW COMPLEX (ANTHONY MILNE)	166	564	273	1,157	2,172
BEAR WALLOW COMPLEX (CARIBOU)	1,825	3,736	2,419	4,007	11,990
BEAR WALLOW COMPLEX (UKONOM)	6,126	11,852	9,557	12,228	39,985
BURNEY	119	744	443	215	1,523
BUTLER	3,724	10,544	7,035	2,626	23,942
CHINA	2	19	15	27	64
GLASGOW	2,434	4,775	3,061	3,171	13,481
HANCOCK	2,113	9,554	4,677	6,912	23,275
HAYPRESS	100	7,852	2,308	3,503	13,771
HOTELLING	1,336	8,652	3,354	4,206	17,595
ISLAND	5,191	25,833	14,983	7,729	53,738
KING TITUS	0	3	1	19	23
MAN	3,915	6,167	3,561	2,204	15,850
NIELON	404	479	320	346	1,549
ORLEANS COMPLEX	522	4,670	1,077	3,060	9,337
PANTHER	5,044	11,889	5,748	5,255	27,999
PIGEON	114	503	239	637	1,496
RUSH	508	2,442	1,157	1,167	5,276
SALMON RIVER COMPLEX	3,152	5,935	4,663	1,184	14,942
SPECIMEN	2,083	1,809	1,410	1,826	7,146
ST.CLAIRE	233	3,692	1,172	3,438	8,537
UNCLES COMPLEX	899	1,079	880	916	3,788
UNNAMED	9	860	47	415	1,331
WHITES	9,929	10,597	7,296	6,120	33,961
WOOLEY	266	1,184	400	1,383	3,234
YELLOW 2	2,926	23,186	8,619	18,435	53,568

Table C 3 Crosswalk from MTBS-assigned names to normal Incident Names.

MTBS Incident Name	Incident Name	Year
BEAR WALLOW COMPLEX (ANTHONY MILNE)	ANTHONY MILNE	2008
BEAR WALLOW COMPLEX (CARIBOU)	CARIBOU	2008
BEAR WALLOW COMPLEX (UKONOM)	JAKE	2008
BURNEY	BURNEY	2017
BUTLER	BUTLER	2013
CHINA	CHINA	1987
GLASGOW	GLASGOW	1987
HANCOCK	HANCOCK	2006
HAYPRESS	HAYPRESS	2017
HOTELLING	HOTELLING	1987
IRON AND ALPS COMPLEXES (CAREY)	CAREY-Iron Complex	2008
ISLAND	WALLOW, ISLAND; SALMON AUGUST COMPLEX	2017
KING TITUS	KING TITUS	1987
MAN	FRYING PAN	2014
NIELON	NIELON	1987
ORLEANS COMPLEX	SOMES	2006
PANTHER	PANTHER, HAYPRESS, MERRILL	2008
PIGEON	PIGEON, BAKE OVEN	2006
RUSH	RUSH	2006
SALMON RIVER COMPLEX	SALMON COMPLEX	2013
SPECIMEN	SPECIMEN	1994
ST.CLAIRE	SAINT CLAIRE	1987
UNCLES COMPLEX	UNCLES	2006
UNNAMED	UNNAMED	2017
WHITES	WHITES	2014
WOOLEY	WOOLEY	2005
YELLOW 2	YELLOW	1987

Table C 4 Percentage of area burned by (MTBS) fire severity categories in the 1987 Yellow Fire and subsequent overlapping fires, within the portions of the Yellow Fire footprint that were re-burned in the 2008 Jake Fire and the 2013 Salmon Complex.

	Overlapping Area – 1987 Yellow Fire and 2008 Jake Fire (4,574 acres of overlap)		**Overlapping Area – 1987 Yellow Fire and 2013 Salmon Complex (7,293 acres of overlap)**	
Fire Severity	Yellow Fire	Jake Fire	Yellow Fire	Salmon Complex
Unburned to Low	23.9%	17.7%	21.2%	4.6%
Low	40.7%	26.2%	41.5%	31.5%
Moderate	27.7%	32.5%	28.5%	37.8%
High	7.5%	23.2%	7.8%	26.1%

Appendix D - Defensible Space and Home Hardening, Public Resource Codes

Defensible Space Information

Content from:
https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/defensible-space/

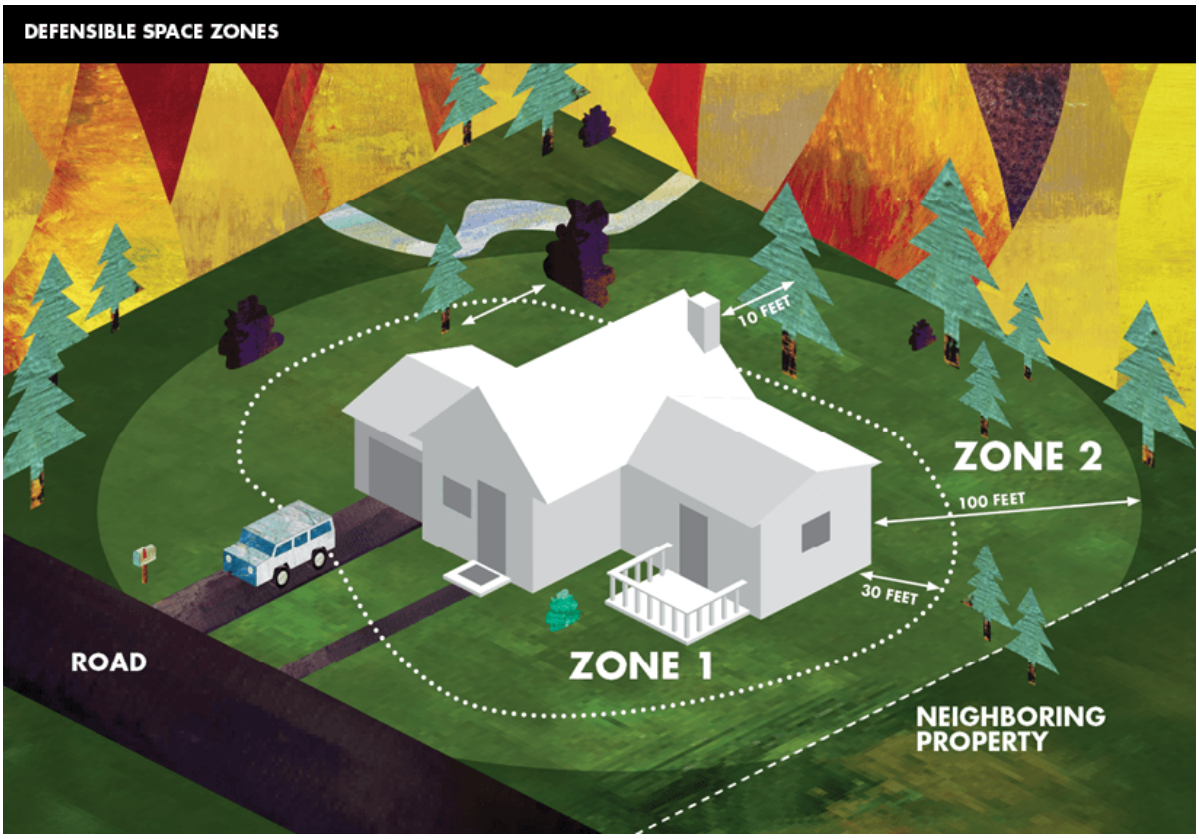
MAINTAIN DEFENSIBLE SPACE

Keep your property lean and green to help protect your family and home.

Defensible space is essential to improve your home's chance of surviving a wildfire. It's the buffer you create between a building on your property and the grass, trees, shrubs, or any wildland area that surround it. This space is needed to slow or stop the spread of wildfire and it helps protect your home from catching fire—either from direct flame contact or radiant heat. Defensible space is also important for the protection of the firefighters defending your home.

Defensible Space Zones

Two zones make up the required 100 feet of defensible space.



Zone 1

Zone 1 extends 30 feet* from buildings, structures, decks, etc.

- Remove all dead plants, grass and weeds (vegetation).
- Remove dead or dry leaves and pine needles from your yard, roof and rain gutters.
- Remove branches that hang over your roof and keep dead branches 10 feet away from your chimney.
- Trim trees regularly to keep branches a minimum of 10 feet from other trees.
- Relocate wood piles to Zone 2.
- Remove or prune flammable plants and shrubs near windows.
- Remove vegetation and items that could catch fire from around and under decks.
- Create a separation between trees, shrubs and items that could catch fire, such as patio furniture, wood piles, swing sets, etc.

Zone 2

Zone 2 extends 100 feet out from buildings, structures, decks, etc.

- Cut or mow annual grass down to a maximum height of 4 inches.
- Create horizontal space between shrubs and trees. (See diagram)
- Create vertical space between grass, shrubs and trees. (See diagram)
- Remove fallen leaves, needles, twigs, bark, cones, and small branches. However, they may be permitted to a depth of 3 inches.

* San Diego County requires 50 feet of clearance in Zone 1. Check with your local fire department for any additional defensible space or weed abatement ordinances.

Plant and Tree Spacing

The spacing between grass, shrubs, and trees is crucial to reduce the spread of wildfires. The spacing needed is determined by the type and size of brush and trees, as well as the slope of the land. For example, a property on a steep slope with larger vegetation requires greater spacing between trees and shrubs than a level property that has small, sparse vegetation.

Vertical Spacing

Remove all tree branches at least 6 feet from the ground.

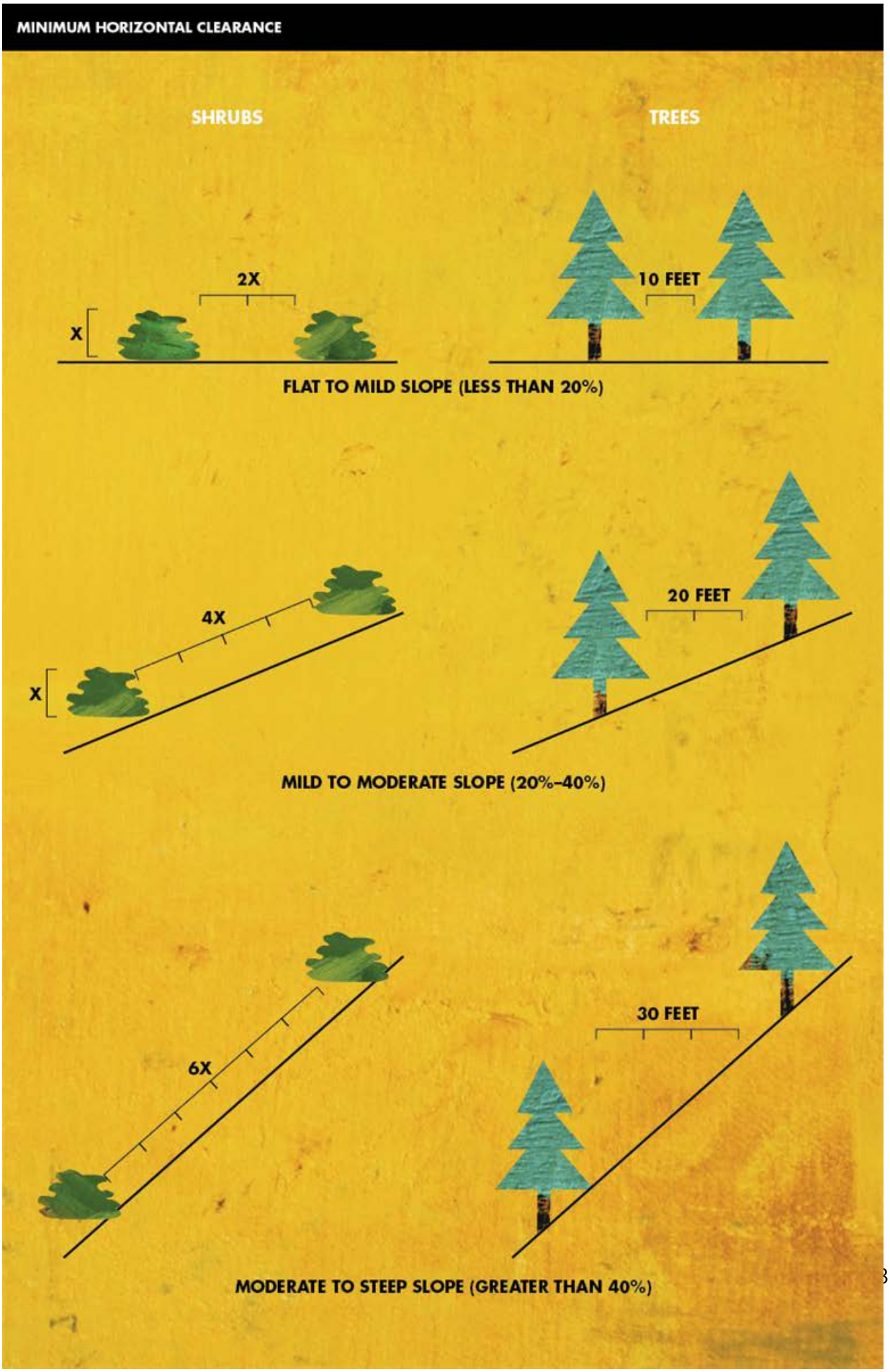
Allow extra vertical space between shrubs and trees. Lack of vertical space can allow a fire to move from the ground to the brush to the treetops like a ladder.

To determine the proper vertical spacing between shrubs and the lowest branches of trees, use the formula below.

Example: A five-foot shrub is growing near a tree. 3×5 = 15 feet of clearance needed between the top of the shrub and the lowest tree branch.

Horizontal Spacing

Horizontal spacing depends on the slope of the land and the height of the shrubs or trees. Check the chart below to determine spacing distance.


MINIMUM HORIZONTAL CLEARANCE
SHRUBS
TREES
2X
X
10 FEET
FLAT TO MILD SLOPE (LESS THAN 20%)
4X
X
20 FEET
MILD TO MODERATE SLOPE (20%–40%)
6X
30 FEET
MODERATE TO STEEP SLOPE (GREATER THAN 40%)

Fire-Resistant Landscaping

Fire-resistant landscaping isn't necessarily the same thing as a well-maintained yard. This type of landscaping uses fire-resistant plants that are strategically planted to resist the spread of fire to your home.

The good news is that you don't need to spend a lot of money to make your landscape fire-resistant. And fire-resistant landscaping can increase your property value and conserve water while beautifying your home.

Home Hardening Information

Content below is from:
https://www.readyforwildfire.org/prepare-for-wildfire/get-ready/hardening-your-home/

HARDENING YOUR HOME

Prepare for wildfire and harden your home now. There are three ways your home can be exposed to wildfire: direct flames from a wildfire or burning neighboring home; radiant heat from nearby burning plants or structures; and flying embers. Flying embers from a wildfire can destroy homes up to a mile away and are responsible for the destruction of most homes during a wildfire.

Taking the necessary measures to harden (prepare) your home can help increase its likelihood of survival when wildfire strikes.

Here are ways you can harden your home and make it more fire resistant.
Ways to Begin Retrofits to Your Home
10 Low-cost Retrofit List
Wildfire Home Retrofit Guide
Take our Wildfire Survey to get a custom checklist

Roof

The roof is the most vulnerable part of your home. Homes with wood or shingle roofs are at high risk of being destroyed during a wildfire.
Build your roof or re-roof with materials such as composition, metal, clay or tile. Block any spaces between roof decking and covering to prevent embers from catching.
Remove accumulated vegetative debris from the roof.

Vents

Vents on homes create openings for flying embers.

Cover all vent openings with 1/16-inch to 1/8-inch metal mesh. Do not use fiberglass or plastic mesh because they can melt and burn.
Use Ember and flame resistant vents (WUI vents).

Eaves and Soffits

Eaves should be boxed in (soffited-eave design) and protected with ignition-resistant* or non-combustible materials.

Windows

Heat from a wildfire can cause windows to break even before the home is on fire. This allows burning embers to enter and start fires inside. Single-paned and large windows are particularly vulnerable.
Install dual-paned windows with one pane of tempered glass to reduce the chance of breakage in a fire.
Consider limiting the size and number of windows that face large areas of vegetation.
Install screens in all usable windows to increase ember resistance and decrease radiant heat exposure

Walls

Wood products, such as boards, panels or shingles, are common siding materials. However, they are flammable and not good choices for fire-prone areas.
Build or remodel your walls with ignition resistant* building materials, such as stucco, fiber cement wall siding, fire retardant, treated wood, or other approved materials. This is especially important when neighboring homes are within 30-feet of the home.
Be sure to extend materials from the foundation to the roof.
Smaller spaces, such as the roof-to-wall area, should have their siding replaced with a noncombustible material.

Decks

Surfaces within 10 feet of the building should be built with ignition-resistant*, non-combustible, or other approved materials.
Create an ember-resistant zone around and under all decks and make sure that all combustible items are removed from underneath your deck.
If a deck overhangs a slope, create and maintain defensible space downslope from the deck to reduce the chances of flames reaching the underside of the deck.

Rain Gutters

Keep rain gutters clear or enclose rain gutters to prevent accumulation of plant debris.
Install a corrosion-resistant and noncombustible metal drip edge for additional protection of the combustible components on your roof's edge.
Use a noncombustible gutter cover to prevent buildup of debris and vegetation in the gutter

Patio Cover

Use the same ignition-resistant* materials for patio coverings as a roof.

Chimney

Cover your chimney and stovepipe outlets with a non-flammable screen. Use metal screen material with openings no smaller than 3/8-inch and no larger than 1/2-inch to prevent embers from escaping and igniting a fire.

Close the fireplace flue during fire season when the chimney is not being used.

Garage

Have a fire extinguisher and tools such as a shovel, rake, bucket, and hose available for fire emergencies.

Add a battery back-up to the garage door motor so that the garage can easily be operated if power is out.

Install weather stripping around and under the garage door to prevent embers from blowing in.

Store all combustible and flammable liquids away from ignition sources.

Treat windows and vents in the garage the same way as if it was a part of the house.

Fences

Best practice is to separate your fence from your house or upgrade the last 5-feet of the fence to a noncombustible material to reduce the chance of the fence from bringing fire to your home.

Driveways and Access Roads

Driveways should be built and maintained in accordance with state and local codes to allow fire and emergency vehicles to reach your home. Consider maintaining access roads with a minimum of 10 feet of clearance on either side, allowing for two-way traffic.

Ensure that all gates open inward and are wide enough to accommodate emergency equipment.

Trim trees and shrubs overhanging the road to allow emergency vehicles to pass.

Address

Make sure your address is clearly visible from the road.

Water Supply

Consider having multiple garden hoses that are long enough to reach all areas of your home and other structures on your property. If you have a pool or well, consider getting a pump.

Useful Links

Fire Information Engine—Preparing Your Home

University of California—Fire Resources and Information

*Ignition-resistant building materials are those that resist ignition or sustained burning when exposed to embers and small flames from wildfires. Examples of ignition-resistant materials include “non-combustible materials” that don’t burn, exterior grade fire-retardant-treated wood lumber, fire-retardant-treated wood shakes and shingles listed by the State Fire Marshal (SFM) and any material that has been tested in accordance with SFM Standard 12-7A-5.

TIPS AND RESOURCES

Plan for evacuation:
Develop a plan with your family and neighbors for you and your pets. Prepare go-bags.

Fire tools:
Keep a stash of tools to help respond quickly to a wildfire and to help create and maintain your defensible space.

Water sources:
Have water available and easy to find for fire personnel. Place a blue reflector near your tank and on the road to help in location.

For more information visit:

- Ucanr.edu/sites/fire/Prepare/Building/
- Humboldtgov.org/firesafecouncil
- Humboldtgov.org/FireSafetyResources
- Readyforwildfire.org

SPONSORS AND THANKS

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PREPARING YOUR HOME FOR WILDFIRE

KEY TIPS FOR THE RURAL LANDSCAPE

DEFENSIBLE SPACE
WHAT DO YOU REALLY NEED?

Zone 0 0-5'

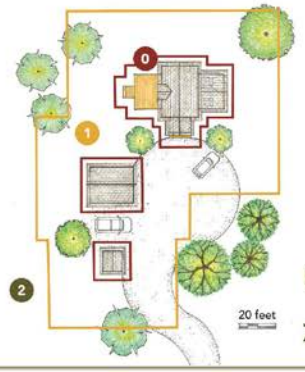
Remove combustibles (woody plants, mulch, and stored items) surrounding any structure and under and around attached decks. Cut grass or install hardscaping.

Zone 1 5-30'

Eliminate the connectivity between islands of vegetation by increasing the spacing between trees, removing lower branches of trees and shrubs, and creating areas of irrigated and mowed grass or hardscape between lush vegetation islands. Plants should be properly irrigated and maintained to remove dead/dry material.

Zone 2 30-100'

Reduce the density of the trees, shrubs, plants, and grasses to slow fire spread and reduce flame heights. Keep shrubs and trees well-spaced and pruned to eliminate fuel ladders, where fire can climb from the ground to the tops of the vegetation.



KNOW YOUR ZONES

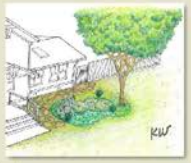
HOME PROTECTION GUIDANCE

You can significantly improve the chances that your home will survive a future wildfire through material choices, design and installation options, and regular maintenance.

Fire-resistant construction relies on awareness of small details that can make your home vulnerable to embers, in addition to building with appropriate materials, and regular home and property maintenance. Key ideas include:

Keep gutters clean: Embers ignite debris in gutters that can result in flames bypassing the roofing. A piece of flashing called a metal drip edge, can block flame penetration at roof edge. A noncombustible gutter guard can be helpful.

Implement 0-5: The proper placement and maintenance of plants around the home is essential. Any plant will burn under the right conditions. Keep vegetation away from the first 5 feet of the home.



Be aware of slopes: Fire easily moves up slope. Reduce vegetation down slope of the home. Site new construction away from the slope.

PREPARING YOUR HOME FOR WILDFIRE

Key Elements of Wildfire Resistance

Roof: Is the roof Class A fire-rated? If not, upgrade. Inspect for wear and tear. Clean off debris.

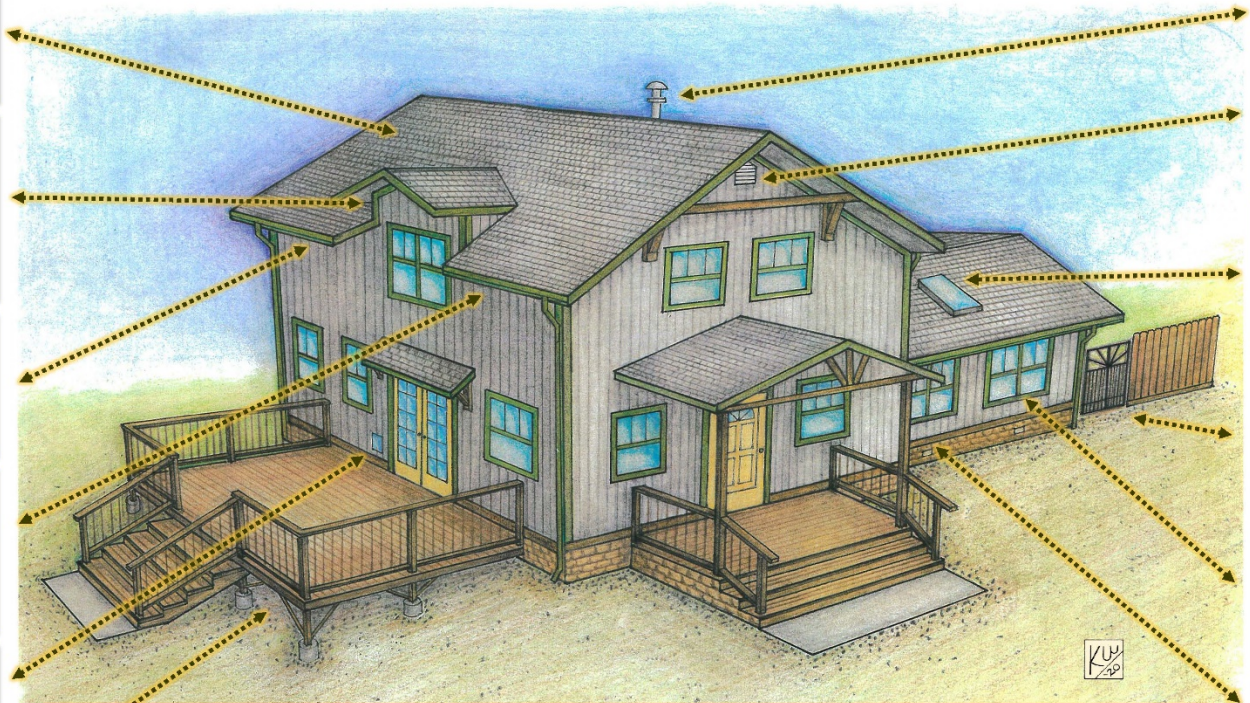
Roof-to-wall intersections: Keep these locations free of debris. Flash and upgrade combustible siding in these locations to enhance fire resistance.

Roof edges: Are gutters free of leaves? Install noncombustible gutter guards. Confirm that the roof edge has a metal drip flashing.

Eaves: Is there open-eave framing? Consider converting to a boxed-in design. Are there vents in the eaves? Upgrade to 1/8" metal mesh screening.

Pet doors: Close all openings when wildfire is near to prevent ember entry.

Decks: Remove all combustibles around and under decks. Regularly clean debris between deck boards.



Chimney: Install spark arrestors (metal 1/2").

Vents: Roof, wall, and foundation vents should be covered with 1/8" metal mesh. Or upgrade to "ember and flame" resistant vents.

Skylights: Remove accumulated debris. Upgrade to flat, tempered glass design. Close opening skylights when wildfire is near.

Fences: To prevent fire from burning to the house, replace the 5 feet of wood fencing that connects to the house with a noncombustible option or metal gate.

Windows: Replace single-pane windows. Where buildings are within 30 feet, upgrade these windows to tempered glass.

Siding: To keep flames from touching the house, maintain a 5-foot noncombustible zone and incorporate 6 inches of vertical noncombustible clearance from the ground to the siding.

WHAT YOU NEED TO KNOW & WHERE TO START

Every homeowner needs to prepare for wind-blown ember, direct flame contact, and radiant heat exposures for all buildings. If a woodshed, shop, or garage is <30 feet from the home, radiant heat exposures are likely.

Embers cause the majority of wildfire home ignitions. Embers can directly ignite the home. They can also ignite vegetation or materials on or near your home resulting in flames touching your house or breaking window glass through a high or radiant heat exposure.

Prioritize the roof, vents, and creating a five-foot perimeter of defensible space. Hardening a home to wildfire exposure does not have to be costly, but it does require an understanding of the fire exposures that may impact your home.

Appendix E: Standardized Recommended Treatment Summary

Table E 1 Estimated area and associated cost for each priority category for standardized treatment areas. CF = correction factor, based on estimate of actual portion of general area requiring treatment/feasible to treat.

Priority	Location - Treatment	Jurisdiction	Acres by Jurisdiction	Total Acres	Cost per Acre	CF	Cost by Jurisdiction	Total Cost
1a	HIZ – to 200 feet from structures	Private	802	1,163	$1,800	0.75	$1,082,700	**$1,570,050**
		USFS	361			0.75	$487,350	
		Wilderness	94					
1b	Primary Access Roads and Trails – 150 feet either side	Private	832	7,824	$1,700	1	$1,414,400	**$13,300,800**
		USFS	6,992			1	$11,886,400	
		Wilderness	804					
1c	Expanded HIZ – 200 to 500 feet from structures	Private	746	1,987	$1,700	0.8	$1,014,560	**$2,702,320**
		USFS	1,241			0.8	$1,687,760	
		Wilderness	227					
Total Priority 1		Private	**2,380**	**10,974**			**$3,511,660**	**$17,573,170**
		USFS	**8,594**				**$14,061,510**	
		Wilderness	**1,125**					
2a	Greenline – 500 feet outside of private property boundaries	USFS	4,323	4,323	$1,800	0.9	$7,003,260	**$7,003,260**
		Wilderness	1,020					
2b	Recreation Access Roads – 150 feet either side	USFS	3,012	3,012	$1,700	1	$5,120,400	**$5,120,400**
		Wilderness	9.9					
Total Priority 2		USFS	**7,335**	**7,335**			**$12,123,660**	**$12,123,660**
		Wilderness	**1,030**					
Total Priorities 1-2		Private	*2,380*	*18,309*			*$3,511,660*	*$29,696,830*
		USFS	*15,929*				*$26,185,170*	

Priority	Location - Treatment	Jurisdiction	Acres by Jurisdiction	Total Acres	Cost per Acre	CF	Cost by Jurisdiction	Total Cost
		Wilderness	*2,155*					
3a	Firefighting Access Roads – 50 feet either side	Private	11	1,991	$1,600	0.9	$15,840	**$2,867,040**
		USFS	1,980		$1,600	0.9	$2,851,200	
3b	Strategic Ridges (some with existing firelines) – 330 feet either side	Private	91	16,218	$1,800	1	$163,800	**$29,192,400**
		USFS	16,127		$1,800	1	$29,028,600	
		Wilderness	3,672					
Total Priority 3		Private	**102**	**18,209**			**$179,640**	**$32,059,440**
		USFS	**18,107**				**$31,879,800**	
		Wilderness	**3,672**					
Total Priorities 1-3		Private	*2,482*	*36,518*			*$3,691,300*	*$61,756,270*
		USFS	*34,036*				*$58,064,970*	
		Wilderness	*5,827*					
4	Secondary Access Roads and Trails – 150 feet either side	Private	1	469	$1,700	1	$1,700	$797,300
		USFS	468		$1,700	1	$795,600	
Total Priorities 1-4		Private	*2,483*	*36,987*			*$3,693,000*	*$62,553,570*
		USFS	*34,504*				*$58,860,570*	
5	15- to 50-Year-Old Plantations Contiguous with other Priority Areas	USFS	17,655	17,655	$1,700	0.9	$27,012,150	$27,012,150
Total Priorities 1-5		Private	*2,483*	*54,642*			*$3,693,000*	*$89,565,720*
		USFS	*52,159*				*$85,872,720*	
		Wilderness	*5,827*					

Appendix F: River Access Points

StreamName	Name	RaftAccess	Class	RoadNum	Notes	Latitude	Longitude
North Fork Salmon River	Mule Bridge	No	Primary		Put-in for Mule Bridge upstream extension of Idlewild Run.	41.35657147	-123.0743849
North Fork Salmon River	Idlewild	Difficult	Primary		Put-in for Idlewild Run. Trail brushed out May 2017.	41.3297845	-123.0588114
North Fork Salmon River	Trooks Flat	Yes	Secondary		Rarely used by paddlers.	41.29843002	-123.0800786
North Fork Salmon River	Sawyers Bar	Difficult	Primary		Take out for Idlewild Run. Put-in for Sawyers Bar Run. This is the only public access in Sawyers Bar. Needs signage.	41.3000547	-123.1383316
North Fork Salmon River	Jackass Gulch	Yes	Secondary		Rarely used by paddlers.	41.30237106	-123.159392
North Fork Salmon River	Kelly Bar	Yes	Secondary		Upriver put-in option for NF Canyon Run.	41.31551352	-123.1687974
North Fork Salmon River	Gallia	Yes	Primary		Put-in for NF Canyon Run. Engine Fill Site sign at Sawyers Bar Road, just upriver of 10 mile marker.	41.31318572	-123.1905595
North Fork Salmon River	Red Bank	Yes	Secondary	54D007	Rarely used by paddlers.	41.29921818	-123.2271223
North Fork Salmon River	Saw Pit Flat	Yes	Primary		Upstream take-out for NF Canyon Run.	41.2777308	-123.2677489
North Fork Salmon River	Schwartz's	Yes	Secondary		Last take-out before Indian Point Gorge (V). Landmark is suspension footbridge & buildings.	41.27278775	-123.2866121
North Fork Salmon River	Wild Mile	No	Secondary	54D009	Rocky put-in area	41.26786079	-123.3049288
North Fork Salmon River	Bonally Mine	Yes	Secondary	54D009A	Rarely used by paddlers.	41.26472853	-123.3083254
North Fork Salmon River	Forks of Salmon Park	Yes	Primary	1C01	Take out for NF Canyon Run.	41.25851143	-123.3212068
South Fork Salmon River	South Fork Gorge	Yes	Primary		Put-in for South Fork Gorge Run.	41.14264314	-123.1841964
South Fork Salmon River	Matthews Creek	Yes	Primary		Take-out for SF Gorge Run. Requires carrying to parking area. Alternative is upsteam in Matthews Creek CG.	41.18818873	-123.2174096
South Fork Salmon River	Methodist Creek	Yes	Primary		Put-in for Methodist Run.	41.22242983	-123.2497474
South Fork Salmon River	Windy Bridge	No	Secondary		Rarely used by paddlers.	41.23231619	-123.259987
South Fork Salmon River	Hotelling	No	Secondary		Rarely used by paddlers.	41.23983169	-123.2737573
Salmon River	Forks of Salmon	Yes	Primary		Take out for Methodist Run on South Fork, NF Canyon Run, put-in for Forks to Nordheimer Run.	41.25761277	-123.3294407
Salmon River	Quail Flat	No	Secondary	54D010	Rarely used by paddlers.	41.28338924	-123.3575776
Salmon River	Nordheimer	Yes	Primary		Follow road thru Nordheimer Campground to reach river bar. Short carry to water. Road in bad shape.	41.29731567	-123.3594839
Salmon River	Bloomer Falls	No	Secondary		Difficult access to eddy above Bloomer Falls as alternate put-in.	41.30646517	-123.3728745
Salmon River	Cascade Falls	No	Secondary		Trail access to river left at Cascade Falls. Trail not frequently maintained and gets muddy near bottom.	41.33938745	-123.3777208
Salmon River	Indian Bottom	Yes	Secondary		Rarely used by paddlers.	41.34160696	-123.3834501
Salmon River	Grant Creek	No	Secondary		Last access point before Last Chance (IV+) and Freight Train (V) rapids.	41.33564381	-123.39547
Salmon River	Butler Kayak Access	No	Secondary		Easier access point for kayaks than official Butler Creek access point.	41.33615752	-123.4055698
Salmon River	Butler Creek	Yes	Primary		Awkward location at mouth of Butler Creek: large boulder bar often blocks access into/out of river channel.	41.33687444	-123.4083838
Salmon River	Inga's	No	Secondary		Access point for take out after running first mile of Butler Run.	41.34854777	-123.4065768
Salmon River	Grubstake	No	Secondary		Gate permanently closed on access road. Must hike to river. No good parking available.	41.36591211	-123.4135273
Salmon River	Brannon Bar	Yes	Primary		Take out for Butler Run. Put-in for Lower Salmon Run.	41.37367376	-123.4317579
Salmon River	Oak Bottom	Yes	Secondary		Easy access to river for rafts; used as alternate take-out for Brannon Bar by rafters, surf wave access for kayakers.	41.37430603	-123.4549633
Salmon River	George Geary	Yes	Secondary		Rarely used by paddlers.	41.3786374	-123.4633984
Salmon River	Blue Hole	No	Secondary		Uncommonly used by paddlers.	41.37917443	-123.4716978
Klamath River	Ishi Pishi	Yes	Primary		Take out for Lower Salmon River Run. Karuk ceremonial site.	41.37705511	-123.493814