

Regional District of Central Kootenay Area H North and Villages of Silverton and New Denver Community Wildfire Protection Plan

September 10, 2019
Revised December 15, 2020



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This Community Wildfire Protection Plan was prepared following the Strategic Wildfire Prevention Initiative 2017 Community Wildfire Protection Plan Template, January 23, 2018 version.

Acknowledgments

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The authors would like to thank the following for their input, assistance and expert knowledge that went into developing the Regional District of Central Kootenay Area H North Community Wildfire Protection Plan:

- Richard Allin, Hills Volunteer Fire Brigade
- Leonard Casley, Mayor of New Denver; and New Denver and Area Fire Chief
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- Michelle West, GIS Technician, Regional District of Central Kootenay

Funding for this CWPP was provided by the Union of BC Municipalities, the Slocan Integral Forestry Cooperative, the Regional District of Central Kootenay, the Village of Silverton and the Village of New Denver.

Executive Summary

In 2017, the Slocan Integral Forestry Cooperative (SIFCo) was retained by the Regional District of Central Kootenay (RDCK) - with support from the Villages of New Denver, Silverton, and Slocan - to create a Community Wildfire Protection Plan for Electoral Area H. Due to the large geographic area, diverse ecosystems, and abundance of communities throughout the Slocan Valley, two CWPPs were developed: Area H North and Area H South.

The Area of Interest for this CWPP encompasses the Villages of New Denver and Silverton, and the communities of the Regional District Central Kootenay Electoral Area H North. Following the Strategic Wildfire Prevention Initiative 2017 Community Wildfire Protection Plan Template, January 23, 2018 version, and the 2013 Wildland Urban Interface Wildfire Threat Assessment Guide, wildfire threat was determined through a combination of field reconnaissance and spatial data analysis. Results from the wildfire threat analysis indicate that there is a high threat of wildfire throughout the North Slocan Valley.

Through a combination of strategically located fuel treatments, FireSmart activities, and emergency planning and preparedness, the wildfire risk facing the communities of New Denver, Silverton, and Area H North can be mitigated. Thirty-four recommendations included in this report aim to reduce the likelihood of a wildfire entering the community; reduce impacts and losses to property, critical infrastructure, and values; and reduce negative economic and social impacts to the community as a result of a wildfire.

Summary of CWPP Recommendations

Table 1: Summary of CWPP Recommendations

Number	Recommendation	Responsibility /Funding Source
Objective: To incorporate wildfire risks into local government policies, bylaws and plans		
1	<p>Ensure that existing and future planning documents, policies and bylaws consider wildfire risks, evacuation routes, and emergency response. This includes:</p> <ul style="list-style-type: none"> • Reviewing OCPs and bylaws to evaluate their effectiveness at mitigating wildfire risks. • Exploring the use of Development Permit Areas requiring FireSmart landscaping practices, fire resistant external construction materials, and vegetation/debris management in high fire hazard areas. • Exploring the use of a RDCK outdoor burning bylaw to restrict burning during high fire hazard. • Continuing current efforts to update and develop emergency planning documents - including emergency evacuation plans. 	RDCK, Villages of New Denver and Silverton, UBCM CRI Program
2	Consider undertaking additional landscape-level wildfire planning for areas outside of the WUI. A comprehensive landscape-level wildfire plan should complement existing CWPPs, evaluate wildfire threat, and identify strategic areas for fuel treatment outside of the WUI.	Forest Licensees, FESBC, RDCK, BC Parks
3	Review progress on fire mitigation efforts and update wildfire planning documents and CWPPs every 7 years.	RDCK / UBCM CRI Program
Objective: To increase wildfire mitigation efficiency through collaborative efforts		
4	Establish a Wildfire Preparedness Working Group for the Slokan Valley. The group should work to identify wildfire related issues, resource deficiencies, and opportunities for improvement. Potential Working Group representatives may include the RDCK, fire departments, licensees (Interfor, Kalesnikoff, SIFCo, NACFOR, BCTS and Woodlots); utilities (BC Hydro and Fortis); municipalities (New Denver, Silverton, Slokan); and government agencies (BC Parks, BCWS, MOTI, and FWCP).	UBCM CRI Program , Villages of New Denver and Silverton, New Denver VFD, Hills Fire Brigade, forest licensees, utility companies, BC Parks, BCWS, RDCK MOTI
5	Coordinate wildfire risk mitigation efforts with other agencies, organizations, and across Electoral Area boundaries. Coordinate mitigation efforts around the community of Summit Lake, Valhalla Park, and along highway right-of-ways.	RDCK, utility companies, BC Parks, forest licensees

Objective: To increase the resiliency of values at risk and critical infrastructure to potential wildfire damage		
6	Review, maintain and upgrade back-up power sources for critical infrastructure and emergency services. A review should identify any gaps in back-up power and recommend upgrades to existing power sources to meet potential extended outages.	Villages of New Denver and Silverton, New Denver VFD, UBCM CRI Program, RDCK
7	Prioritize fuel management treatments that protect electrical power, communications, transportation and water critical infrastructure. Review, prioritize, and implement fuel management treatments in areas identified in Table 19.	RDCK, utility companies and forest licensees, FESB, UBCM CRI Program
8	Coordinate with BC Hydro, and MOTI to conduct vegetation management and danger tree removal along distribution lines, transmission lines, and right of ways. Explore utilizing existing right of ways as landscape-level fuel breaks through an ongoing fuel treatment program.	RDCK, MOTI, and BC Hydro, UBCM CRI Program
9	Complete FireSmart and vulnerability assessments of critical infrastructure. Undertake any necessary corrective actions to meet FireSmart standards for critical infrastructure, local government buildings, and emergency services infrastructure.	UBCM CRI Program , RDCK, Villages of New Denver and Silverton, New Denver VFD
10	Identify areas likely to suffer post-fire terrain, water flow and stream channel stability issues. Create draft plans for post-fire stabilization work.	RDCK, forest licensees
Objective: To ensure values at risk are sufficiently considered during fuel management activities		
11	Carry out information sharing with First Nations during the fuel management prescription development process prior to any on the ground fuel management activities.	RDCK, Villages of New Denver and Silverton, consultants preparing prescriptions, UBCM CRI Program, FESBC, forest licensees
12	Carry out consultation with local communities during fuel management prescription development to ensure local concerns are addressed and to cultivate social licence to operate in the WUI.	RDCK, Villages of New Denver and Silverton, consultants preparing prescriptions, UBCM CRI Program, FESBC, forest licensees

13	<p>Incorporate multiple objectives into fuel treatment projects when possible. Fuel management activities can address forest health concerns, enhance wildlife habitat, rehabilitate low value stands, and utilize low value fibre. Where feasible, wildfire threat reduction should be combined with biodiversity and habitat enhancement prescribed by a qualified professional.</p>	<p>Forest licensees, RDCK, consultants preparing prescriptions, UBCM CRI Program, FESBC</p>
Objective: To garner community support for wildfire mitigation efforts		
14	<p>Undertake education and outreach with the goal of obtaining community support to implement CWPP recommendations. Consider:</p> <ul style="list-style-type: none"> • Making summaries of this report and associated maps publicly available through web pages, social media, and public FireSmart meetings. This includes posting this CWPP on the RDCK¹ and SIFCo websites². • Integrating this CWPP into existing and proposed FireSmart education and outreach initiatives – at both local and regional levels. • Distribute a CWPP summary package to households through bulk mail or newspaper insert. • Adding wildfire threat spatial data to the RDCK interactive web-map - allowing residents to view the threat of wildfire adjacent to their property. • Creating a position based in the Slokan Valley to implement CWPP recommendations and FireSmart programs. 	<p>RDCK, Villages of New Denver and Silverton, UBCM CRI Program, forest licensees</p>
Objective: To reduce wildfire threat through fuel treatment		
15	<p>Work with licensees (BCTS, Interfor NACFOR, SIFCo) and other partners (BC Hydro, MOTI, and FWCP) to implement fuel treatment as recommended in Table 19. Treatments should increase opportunities for fire suppression, including reducing fuel loads, improving firefighter access and treating areas that are continuous and anchored to strategic locations (such as water bodies, roads, or gravel pits) when possible. Consider funding streams provided by the CRI and Forest Enhancement Society of BC (FESBC).</p>	<p>RDCK, Villages of New Denver and Silverton, forest licensees, utility companies, consultants preparing prescriptions, UBCM CRI Program, FESBC, CBT</p>
16	<p>Continue to monitor previously treated areas and re-treat as required to maintain a moderate or low fire threat.</p>	<p>RDCK, UBCM CRI Program, FESBC, forest licensees</p>
Objective: To reduce wildfire risk through FireSmart programs		
17	<p>Maintain FireSmart programs throughout Area H and municipalities.</p>	<p>UBCM CRI</p>

¹ <http://www.rdck.ca/EN/main/services/emergency-management/community-wildfire-protection-plans.html>

² <https://www.sifco.ca/>

	Coordinate activities between the RDCK and municipalities to reduce program costs and increase efficiencies.	Program , RDCK and Villages of New Denver and Silverton
18	Review, select and implement activities from Table 20 as part of an ongoing FireSmart program. Activities include education and outreach, vegetation management, incorporating FireSmart into community planning and development, and increasing local capacity to defend against interface fires.	UBCM CRI Program , RDCK and Villages of New Denver and Silverton
19	Explore rebate programs to create incentives for FireSmart on private land. Continue to advance proposal that public funds should be invested in fuel management on private land that forms part of a strategic, landscape level fuel break.	UBCM CRI Program , FESBC, RDCK and Villages of New Denver and Silverton
20	Maintain sufficient signage at high-use recreational areas and completed fuel treatment sites. Signage should include fire danger ratings, information on fire prevention, emergency contact information, and evacuation procedures on trails. Explore opportunities to work with other agencies to maintain and increase fire prevention signage at trailheads, forestry roads, along the highway, and within communities.	RDCK, Villages of New Denver and Silverton, BCWS, MOTI, BC Parks, Rec Sites and Trails BC, community and recreation groups, UBCM CRI Program
21	Coordinate trail development and maintenance with wildfire mitigation efforts in high-risk areas. Information regarding trail development should be shared with response agencies and incorporated into evacuation and emergency response plans.	RDCK, Villages of New Denver and Silverton, BCWS, BC Parks, Rec Sites and Trails BC, community and recreation groups/UBCM CRI Program
Objective: To improve the efficiency of emergency evacuation, preparedness, and response		
22	Conduct a water availability assessment that considers: <ul style="list-style-type: none"> • An assessment of water sources, access points, and hydrants/standpipes for fire suppression needs. • A vulnerability assessment of water sources particularly to summer drought conditions and reliance on electrical power. • The identification of settlement areas that may have insufficient or unreliable water supplies. 	Villages of New Denver and Silverton, RDCK and New Denver VFD
23	Continue to identify and map alternate water sources for fire suppression. Create designated access points to natural water sources and ensure access	Villages of New Denver and

	points are clear and usable in the event of an emergency. If necessary, seek emergency access permission from landowners. Develop additional alternate and backup water sources as necessary.	Silverton, RDCK and New Denver VFD
24	<p>Develop a detailed evacuation plan for New Denver, Silverton and communities of Area H – including the west-shore of Slocan Lake. A detailed evacuation plan should consider:</p> <ul style="list-style-type: none"> • Maps of evacuation routes, safety zones, marshaling points, and Emergency Support Services Reception Centers. • Designating and communicating pre-determined primary and secondary evacuation routes. • A feasibility review of FSRs as alternate evacuation routes. • Agreements and contact information with local transportation (busses, rotary-wing, and boats). • A communications and traffic control plan to be implemented in the event of an evacuation. • Information on residents who cannot self-evacuate, and current phone lists. • Collaboration with other agencies. This should include working with BC Parks to develop an evacuation plan for the west-side of Slocan Lake and other high-use recreational areas. • Communicating a summary of the plan and the administration framework of the evacuation process to residents to reduce confusion and delay when an evacuation is implemented. 	Villages of New Denver and Silverton, RDCK and New Denver VFD, UBCM CRI Program
25	<p>Explore opportunities to address emergency access and evacuation constraints throughout the AOI. This should include:</p> <ul style="list-style-type: none"> • Connecting dead-end roads and ensuring new developments consider emergency access and evacuation routes. • Communicating access constraints to homeowners and the implications on emergency response. • Exploring opportunities to coordinate with Fortis BC, BC Hydro, and Ministry of Transportation and Infrastructure to create/maintain fuel breaks adjacent to roads, highways, and bridges. 	RDCK, Villages of New Denver and Silverton, and New Denver VFD
26	<p>Continue to collect data on firefighting resources. Develop and maintain a wildfire suppression data set for use by BCWS and Fire Departments, including</p> <ul style="list-style-type: none"> • Firefighting resources • Current access roads and trails • Old overgrown roads • Access blockages (washouts, bridge failures) • LiDAR terrain data • Water access points • Critical infrastructure 	Villages of New Denver and Silverton, RDCK, New Denver VFD, UBCM CRI Program,
27	Consider installing satellite internet service equipment with generator at fire halls to provide redundant backup communications abilities if conventional	RDCK, Villages of New Denver

	communications systems are impacted by wildfire activity.	and Silverton
28	As part of a FireSmart program, encourage members of the public to develop personal evacuation plans. This may include: <ul style="list-style-type: none"> • Registering with the RDCK's Emergency Notification System • Notifying friends and family of evacuations • Pre-identifying evacuation routes and accommodations outside of the valley • Ensuring vehicles are regularly fueled • Developing a readily available evacuation kit with cash, medication, food, water and other necessities 	UBCM CRI Program
Objective: To increase local capacity to respond to wildfires		
29	Incorporate volunteer firefighter recruitment into FireSmart education and outreach initiatives.	RDCK, Villages of New Denver and Silverton, New Denver VFD, Hills Volunteer Fire Brigade, UBCM CRI Program
30	Explore funding opportunities to acquire community fire caddies (small trailer with water tank and pump) and water trucks where there are gaps in fire response coverage. Consider purchasing additional wildland specific firefighting equipment including two-stroke pumps (Wajax Mark 3 or similar) pump kits, and quick connect 1.5" wildland fire hose.	RDCK, Villages of New Denver and Silverton, New Denver VFD, Hills Volunteer Fire Brigade, UBCM CRI Program
31	Encourage cross-training between the RDCK Fire Departments and the BCWS. Explore opportunities for: annual mock fire exercises, Fire Operations in the Wildland/Urban Interface (S-215) training, Structure and Site Preparation (S-115) training, ICS, communications, and after action reviews of past interface fires.	Villages of New Denver and Silverton, RDCK, New Denver VFD, Hills Volunteer Fire Brigade, BCWS, UBCM CRI Program
32	Offer Basic Fire Suppression and Safety S-100 training for interested community members throughout Area H at a reduced rate or free of charge.	RDCK, Villages of New Denver and Silverton, New Denver VFD, UBCM CRI Program
33	Maintain RDCK SPUs and continue to acquire additional units. Continue SPU deployment training for firefighters and monitor SPU needs.	RDCK

34	Explore opportunities to assist homeowners and community groups to develop their own sprinkler kits. Consider coordinating initiatives with other municipalities and electoral areas to increase cost effectiveness.	RDCK, Villages of New Denver and Silverton, New Denver VFD, UBCM CRI Program
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Appendix 2 – Wildfire Threat Assessment Worksheets and Photos

Acronym Guide

AAC	Annual Allowable Cut
ALR	Agricultural Land Reserve
AOI	Area of Interest
BBC	Bonanza Biodiversity Corridor
BCTS	BC Timber Sales
BCWS	BC Wildfire Service
BEC	Biogeoclimatic Ecosystem Classification
CBT	Columbia Basin Trust
CFFDRS	Canadian Forest Fire Danger Rating System
CI	Critical Infrastructure
CRIP	Community Resiliency Investment Program
CWPP	Community Wildfire Protection Plan
DEM	Digital Elevation Model
ED	Euclidean Distance
EOC	Emergency Operation Centre
ESB	Emergency Services Building
ESSF	Engelmann Spruce Subalpine Fir
FBP	Canadian Forest Fire Behavior Prediction System
FESBC	Forest Enhancement Society of BC
FLNRORD	Forests, Lands, and Natural Resource Operations, and Rural Development
FPPR	Forest Planning and Practices Regulation
FRPA	Forest and Range Practices Act
FSP	Forest Stewardship Plans
FUS	Fire Underwriters Survey
FWCP	Fish and Wildlife Compensation Program
GAR	Government Actions Regulations

HFI	Head Fire Intensity
IA	Initial Attack
ICH	Interior Cedar Hemlock
ICS	Incident Command System
ISI	Initial Spread Index
KBHLP	The Kootenay Boundary Higher Level Plan
LLSWPP	Landscape Level Strategic Wildfire Protection Plan
NACFOR	Nakusp and Area Community Forest
NDT	Natural Disturbance Type
OCP	Official Community Plan
OFC	Office of the Fire Commissioner
OGMA	Old Growth Management Areas
PSTA	Provincial Strategic Threat Analysis
RDCK	Regional District of Central Kootenay
SIFCo	Slocan Integral Forestry Cooperative
SPP	Structural Protection Program
SPU	Structure Protection Unit
SWPI	Strategic Wildfire Prevention Initiative
TFL	Tree Farm Licence
TSA	Timber Supply Area
UBCM	Union of BC Municipalities
WDPA	Wildfire Development Permit Area
WTA	Wildfire Threat Assessment
WUI	Wildland Urban Interface

SECTION 1: Introduction

The 2017 and 2018 wildfire seasons were among the most devastating in British Columbia's history. In 2018, over 1.3 million hectares were burned - costing the province over \$350 million in direct suppression costs (Judd, 2018). Similarly, 2017 resulted in an estimated 1.2 million hectares burned and the displacement of roughly 65,000 people during the fire season (BC Wildfire Service, 2017). The unprecedented amount of fire activity resulted in a province-wide state of emergency lasting 70 days.

Both the 2017 and the 2018 fire seasons re-emphasized the need for communities to develop and implement Community Wildfire Protection Plans - a recommendation that first came to light in 2003. The 2003 fire season was extremely destructive - destroying over 334 houses and costing nearly \$700 million (Filmon, 2004). Firestorm 2003 – an extensive review of BC's wildfire preparedness, response, and planning process – was conducted shortly after the 2003 fire season. The Firestorm report highlighted the need for communities to undertake wildfire planning, prevention, and mitigation efforts.

In order to assist with such initiatives, Community Wildfire Protection Plans (CWPPs) have emerged as an important tool for communities wishing to reduce their wildfire risk. The purpose of a CWPP is to identify and evaluate high fire hazard areas, values at risk, and the possible consequences of a wildfire in and around the community. CWPPs also provide recommended actions to mitigate the fire hazard and reduce wildfire risk facing the community.

1.1 Purpose

In 2007, the Regional District of Central Kootenay (RDCK) retained B.A Blackwell and Associates to complete seven CWPPs for the communities of the Slocan Valley (including Crescent Valley, New Denver, Passmore, Silverton, Slocan, and Winlaw). Since the release of the 2008 reports, there have been significant changes to the landscape, the methods in which wildfire risk is assessed, and the CWPP reporting standards. In 2018, the process of updating the CWPPs for the Slocan Valley began. The Slocan Integral Forestry Cooperative (SIFCo) was retained on behalf of the RDCK to develop two new CWPPs– one for the North Slocan Valley (Electoral Area H North), and one for the South Slocan Valley (Electoral Area H South). The objectives of these reports are to:

1. To reassess the threat of wildfire facing the communities; including life, property, critical infrastructure, and high value areas.
2. To identify, evaluate, and recommend measures to effectively mitigate the risk of wildfire facing the communities.

The two complementary CWPPs for the Slocan Valley aim to facilitate a unified approach towards fire management and planning in the region. The recommendations made in the CWPPs intend to reduce the likelihood of a wildfire entering the community; reduce impacts and losses to property, critical infrastructure, and values; and reduce negative economic and social impacts to the community as a result of a wildfire (SWPI, 2018).

1.2 CWPP Planning Process

The CWPPs for Electoral Area H were developed using the Strategic Wildfire Prevention Initiative (SWPI) 2017 CWPP Template. CWPPs were developed in consultation with the RDCK, the Villages of New Denver, Silverton, and Slocan - following a six-stage planning process:

1.2.1 Information Sharing

Community meetings were held in Silverton, Winlaw, and Slocan Park in the spring of 2018. During the meetings, community members were provided with a description of the CWPP process, the purpose of the CWPP update, and were invited to respond with questions, concerns, and feedback.

Information packages were also sent to 17 First Nation groups³:

- Adams Lake Indian Band
- Akisqnuq First Nation
- Columbia Shuswap Regional District
- Ktunaxa Nation Council
- Lower Kootenay Band
- Lower Similkameen Indian Band
- Neskonlith Indian Band
- Okanagan Indian Band
- Okanagan Nation Alliance
- Osoyoos Indian Band
- Penticton Indian Band
- Shuswap Indian Band
- Splotsin First Nation
- St. Mary's Indian Band
- Tobacco Plains Indian Band
- Upper Nicola Indian Band
- Westbank First Nation

1.2.2 Consultation with Stakeholders and Experts

In February 2018, meetings were held with the five fire departments located in the Slocan Valley. Fire chiefs were asked to provide information on firefighting resources and equipment, and express any concerns regarding wildfire risk in their local communities. Additional consultation with the RDCK, BC Wildfire Service (BCWS), municipalities, and local fire departments was on-going throughout the CWPP development.

1.2.3 Review of Existing Plans, Reports and Spatial Data

Extensive background research set the context for the CWPP and study areas. Relevant plans, legislation, and reports were reviewed to ensure compatibility. Spatial data including the provincial fuel type data and Provincial Strategic Threat Analysis (PSTA) data were thoroughly reviewed. Spatial data pertaining to cultural, social, ecological, and economic values; as well as critical infrastructure data was also reviewed and updated as part of the CWPP development.

³ The AOI was assessed using the provincial Consultative Areas Database to determine First Nations with potential Aboriginal Interests in the area.

1.2.4 Field Review and Site Assessments

Field assessments were conducted in the summer of 2018 and early spring of 2019. Two-hundred and fourth seven Wildfire Threat Assessment plots were conducted throughout the entire Slocan Valley - primarily on high-threat areas determined by the PSTA data and local expertise.

1.2.5 Local Wildfire Threat Calculation and Mitigation Strategy Development

Wildfire threat was determined following the 2013 Threat Assessment Process using a combination of field assessments and GIS analysis. Spatial analysis, stakeholder and expert consultation, and local knowledge were used to prioritize and recommend actions to mitigate the wildfire risk.

1.2.6 CWPP Review and Finalization

A draft CWPP was reviewed by Regional District staff. Comments and feedback were considered and the CWPP draft was updated prior to finalization.

1.2.7 2020 Revisions

The following revisions were made in December 2020 to reflect comments received from BCWS:

1. Proposed treatment unit names in the spatial data submission were shortened to 7 characters maximum. The new shorter treatment unit name was added to the treatment unit descriptions in Table 19: Summary of Proposed Fuel Treatment Units.
2. Map 6 - Fuel Types was revised to use standard BCWS color themeing of fuel types. Also the area summary from Table 13: Area of FBP Fuel Types in the AOI was added to Map 6.
3. Map 7 - CWPP Wildfire Threat was revised to reflect changes in critical infrastructure mapping described above, and the information shown in Table 17: Area of Wildfire Behavior Threat and Table 18: Area of WUI Threat was added to Map 7.
4. Maps 1 and Map 8 were revised to show the new, 7 character proposed treatment unit names.
5. Maps 3 and 5 were also revised to use the slightly modified map layouts and symbolization developed during the above map revision work.

The Critical Infrastructure data set shown on Map 2 - Values at Risk was also reviewed and revised:

- several municipal water supply features in New Denver and Silverton were added
- domestic buried service electrical transformers were removed in two locations,
- several remote forest road bridges were removed
- a group of heritage structures and museums were removed from the Critical Infrastructure data set and added to the High Environmental and Cultural Values data set, which is also shown on Map 2.

SECTION 2: Local Area Description

The Slocan Valley is located in the West Kootenay Region of BC. The valley is bordered by the Valhalla Mountain Range - to the west - and the Selkirk Mountain Range - to the east. In the center of the valley, Slocan Lake feeds into the Slocan River - which runs south into the Kootenay River. The incorporated Villages of New Denver, Silverton, and Slocan are the three municipalities in the valley and are located along the shore of Slocan Lake. Eighteen unincorporated communities are also found throughout the valley and form the RDCK's Electoral Area H.

Together, the three municipalities of New Denver, Silverton and Slocan and the rural communities of Area H form the Area of Interest (AOI) for the 2019 CWPPs for the Slocan Valley.

Area H is bordered by the RDCK Electoral Area D to the north east, Area F to the south east, Area I to the south, Area J to the south west, and Area K to the north-west.

2.1 CWPP Area of Interest

Due to the large geographic area, diversity of ecosystems, and abundance of communities throughout the Slocan Valley, two CWPPs were developed in 2019 - Area H North, and Area H South.

The area of interest for Area H North builds off the previously completed CWPP study areas for New Denver and Silverton - further expanded to include nearby communities in the region, new infrastructure development, and other high-value areas. The AOI was derived using a 2km buffer around communities with a minimum density of 6 structures per square kilometer. This buffer is known as the Wildland Urban Interface (WUI) and is defined as the area "where combustible wildland fuels are found adjacent to homes, farm structures, and other outbuildings" (Partners in Protection, 2003). The AOI was reviewed to ensure that the majority of community and domestic watersheds in the area were included in the CWPP.

The AOI also includes two large areas on the west shore of Slocan Lake where the terrain is suitable for fuel management activities. These areas have high recreational value, and also may pose a threat to the settled east shore of the lake through ember showers in a high intensity fire event.

The Area H North CWPP includes the Village of New Denver, the Village of Silverton, and the unincorporated communities of Hills, Red Mountain, Roseberry, Sandon, and Summit Lake (Figure 1 – CWPP Area of Interest). The AOI encompasses a total area of 29,087 hectares - including municipal, regional, private, and Crown land and provincial parks (Table 2).

Table 2: AOI Land Ownership/Status

Ownership/Status	Area (hectares)	Percent of total AOI
Crown (Federal)	0.3	< 1%
Crown Provincial (outside of parks)	21,260.3	68%
Crown Provincial Parks	1,369.4	4%
Municipal	26.3	< 1%
Private	3,291.9	11%
Water	5,114.2	16%
Total:	31,062.4	100%

2.2 Community Description

The Slocan Valley has a rich history dating back thousands of years. The Sinixt Nation and the Ktunaxa Nation were among the original inhabitants of the area, while European settlement of the valley did not occur until fairly recently (RDCK, 2009). The discovery of silver and lead ore deposits in the 1890's brought waves of settlers to the Kootenays; particularly to the Slocan Valley. In order to support the mining boom, railways, trails, and steam ships were constructed - connecting communities throughout the region. Doukhobors from Russia immigrated to the valley in the early 1900's focusing on agriculture and forestry. By 1910, mining in the valley had decreased substantially forcing many communities to also turn to forestry and agriculture. Evidence of the once prosperous mining towns that were unable to adapt remain as ghost towns throughout the valley. In the 1940's Japanese Canadians were forced by the government to live in internment camps located in Lemon Creek, Slocan, New Denver, Sandon, and Rosebery during World War Two. Once the war ended, some of the Japanese Canadians remained in the valley. The 1960's and 70's, brought on a wave of young immigrants from the United States looking to escape the Vietnam War. Today, the Slocan Valley is composed of a diversity of residents as a result of its rich and colourful history.

There are three municipalities located the Slocan Valley - New Denver, Silvertown, and Slocan - which provide services including: road and sidewalk services, water services, cemetery services, and parks and recreational facilities. Curbside solid waste services are available in New Denver and Slocan. The RDCK maintains waste transfer stations in Rosebery and Slocan, as well as recycling stations in all three villages, Winlaw and Crescent Valley.

The Village of New Denver is located on the eastern shore of Slocan Lake, at the intersection of Highway 6 and Highway 31A. The municipality is 1.4 km² in size and was incorporated in 1929 (Village of New Denver, 2013). The Village is home to roughly 473 residents (Stats Canada, 2016), and contains several emergency services including a RCMP detachment, BC Ambulance station, and fire hall - home to the New Denver and Area Fire Department. The Slocan Community Health Centre – located in New Denver – provides emergency and non-emergency medical services for residents of the valley.

Five kilometers south of New Denver, on Highway 6, is the Village of Silverton. Incorporated in 1930, Silverton was once the smallest municipality in British Columbia in both size and population. Today, Silverton is home to 195 residents and covers an approximate area of 0.63 km² (Stats Canada, 2016).

Although not included in the AOI for this CWPP, the Village of Slocan is located approximately 28 km south of Silverton on Highway 6. It is the second largest municipality in the Slocan Valley, covering 0.92 km² with a population of roughly 272 residents (Stats Canada, 2016). The wildfire threat analysis and recommendations for the Village of Slocan are included in the 2019 CWPP for Area H South.

New Denver, Silverton, and Slocan are three of the nine member municipalities of the RDCK. The remaining unincorporated communities of the Slocan Valley are part of the RDCK Electoral Area H - one of the eleven electoral areas of the regional district. Area H covers 3,291 km² and is home to roughly 4,667 residents (Stats Canada, 2016). As the local government for Area H, the RDCK provides a number of services throughout the central Kootenays – servicing a population of nearly 60,000 people. Services provided by the RDCK can vary from a local to a regional level and are determined by the regional board with approval of the electors (RDCK, 2016). Services include emergency management, fire rescue, wildfire mitigation, waste and recycling, and water services.

Highway 6 runs down the center of the Slocan Valley and provides the main access route for the communities in the area. Outside of the AOI, the Village of Nakusp is located 15 km from Summit Lake - north on Highway 6. At the southern entrance to the valley - at Playmor Junction - Highway 6 continues east to Nelson (20 km), while Castlegar is located 22 km south on Highway 3A. The Slocan Valley can also be accessed by Highway 31A which connects New Denver to the Village of Kaslo (46 km east).

Forestry is a major economic driver in the Slocan Valley. The AOI is part of the Selkirk Natural Resource District, and located within parts of the Arrow Timber Supply Area (TSA) - which has an Annual Allowable Cut (AAC) of 500,000m³ (Nicholls, 2017). The AOI includes licensee operating areas for International Forest Products (Interfor) and BC Timber Sales (BCTS). The Slocan Integral Forestry Cooperative holds community forest agreement K2R in the central valley and operates as an incorporated non-profit cooperative. The Nakusp and Area Community Forest – owned by the Village of Nakusp - holds community forest agreement K2S within the northern portion of the AOI (near Summit Lake). The AOI also contains land not within the timber harvesting land base.

The valley is rich in arts, culture, and picturesque scenery – attracting tourists from the Pacific Northwest and from further afield. Visitors and locals alike enjoy the diversity of hiking, mountain biking, horseback riding, locally grown fruits and vegetables, and artisan crafts which can be found throughout the valley.

2.3 Past Wildfires, Evacuations and Impacts

There are records of several large wildfires throughout the valley - particularly near Summit Lake and the Village of Slocan in the early 1900's. Recent wildfires of note within the Slocan Valley include:

- 2007 Springer Creek Fire burned roughly 3,000 hectares along Highway 6 between Slocan and Enterprise Creek, 10 km south of Silverton. The fire resulted in an Evacuation Order and Alerts, closed Highway 6, and prompted the RDCK to declare a local state of emergency from August 1-6th.
- 2013 Perry Ridge Fire (64.5 hectares), 4.5 km west of Winlaw. On July 26, a tanker truck carrying aviation fuel to support firefighting efforts related to this fire rolled into Lemon Creek, spilling

approximately 35,000 litres of Jet A1 fuel. The spill resulted in the evacuation of roughly 2,500 people. Evacuees were directed to Castlegar, Nelson and Slocan.

- 2014 Slocan Park Fire (90 hectares), 2 km north of Highway 6 near Slocan Park. The fire resulted in an Evacuation Alert for Slocan Park and Crescent Valley.
- 2015 Mt Aylwin Fire (roughly 5 hectares) near Silverton led to an Evacuation Alert for several homes between Enterprise Creek and Red Mountain Road.
- Although not within the Slocan Valley, the 2007 Arrow-Penstock fire near the community of Needles (Area K) damaged power infrastructure cutting-off electricity to the communities of Nakusp, New Denver, Silverton, and residents along Red Mountain Road and on the north side of Enterprise Creek Road. The power outage lasted approximately 1.5 days forcing communities to rely on back-up power generators.

The 2017 and 2018 wildfire seasons in the South East Fire Centre resulted in several interface fires prompting evacuations throughout the Kootenay region. However there were no major interface fires of note within the AOI.

2.4 Current Community Engagement

There have been several initiatives aimed at mitigating the risk of wildfire in the region including previous CWPP development, operational fuel management, and FireSmart programs. Many of these activities are the result of collaborative efforts between the RDCK; the municipalities of New Denver, Silverton, and Slocan; the BCWS, and SIFCo.

2008 CWPPs⁴

Previous CWPPs for the Slocan Valley were completed in 2008. The seven reports provided recommendations aimed at reducing the threat and consequence of wildfire in the villages of Silverton and Slocan; the communities of Crescent Valley, Passmore, and Winlaw; and the fire protection districts of New Denver/Silverton, and Slocan. Recommendations included reducing forest fuels in high-hazard areas, adopting a FireSmart program, and improving emergency response procedures and policies.

Fuel Treatment

Since the release of the 2008 CWPPs, roughly 644 hectares of forest have been treated within the valley, 398 hectares of which are within the Area H South AOI (see Table 3). In 2018, a 216 hectare landscape-level fuel break was completed around the communities of Silverton and Red Mountain. The 8 year-long project is an example of a continuous, landscape-level fuel break, strategically located to defend communities from an approaching wildfire.

In the south valley a 60 hectare prescribed burn was completed in the spring of 2018 near Winlaw. The objective of the burn was to rejuvenate shrub, herb and grass layers, enhance winter habitat for mule deer and elk, create an open forest habitat, and reduce forest fuel loading. The joint efforts between SIFCo and the BCWS resulted in a successful prescribed burn, which will help facilitate future prescribed burn projects throughout the valley.

⁴ <http://www.rdck.ca/EN/main/services/emergency-management/community-wildfire-protection-plans.html>

Previous habitat enhancement projects in the West Kootenays completed by the BC Fish and Wildlife Compensation Program (FWCP) historically included burning. There is an opportunity to work with the FWCP to plan future projects in order to meet habitat enhancement and wildfire hazard reduction objectives in the region.

Table 3: Area H North Completed Fuel Treatments

Year	Location	Treatment Area (hectares)	Treated By
2010	New Denver	29.7	RDCK and SIFCo
2013	Silverton	48.0	SIFCo
2014	Silverton	14.1	SIFCo
2015	Enterprise Creek	2.9	SIFCo
2016	Silverton	39.3	SIFCo
2017	Silverton	35.7	SIFCo
2018	Silverton	98.6	SIFCo
	New Denver	43.6	SIFCo
2019	Silverton	40.6	SIFCo
	Enterprise Creek	45.0	SIFCo
TOTAL		397.5	

FireSmart

FireSmart is a national initiative intended to promote wildfire mitigation efforts within and near the wildland urban interface. Through the use of education and outreach, FireSmart provides homeowners and community members with the knowledge needed to reduce the fire hazard in their community. The 2008 CWPPs made a number of recommendations to establish FireSmart programs throughout the valley. The RDCK has adopted several of these recommendations with funding provided by the Union of BC Municipalities Community Resiliency Investment Program (CRI). Additional information regarding FireSmart initiatives are described in Section 5.2 - FireSmart Planning & Activities.

Other Community Engagement

In the summer of 2018, SIFCo and FLNRORD hosted a Wildfire and Climate Change conference in Nelson. Wildfire and climate change experts, as well as forest and emergency management professionals, explained how communities and individuals can participate in wildfire risk reduction. A “Call to Action” was developed providing the over 220 delegates in attendance with recommended actions to help address the wildfire risk in the Kootenay region.

Other community engagement initiatives in the valley include:

- The SIFCo webpage which promotes Fire Smart and wildfire principles and that hosts a series of videos, interviews and presentations in support of wildfire mitigation etc. www.sifco.ca
- The RDCK webpage which promote FireSmart and wildfire mitigation principles.
- The Wildfire Conference website that hosts a series of recorded presentations: www.kootenaywildfire.ca
- The RDCK's Emergency Alert Notification System which sends emergency notifications through text or voice call to registered individuals.
- Educational signage posted by SIFCo at completed fuel treatment sites throughout the valley.

Additional details on community engagement – including recommended actions – have been included in section 5.3 - Community Communication and Education; and Table 20 - Recommended FireSmart Practices and Activities.

2.5 Linkages to Other Plans and Policies

Effective wildfire response, prevention, and emergency planning requires collaboration between multiple agencies and partners. Interface fires can span several jurisdictions and cross political and administrative boundaries. In order to ensure compatibility with current plans, policies, and practices, existing documents were reviewed as part of the CWPP process. Relevant plans and policies have been summarized below for reference.

2.5.1 Local Authority Emergency Plan

The RDCK's 2016 Emergency Response and Recovery Plan outlines policies and procedures to be implemented in the event of an emergency⁵. The Emergency Response and Recovery Plan applies to all RDCK electoral areas and partnering municipalities – including the villages of New Denver, Silverton, and Slokan. The plan contains several sections relevant to an interface fire, including:

- *Section 2:* Provides the structure for establishing an Emergency Operation Centre (EOC). The RDCK manages a two-tiered EOC system consisting of a Local Area Emergency Operations Centre (LAEOC), and a Regional Emergency Operations Centre (REOC). EOCs typically assist with coordinating multiple agencies, providing media releases, and managing evacuees.
- *Section 3.10:* Provides the following policies to be implemented in the event of an interface fire:
 - Interface fires will be managed using unified command with the BCWS and local fire departments.
 - The RDCK EOC will coordinate response of interface fire areas not covered by a fire department.
 - The need for evacuation will be determined with the BCWS and/or the Office of the Fire Commissioner.
 - The RDCK will support the evacuation of the public.
 - The RDCK will support evacuation of livestock with the Ministry of Agriculture.

⁵ RDCK. 2016. Emergency Response and Recovery Plan. Retrieved from <http://www.rdck.ca/EN/main/services/emergency-management.html>

- The RDCK will prepare evacuation documents, including the Local State of Emergency.
- *Section 4:* The RDCK will consider population density, evacuation routes, terrain, and urgency when formulating an evacuation plan. The RDCK has predetermined Emergency Support Services Reception Centres that will be activated based on:
 - Proximity to a localized emergency
 - Travel routes from a localized emergency
 - Safety of the area
 - Number of people evacuated

The RDCK Emergency Response and Recovery Plan also includes sections regarding critical infrastructure failure, structural/industrial fires, severe weather, utility failure, and recovery planning - all of which may become relevant in the event of an interface fire.

Currently, all RDCK emergency plans are being updated - including the 2016 Emergency Response and Recovery Plan. The RDCK intends to secure funding to update evacuation plans and create wildfire pre-plans (Personal Communication, RDCK Wildfire Mitigation Coordinator Nora Hannon 2018). Data pertaining to critical infrastructure, water sources, and evacuation routes is also currently being collected by the RDCK. This information can be integrated into the EOC web-map and is a valuable resource for emergency response efforts in the event of an interface fire or evacuation.

Recommendations intended to improve the efficiency of emergency evacuation, preparedness, and response have been included in Section 6.3 - Recommendations for Wildfire Response and Resources.

2.5.2 Affiliated CWPPs

Affiliated CWPPs include the recently updated CWPPs for RDCK Area D, F, K, and I – all of which border Area H. The RDCK is also currently updating the Area J CWPP. The 2018 CWPP for RDCK Electoral Area K and Nakusp includes a portion of the WUI surrounding the community of Summit Lake. NACFOR and SIFCo have worked closely to ensure that the WUI surrounding Summit Lake (near the Area H and Area K border) has been adequately included into the CWPP updates. The WUI around Summit Lake is partially within NACFOR’s tenure area, providing an opportunity to coordinate fuel treatment and wildfire risk mitigation efforts.

The 2019 CWPP for Area H South contains information on firefighting resources, critical infrastructure, and recommendations to mitigate the fire risk in the South Slokan Valley. When planning FireSmart and fuel management activities, efforts should be coordinated between Area H North and South to improve operational efficiencies and reduce costs. It is recommended that all CWPPs be updated every 7 years.

2.5.3 Local Government and First Nation Plans and Policies

Regional or municipal government policies and First Nation government policies can be effective tools to mitigate wildfire risk in the community. The following relevant local government plans and policies have been summarized as part of the CWPP process. All the community plans reviewed have identified wildfire as a potential hazard threatening the community.

Village of New Denver Official Community Plan - Bylaw No. 611, 2007

The Village of New Denver Official Community Plan (OCP) recognizes the importance of wildfire hazard mitigation and water source protection. Section 3.1.4 states that it is an objective “to encourage all public agencies and the public to minimize interface fire hazard.” Section 3.2.9 further states that it is “Council’s policy is to provide information and educational opportunities for interface fire hazards to property owners and tourists.” Section 9.2.5 emphasizes the objective “to protect and enhance all sources of potable water for the Village water system”.

Village of Silverton Official Community Plan - 2010

The Village of Silverton OCP recognizes that wildfire is a natural hazard which may affect the village (Section 3.2.2). According to Section 4.2 of the OCP, Development Permit Areas may be established with the objective of protecting the community from hazardous conditions (including wildfire). Additional relevant sections state that it is a goal of the village to maintain and enhance local natural areas and parks (Sec 5.3); and that Council will ensure essential municipal services comply with recognized needs - including the need for upgrading of specific components of the water system (Section 5.5.2).

Slocan Lake North Portion of Electoral Area ‘H’ Official Community Plan – Bylaw No. 1967, 2009

The OCP for Area H North places a high importance on wildfire risk mitigation and includes several fire management policies in Section 15 of the OCP. According to the OCP, the regional board may require developers to “undertake a fire hazard risk assessment at the time of submitting a subdivision application where the Province indicates that a property may be subject to a moderate or high fire risk. The Regional Board may request the same assessment during a land use designation amendment or development permit process.” A fire hazard assessment will provide a fire hazard mitigation strategy that may include the creation of fuel breaks; the use of interface fire protection and fire resistant building material standards outlined in Provincial publications (including the Home Owners FireSmart Manual). Mitigation strategies may also include provisions for ensuring the availability of water for fire suppression; and designing roads with the consideration of evacuation routes and fire suppression.

Other policies in Section 15 include encouraging proactive wildfire mitigation programs to reduce the risk of wildfires; ensuring water sources - such as hydrants, standpipes, lakes, and streams - remain free of obstructions for fire protection purposes; and encouraging local volunteer fire departments to work with the RDCK for emergency preparedness.

Additional relevant sections of the OCP include:

- *Section 10:* States that the Regional Board “Will consult with the local fire department(s) to determine needs for access and the filling of tankers to support local fire service to unincorporated communities within the Plan area where appropriate.” And “ensure that land use decisions accommodate emergency response through provision of adequate access to developments and facilities for fire protection services and emergency first response.”
- *Section 12:* “Requires that new and improved domestic community water systems be designed and constructed to provide hydrants with sufficient flows for the provision of fire protection.”
- *Development Permit Area #3:* Ensures that industrial developments are compatible and considerate of the natural environment including the susceptibility to natural hazards and wildfire risk.

Additional Applicable Plans and Bylaws

- Village of New Denver Outdoor Burning Regulation Bylaw No. 591, 2005: Regulates outdoor burning and burn permit requirements.
- Regional District of Central Kootenay Emergency Management Regulatory Bylaw No. 2210, 2011: Enables the establishment and maintenance of an emergency management framework for the RDCK.
- Regional District of Central Kootenay Emergency Program Management Plan: Provides details regarding emergency program structure, jurisdiction, mitigation and response.
- Regional District of Central Kootenay Fire Services Bylaw No. 2170, 2010: Provides for the operation and regulation of Volunteer Fire Departments for RDCK Fire Protection Services.
- Regional District of Central Kootenay Overall Automatic Aid Agreement Bylaw No. 2367, 2013: authorizes the RDCK to enter into an “Automatic Aid Agreement” to include all Regional District Fire Departments.
- Regional District of Central Kootenay Water Bylaw No. 2470, 2015: Regulates water use, ownership and access.
- Regional District of Central Kootenay Park Regulation Bylaw No. 2173, 2011: Regulates the use of parks within all electoral areas of the RDCK, and within all Regional Parks within municipal boundaries under the jurisdiction of the RDCK. Regulations include the lighting, fuelling or making use of fire within parks.

2.5.4 Higher Level Plans and Relevant Legislation

The Kootenay Boundary Higher Level Plan Order (KBHLPO)

The Kootenay Boundary Higher Level Plan Order establishes resource management zones and objectives in the region. The Slocan Valley is located within the Arrow Resource Management Zone. The KBHLPO contains legally binding objectives for biodiversity emphasis areas, old and mature forests, caribou, green-up, grizzly bear and connectivity corridors, consumptive use streams, fire maintained ecosystems, enhanced resource development zones, visuals, and social and economic stability.

Relevant Legislation and Regulations

The AOI encompasses a variety of land classifications and ownership. As communities plan to undertake wildfire mitigation actions, there are several pieces of legislation that must be considered. The following list includes some of the main pieces of the legislation and regulations that may come into effect while planning to undertake fuel management and FireSmart activities:

- *Environmental Management Act and Open Burning Smoke Control Regulation*: Governs disposal of waste into the environment; sets regulations for open burning and smoke management.
- *Forest Act*: Establishes forms of tenure and authorizations that grant legal rights to harvest or damage Crown timber and to construct access roads, and establishes provisions for billing for Crown timber.
- *Forest and Range Practices Act and Forest Planning and Practices Regulation*: Governs and regulates forest practices on provincial Crown land. Provides for the protection of 11 resources

values including: biodiversity, cultural heritage, fish/riparian, forage and associated plant communities, recreation, resource features, soils, timber, visual quality, water quality, and wildlife.

- *Government Actions Regulations (GAR)*: Provides for the establishment of land designations and identification of resource features that require special management, such as ungulate winter range, wildlife habitat areas, and critical habitat for fish. GAR orders within the AOI replace some of the objectives set by the KBHLPO - particularly those objectives for caribou and visual quality objectives. Some objectives set within FPPR have also been replaced by GAR orders, specifically regarding ungulate winter range.
- *Land Act*: Provides for the establishment of orders regarding the use and management of Crown resources and land.
- *Local Government Act*: Enables local governments to designate areas for protection from hazardous conditions, including the establishment of wildfire development permit areas (WDPA). Within these areas, requirements for the use of fire resistant building materials, fuel hazards mitigation, fire hydrant locations, and emergency access and evacuation can be established (Forest Practices Board, 2015).
- *Park Act*: Governs the protection, management, and use of parks; including the regulation of lighting, fuelling or making use of fire within parks.
- *Wildfire Act and Wildfire Regulation*: Governs the prevention and suppression of wildfires in the province. Provides obligations and responsibilities regarding fire use, prevention, control and rehabilitation.

2.5.5 Ministry or Industry Plans

Under the Forest and Range Practices Act, all forest licence and agreement holders must prepare a Forest Stewardship Plan (FSP) or a Woodlot Licence Plan. SIFCo has WUI stocking standards in their approved FSP which include reduced stocking densities and deciduous/less-flammable preferred and acceptable species (SIFCo, 2017). The Selkirk Resource District (SRD) has recently approved similar fire management / WUI stocking standards which can be used by any agreement holder in an operational plan.

The Selkirk Resource District has a Fire Management Plan in place and there are plans to update this document over the next several years.

Other relevant plans in the AOI include:

2016 Landscape Level Strategic Wildfire Protection Plan (LLSWPP)

SIFCo's recently developed Landscape Level Strategic Wildfire Protection Plan (LLSWPP) provides an innovative approach to wildfire management throughout Community Forest Agreement K2R on the east slopes of the Slocan valley. The 2016 LLSWPP utilised fire modelling technology (FlamMap 5) to examine potential fire behaviour and spread direction in the valley. Applying this information, the LLSWPP recommends locations for strategic landscape-level fuel breaks and fuel treatment sites within the WUI. The plan "identifies locations where is it desirable and feasible to create a strategic fuel break, considering: major fire path locations, vegetation and fuel types, terrain and slope, access (potential and existing), forestry staff local knowledge, and land ownership." The LLSWPP also includes a guide of the five main types of fuel treatment including: Wildland Urban Interface Fuel

Management (Type 1); Post-Harvest Fuel Management (Type 2); Machine Based Interface Cleanup (Type 3); Fuel Management for Habitat Restoration and Ecosystem Resiliency (Type 4); and Wildland-Urban Interface Re-Treatment (Type 5). The LLSWPP complements the CWPPs for Area H North and South and should be referenced - along with the CWPPs - when planning fuel treatment in the WUI.

SIFCo 2007 Landscape Level Plan (LLP,) and 2011 Management Plan

The LLP contains maps of terrain stability, ecologically sensitive and protected areas, and economically inaccessible areas within the community forest K2R tenure area. The LLP was developed through a combination of aerial imagery interpretation, field work, and pre-existing map data sets. SIFCo's Management Plan identifies fire hazard reduction and fire interface sites as a priority for harvesting within the CFA.

2012 Valhalla Park Management Plan

Valhalla Park is located on the western shore of Slocan Lake. It encompasses most of the Valhalla Range of the Selkirk Mountains and covers a total of 50,060 hectares. No roads reach the park landbase. Access to the park is by water, or by forest road and then hiking trail. The management plan for the park recognises the importance of wildfire on the landscape and states that: "natural processes such as wildfire, disease and insect infestation must be incorporated into management for the park."

It is a high priority to develop a pro-active fire management plan for Valhalla Park. According to the park management plan, an appropriate fire management plan should:

- Prescribe conditions in which lightning caused fires can be allowed to burn in the park.
- Identify and protect recreational and scenic values.
- Encourage cooperation with communities and private property owners to ensure fire safe practices are followed within and near the park's boundaries.
- Encourage permitting agencies to require proposed developments adjacent to the park assess fire hazards and risks.
- Coordinate with appropriate agencies to set thresholds for the atmospheric conditions, the cumulative smoke level in the Slocan Valley, and the duration of smoke emissions from fires, and suppress fires in the park if thresholds are exceeded.
- Use ecologically acceptable methods of vegetation management and firefighting.
- Align with wildfire response directions on the Ministry of Environment's Wildfire Response intranet page and be shared with wildfire responders.
- Allow burned areas to recover naturally.

The wildfire threat within Valhalla Park was not assessed as part of this CWPP, except for a small area of the park surrounding private land on the shore on Slocan Lake. Local wildfire experts have indicated that there is significant blow down and fuel loading within the park boundary - particularly around Nemo Creek⁶. A large fire in the park has the potential to affect communities and residents of Area H, as well as recreational and backcountry users. Based on historical reports from the 1920's, current high fuel loads, and observed fire behaviour in extreme fire weather conditions, a large fire in the park

⁶ Personal Communications, Jonathan Fox, BCWS

could affect communities on the east side of the lake. A comprehensive fire management plan for Valhalla Park would assess and mitigate the risk of a wildfire in the park, as well as a fire starting in the park and spreading to nearby values.

2.6 Recommendations for Wildfire Planning, Policies, and Coordination

Table 4 includes recommendations intended to incorporate wildfire risks into in local government policies and plans. Recommendations are also provided to increase the efficiency of wildfire mitigation efforts through coordination with multiple agencies, organizations, and stakeholders.

Table 4: Wildfire Planning, Policies, and Coordination Recommendations

Number	Recommendation
Objective: To incorporate wildfire risks into local government policies, bylaws and plans	
1	<p>Ensure that existing and future planning documents, policies and bylaws consider wildfire risks, evacuation routes, and emergency response. This includes:</p> <ul style="list-style-type: none"> • Reviewing OCPs and bylaws to evaluate their effectiveness at mitigating wildfire risks. • Exploring the use of Development Permit Areas requiring FireSmart landscaping practices, fire-resistant external construction materials, and vegetation/debris management in high fire hazard areas. • Exploring the use of a RDCK outdoor burning bylaw to restrict burning during high fire hazard. • Continuing current efforts to update and develop emergency planning documents - including emergency evacuation plans.
2	<p>Consider undertaking additional landscape-level wildfire planning for areas outside of the WUI. A comprehensive landscape-level wildfire plan should complement existing CWPPs, evaluate wildfire threat, and identify strategic areas for fuel treatment outside of the WUI.</p>
3	<p>Review progress on fire mitigation efforts and update wildfire planning documents and CWPPs every 7 years.</p>
Objective: To increase wildfire mitigation efficiency through collaborative efforts	
4	<p>Establish a Wildfire Preparedness Working Group for the Slokan Valley. The group should work to identify wildfire related issues, resource deficiencies, and opportunities for improvement. Potential Working Group representatives may include the RDCK, fire departments, licensees (Interfor, Kalesnikoff, SIFCo, NACFOR, BCTS and Woodlots); utilities (BC Hydro and Fortis); municipalities (New Denver, Silverton, Slokan); and government agencies (BC Parks, BCWS, MOTI, and FWCP).</p>
5	<p>Coordinate wildfire risk mitigation efforts with other agencies, organizations, and across Electoral Area boundaries. Coordinate mitigation efforts around the community of Summit Lake, Valhalla Park, and along highway right-of-ways.</p>

SECTION 3: Values at Risk

Values at risk (VAR) are human or natural resources including human life, property, critical infrastructure and high environmental and cultural values that may be impacted by wildfire and or by fuel treatments. In terms of wildfire response, the BCWS prioritizes the following values in descending order⁷:

1. Human Life and Safety

- Evacuation
- Emergency protection of occupied interface areas, evacuation travel corridors, and other occupied sites

2. Property

- Infrastructure or assets important to public health and safety
- Concentrated areas of residences and infrastructure facing imminent threat
- Dispersed residences and associated infrastructure facing imminent threat
- Communities or rural residences where threat is greater than 3 days away
- Other public infrastructure, including park facilities
- Infrastructure, installations or assets covered by client agreements
- Other private and commercial property

3. High Environmental Values or Cultural Values

- Community watersheds / drinking water catchment areas
- Critical habitat of known and identified species at risk

4. Resource Values

- Active resource extraction sites or timber harvesting and silviculture investment areas
- Timber covered by a client protection agreement
- Other commercially valuable timber
- Areas identified as a priority in BC Parks Fire Response Plans
- Other forest resource values
- Agricultural values

The following sections outline key values at risk within the AOI. VAR data was updated as part of the CWPP process and included in Appendix 1, Map 2 – Values at Risk.

⁷ Province of British Columbia. (2016). Provincial Coordination Plan for Wildland Urban Interface Fires. Victoria.

3.1 Human Life and Safety

In the event of an interface fire, the first priority is human life and safety - including the evacuation of at-risk areas. Safe egress requires coordination, planning, and time. Evacuation routes can be blocked by the fire itself, downed trees and power lines, and/or traffic congestion or accidents.

Most communities within the AOI are located along Highway 6, with the largest, highest density population cluster focused around New Denver. Smaller population centers are located around the communities of Silverton/Red Mountain, Rosebery, Hills, and Summit Lake. To account for recent development, structure data, structure density, and the WUI were all updated during the CWPP development.

Other high-use areas during the fire season include campgrounds, recreation sites, and tourist attractions within the AOI. Notable areas include Rosebery Provincial Park, Summit Lake Provincial Park, Bannock Point Recreational Site, Valhalla Park, Sandon, and the Rosebery to Three Forks Regional Trail (Galena Trail) which provides 12km of non-motorized recreation use between Rosebery and Three Forks.

3.2 Critical Infrastructure

Emergency Management B.C. defines critical infrastructure as “any physical resources, service and information technology facilities, networks and assets which, if disrupted or destroyed, would have a serious impact on the operation of an organization, sector, region or government.”

Appendix 1, Map 2 (Values at Risk) shows the critical infrastructure in the AOI. Critical infrastructure is categorized into one or more of the following types:

- Electrical power;
- Communications;
- Transportation;
- Emergency services;
- Water and sewage; and
- Hazardous materials.

3.2.1 Electrical Power

Communities are serviced by 69 KV overhead powerlines maintained by BC Hydro. The powerline system originates near the community of Needles and spans roughly 100km before reaching New Denver. Therefore, both local and remote fires have the ability to cause a power outage in the AOI. The Arrow-Penstock fire in 2007 (despite burning over 50 km away) resulted in a 1.5 day-long power outage in New Denver, Silverton, and along Red Mountain and Enterprise Creek Road. Current back-up power sources in the AOI include generators located at the various water systems.

Main transmission lines are generally supported by metal towers while service distribution lines are supported by wooden poles. Wooden poles are more susceptible to damage from a wildfire and from strong-wind events. Downed power lines have the potential to ignite fires, block vehicle access and

egress, and cut-off electricity to critical infrastructure in the AOI. Downed power lines can also threaten first responder safety and delay fire suppression efforts in the event that crews must wait until power lines are deactivated before engaging a fire.

3.2.2 Communications, Pipelines and Public Buildings

Rapid and effective initial attack relies on the public, industry, and aircraft to report wildfires as soon as possible. Depending on weather and fuel conditions, minor delays in wildfire reporting can result in initial attack failure.

Poor mobile phone coverage throughout the valley is a major concern for emergency response and wildfire reporting. It is not possible to report an observed wildfire from many locations. The limited mobile coverage is also susceptible to systems outage due to fire caused damage to cellular towers or power supplies to cellular towers.

Landline phone systems are supported by wooden poles, and may share poles with the electrical power distribution system. Landline communications can be cut by fire and wind damage.

Communications infrastructure in the AOI is shown on Map 2 – Values at Risk.

Public buildings such as schools, arenas and halls can serve as potential evacuation centres in the event of an emergency. Within the AOI, this includes Silverton’s Memorial Hall, New Denver’s Bosun Hall, Knox Hall, and Arena, Lucerne Elementary Secondary School, and Hills Fire Hall. There are also several options in the nearby communities of Slocan, Nakusp, and Kaslo that could serve as potential evacuation centres in the event of an emergency.

3.2.3 Emergency Services Infrastructure

Emergency services in New Denver include a RCMP detachment, BC Ambulance station, and the Slocan Community Health Centre which provides emergency and non-emergency medical services. The New Denver and Area Fire Department maintain fire halls in both New Denver and Silverton. The Hills Volunteer Fire Brigade – although not a recognized fire department - maintains a fire hall in Hills and provides important emergency response coverage outside of the New Denver fire response area.

Outside of the AOI, there are several emergency services available in the Villages of Nakusp and Slocan which may need to be relied upon in the event of a wildfire or evacuation. The Nakusp Emergency Services building houses a B.C. Ambulance station, the Nakusp Volunteer Fire Department and the office of the RDCK Emergency Program Coordinator for Area K and H. There is an RCMP detachment and Level 1 Community Hospital in the Village of Nakusp, while the BC Wildfire Service operates a seasonal base near the airstrip.

Emergency services in the Village of Slocan include a medical clinic and fire rescue services provided by the RDCK Slocan Fire Department. South of Slocan, the unincorporated communities of Winlaw, Passmore, and Crescent Valley are each home to a RDCK Volunteer Fire Department, while the BC Ambulance Service maintains a station in Winlaw. For additional details on the emergency services provided in the South Slocan Valley, refer to the 2019 CWPP for Area H South.

3.2.4 Water and Sewage

The Rosebery Highlands and Denver Siding water systems are owned and operated by the RDCK. The Rosebery Highlands System – located in Rosebery - draws water from a deep well which is not under

the direct influence of surface water (RDCK, 2019). The system services 3 active connections - with an additional 17 serviceable lots located in the service area (RDCK, 2019). The Denver Siding system – located near New Denver – services 21 active connections and draws its water from the Esthwaite Spring, Lloyd Spring, and Aylard Creek – all of which are susceptible to rock slides and sediment intrusion (RDCK, 2019). As the system relies on untreated surface water, the Denver Siding Water System remains on a long term boil water notice. Nearby, the Village of New Denver relies on water from two wells pumped into a reservoir (Have Blue Consulting and Design Ltd. & Endemic Mountain Design, 2010). The RDCK and the Village of New Denver are currently exploring opportunities to amalgamate the Denver Siding and Village of New Denver water systems (RDCK, 2019).

The Village of Silverton’s water system draws from two deep-water wells and pumps into two reservoirs (Village of Silverton, 2017).

The many rural and semi-rural residences in the AOI draw their water from a diverse array of surface water and well intakes. Section 3.3.1 discusses this further.

Section 6.1.2 - Water Availability for Wildfire Suppression - provides additional details on the water systems in the AOI as they relate to fire response.

There are no sewage services provided in the AOI. Residents rely on septic tank and field, or package sewage treatment plants for wastewater management (RDCK, 2009).

3.3 High Environmental, Cultural and Other Values

Wildfires can impact consumptive water sources, fish and wildlife resources, and cultural values. From a fire mitigation perspective, the protection of environmental and cultural values must be viewed through two separate lenses. The first is the objective to protect any identified values from potential damage and destruction caused by wildfire. The second is the equally important objective to ensure that fire mitigation efforts do not cause damage or destruction to some of the very elements that they seek to protect.

The Kootenay Boundary Higher Level Planning Order (KBHLPO), the *Forest and Range Practices Act* (FRPA), *Government Action Regulation* (GAR) orders and government approved Forest Stewardship Plans or Woodlot Licence Plans of forest licensees are the primary legal tools that govern the management of these resources on Crown land within the CWPP AOI. Formal amendments to existing plans or exemptions from orders or regulations may be required to facilitate fuel management. Consultation with First Nations and the local community should be undertaken during prescription development. Consideration should also be given to the following during prescription development (adapted from Morrow, Johnston, & Davies, 2013):

- Potential for wind throw
- Invasive plants introduction or spread
- Habitat protection
- Species at Risk and Sensitive Ecosystems
- Current and future forest
- Live/dead wildfire trees
- Terrain stability
- Access management
- Visual quality
- Drinking water

- health
- Climate change
- Archeological and cultural values
- Coarse woody debris
- Local community values/Social License
- Recreation and tourism values
- Trap lines

3.3.1 Drinking Water Supply Area and Community Watersheds

A severe wildfire within a community or domestic use watershed may not damage water diversion and management structures or critical infrastructure, but could still have significant impacts on drinking water, hydrology, and slope stability adjacent to the community. Wildfires can kill large areas of forest trees, and thus alter snow accumulation and melt patterns, peak flow levels and timing of flow in forested watersheds. Wildfires have the potential to damage soils, and may lead to high rates of erosion and sedimentation and landslides that can degrade water quality for many years. In worst case scenarios, a water supply may have to be abandoned (temporarily or permanently) or new water treatment infrastructure may need to be built to mitigate the damage.

Consumptive-use streams and watersheds are present throughout the valley. Table 5 lists the specific location and size of larger community and domestic watersheds.

Table 5: Community and Domestic Watersheds

Watershed	Location	Area (hectares)	Area Within AOI (hectares)
Alspen Creek	50.149, -117.672	73.0	73.0
Angel Ck. CWS	50.004, -117.356	7.1	7.1
Arthur Creek	50.111, -117.456	226.1	218.1
Aylard CWS	50.003, -117.355	3.9	3.9
Aylwin Creek	49.879, -117.349	686.8	312.1
Bartlett CWS	49.969, -117.327	540.4	507.9
Bird Creek	50.144, -117.666	213.0	186.8
Bluebird Creek	49.99, -117.186	77.5	75.6
Cadden Creek	50.126, -117.465	631.5	333.2
Cadden West Face	50.118, -117.493	424.7	424.7
Cadeen East Face	50.105, -117.479	221.9	221.9
Carpenter Face	50.008, -117.365	1,128.0	1,128.0
Charlie's Creek	50.17, -117.59	459.4	181.0
Charlie's Face	50.157, -117.606	308.4	308.0

Climax CWS	49.8, -117.453	7.7	0.0
Congo Creek	49.892, -117.358	246.3	246.3
Cory Creek	49.838, -117.418	232.0	218.2
Dornier Creek	50.134, -117.632	94.6	63.0
Emily Creek	49.964, -117.306	114.6	114.6
Enterprise Face	49.878, -117.398	813.1	813.1
Gwillim CWS	49.824, -117.619	32.9	0.0
Hasty Creek	49.916, -117.328	1,244.2	655.6
Hemlock / Dane	49.901, -117.355	95.3	95.3
Jervis Face	50.166, -117.675	78.9	78.9
Lemon Creek	49.755, -117.248	611.7	0.0
Levar Creek	49.96, -117.323	55.2	55.2
Memphis Creek	49.817, -117.414	781.1	393.6
Memphis Face	49.83, -117.428	426.1	411.5
Nemo Creek	49.927, -117.543	7,014.8	269.0
New Denver Face	49.98, -117.348	1,021.7	1,004.7
Owl Creek	50.138, -117.487	288.5	179.1
Prior Creek	49.925, -117.303	97.6	0.0
Rashdel CWS	50.002, -117.355	12.3	12.3
Ruby Creek	50.088, -117.606	112.8	0.0
Sandon Face	49.975, -117.22	32.9	32.9
Scimitar Creek	50.139, -117.512	27.4	24.2
Silverton Face	49.918, -117.377	571.6	571.6
Silverton Face	49.942, -117.351	343.0	343.0
Springer Creek	49.804, -117.42	191.7	32.9
Tributary Creek	49.968, -117.257	467.0	319.7
Tributary Face	49.974, -117.235	83.1	83.1
Vevey Creek	49.906, -117.358	648.6	648.0
Vevey Creek	49.896, -117.342	205.3	166.5
Wilson Face	50.041, -117.412	181.0	181.0
ZZ Spring (73603)	50.085, -117.505	333.2	222.5

3.3.2 Cultural Values

Cultural Heritage Resource

A Cultural Heritage Resource (CHR) is defined as an object, a site or a location that is the focus of a traditional use by an aboriginal people that is of continuing importance to that people, and not regulated under the Heritage Conservation Act (i.e. not archaeological resources or sites). CHRs include a First Nation's Aboriginal Interest(s) and Aboriginal rights, which are practices or traditions integral to a First Nation culture at the time of contact. Examples include fishing, hunting and gathering plants⁸.

The Consultative Areas Database indicates that there are 17 First Nations with aboriginal interests in the Slocan Valley. A request for information on cultural heritage resources and aboriginal interests was sent to First Nations during the CWPP planning process for both the North and South CWPPs. No cultural heritage resources were identified through the information sharing request.

There are no treaty lands within the AOI.

Additional information sharing with First Nations will be carried out during the fuel management prescription development process prior to any on the ground fuel management activities.

Archaeological Sites

Archaeological sites in BC dated from 1846 or earlier are protected by the *Heritage Conservation Act* (HCA). The provisions of the HCA apply to archaeological sites located on both public and private land. The Archaeology Branch of the FLNRORD administers the provisions of the HCA and is responsible for making final decisions concerning the management of archaeological resources. Archaeological site records will be requested during the prescription development phase prior to the commencement of operational fuel treatment. In the event that cultural or archaeological values are identified, a reconnaissance survey or an Archaeological Impact Assessments may be required.

Heritage Structures and Museums

Heritage structures and museums preserve structures and cultural history from the period after 1890. These features are important to communities, and provide tangible links to local history and experiences. The Silverton Gallery and Fingland Cabin in Silverton, the Nikkeie Internment Memorial Centre and the Silvery Slocan Museum in New Denver, and the Sandon Museum were identified as heritage structures and/or museums. These are shown on Appendix 1, Map 2 – Values at Risk.

3.3.3 High Environmental Values

Caribou habitat protected by a *Government Action Regulation* (GAR) order is located within the AOI near the community of Hills.

Old Growth Management Areas (OGMAs) which were identified to maintain old forests and landscape level biodiversity are located throughout the AOI – particularly around the communities of Hills, New Denver, and Silverton.

Caribou habitat areas and OGMAs are shown in Appendix 1, Map 2- Values at Risk.

⁸ Bulletin: Woodlot Licences: Information Sharing and Consultation with First Nations. May 2016

No spatially located habitat areas have been designated within the AOI for the protection of recognized species at risk other than wildland caribou. Table 6 identifies recorded occurrences of Blue and Red listed species in the AOI. Other notable locally significant species include Grizzly Bear (*Ursus arctos*), and Western-Toad (*Anaxyrus boreas*). In the event of a wildfire and during fuel treatments, the presence of Blue and Red listed species should be considered and appropriate management activities undertaken to ensure their protection.

Table 6: Conservation Data Center occurrences of Blue and Red listed species in the AOI

Scientific Name	English Name	B.C Status
<i>Acipenser transmontanus pop. 2</i>	White Sturgeon (Columbia River population)	Red
<i>Kootenaia burkei</i>	Pygmy Slug	Blue
<i>Magnipelta mycophaga</i>	Magnum Mantle Slug	Blue
<i>Anguispira kochi</i>	Banded Tigersnail	Blue
<i>Rangifer tarandus pop. 1</i>	Caribou (southern mountain population)	Red

The Bonanza Biodiversity Corridor (BBC) – spanning from New Denver to Nakusp - encompasses important wildlife habitat, wetlands, and rare-plant species (Mahr, 2018). Fuel treatments – particularly in environmentally sensitive areas, such as the BBC – should consider potential implications on habitat and biodiversity. Combining wildfire threat reduction objectives with biodiversity and habitat enhancement objectives should be considered in consultation with a qualified professional during the fuel management prescription phase.

3.4 Other Values

The KBHLPO and FRPA recognize Visual Quality as a resource management objective. Managing for visual quality in the WUI can be challenging due to the close proximity to populated areas. Both wildfires and fuel treatment have the ability to impact visual quality. Fuel management in areas with Retention or Partial Retention Visual Quality Objectives and in other highly visible areas should consider treatments such as partial cutting or thinning from below - when appropriate - to reduce impacts to visual quality.

Communities throughout the Slokan Valley have significant historical value. Sandon - considered a “ghost town” – is home to several residents as well as numerous historical buildings and artifacts. Once home to roughly 5,000 people, Sandon’s rich history as the “Capital of Silvery Slokan” during the mining boom in the early 1900's makes it an important historical value and tourist attraction in the region.

3.5 Hazardous Values

Hazardous values include materials or substances that may pose a safety hazard to emergency responders and the public, or have the potential to exacerbate wildfire volatility. Hazardous values

including fuelling centers and landfill/transfer station sites are identified on Appendix 1, Map 2 – Values at Risk.

3.6 Recommendations to Protect Values at Risk

Recommendations made in Table 7 intend to mitigate potential damage to high value areas and critical infrastructure from both wildfires and fuel treatment. Recommendations related specifically to improving water availability for firefighting and structure protection are included in Section 6.3 - Wildfire Response and Resources Recommendations.

Table 7: Values at Risk Recommendations

Number	Recommendation
Objective: To increase the resiliency of values at risk and critical infrastructure to potential wildfire damage	
6	Review, maintain and upgrade back-up power sources for critical infrastructure and emergency services. A review should identify any gaps in back-up power and recommend upgrades to existing power sources to meet potential extended outages.
7	Prioritize fuel management treatments that protect electrical power, communications, transportation and water critical infrastructure. Review, prioritize, and implement fuel management treatments in areas identified in Table 19.
8	Coordinate with BC Hydro and MOTI to conduct vegetation management and danger tree removal along distribution lines, transmission lines, and right of ways. Explore utilizing existing right of ways as landscape-level fuel breaks through an ongoing fuel treatment program.
9	Complete FireSmart and vulnerability assessments of critical infrastructure. Undertake any necessary corrective actions to meet FireSmart standards for critical infrastructure, local government buildings, and emergency services infrastructure.
10	Identify areas likely to suffer post-fire terrain, water flow and stream channel stability issues. Create draft plans for post-fire stabilization work.
Objective: To ensure values at risk are sufficiently considered during fuel management activities	
11	Carry out additional information sharing with First Nations during the fuel management prescription development process prior to any on the ground fuel management activities.
12	Carry out consultation with local communities during fuel management prescription development to ensure local concerns are addressed and to cultivate social licence to operate in the WUI.
13	Incorporate multiple objectives into fuel treatment projects when possible. Fuel management activities can address forest health concerns, enhance wildlife habitat, rehabilitate low value stands, and utilize low value fibre. Combining wildfire threat reduction with biodiversity and habitat enhancement should be considered along with the consultation of a professional biologist (or qualified professional).

SECTION 4: PSTA and Local Wildfire Threat

Wildfire threat within the AOI has been analysed using two different methodologies - intended for two different purposes. The Provincial Strategic Threat Analysis (PSTA) (Section 4.2.1/Map 4) provides a general - provincial-scale - overview of approximate wildfire threat. It is intended to provide a strategic-level analysis of factors that contribute to wildfire threat but it is not intended to represent absolute, site-specific values. The PSTA was provided by the BCWS and is derived using spatial data and computer based modeling (BC Wildfire Service, 2017).

At the forest-stand level, the Local Wildfire Threat provides a more refined assessment of wildfire threat in the AOI and is based on local field-verified data. The Local Wildfire Threat was determined following the 2013 Wildfire Threat Classification process⁹. The final outcome of the Local Wildfire Threat process is a map of Wildfire Behaviour Threat Class and WUI Threat Class (Section 4.3.5/Map 7). The Local Wildfire Threat was used in conjunction with local expertise to select strategic locations for fuel treatment as recommended in Table 19 - Fuel Treatment Summary.

4.1 Fire Regime, Fire Danger Days and Climate Change

Wildfire is a natural process that plays an important role in forest succession and landscape dynamics. Disturbance and associated change are important factors in maintaining healthy landscape ecosystems. The ecological significance of wildfires on the landscape should be considered in order to develop effective and responsible management plans and prescriptions that protect both the community and environment.

4.1.1 Local Ecology and Fire Regime

The Biogeoclimatic Ecosystem Classification System (BEC) is used throughout the province to categorize ecosystems based on vegetation, soil and climate. The BEC system enables resource professionals to make informed land management decisions that consider local ecological characteristics. The majority of the AOI is classified under the Interior Cedar Hemlock (ICH) BEC zone. Forested areas higher in elevation are within the Engelmann Spruce Subalpine Fir zone (ESSF) (Table 8).

The ICH is biologically diverse and the most productive zone in the interior of BC (Ketcheson, et al., 1991). Recurrent fires create a mosaic of climax and seral stands throughout the ICH (BC Ministry of Forests, 1992). Mixed stands of western hemlock (*Tsuga heterophylla*), western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), western larch (*Larix occidentalis*) are common throughout the ICH. These forests are often referred to as the Kootenay Mix. Lodgepole Pine (*Pinus contorta*), Ponderosa Pine (*Pinus ponderosa*), grand fir (*Abies grandis*), and paper birch (*Betula papyrifera*) can also be found throughout the Slokan Valley. With the diversity of climate and soils throughout the ICH, there is substantial variability in vegetation among the various subzones. Drier sites are commonly associated with Douglas-fir and pine, while moist sites typically have a higher abundance of western redcedar and hemlock. Typical wildlife found throughout the ICH includes grizzly and black bear, deer,

⁹ Morrow, Bruce, Kelly Johnston, and John Davis. 2013. Wildland Urban interface Threat Assessments in B.C. Ministry of Forests, Lands and Natural Resource Operations.

moose, and elk (BC Ministry of Forests, 1992; Ketcheson, et.al, 1991). Recorded occurrences of Blue and Red listed species in the AOI has been provided in Section 3.3.3 - High Environmental Values.

The majority of the AOI is within the ICH Moist Warm, Shuswap variant (ICH mw2) (65.4%). This is a highly productive zone with a diversity of tree species dominated by the “Kootenay Mix.” Historically, infrequent stand replacing fires were the major fire regime. The average disturbance return interval is 200 years in the NDT2, ICH (BC Ministry of Forests, 1995) - this disturbance regime is referred to as a Natural Disturbance Type 2 regime (NDT 2). Extended post-fire regeneration periods within the ecosystem have created stands with uneven-aged tendencies (BC Ministry of Forests, 1995). Wildfires would typically range in size from 20 to 1,000 ha, with larger fires occurring after periods of extended drought. Wildfires would often leave pockets of unburnt fuel throughout the burned area as a result of terrain features or areas of high moisture content (BC Ministry of Forests, 1995).

The ICH Dry Warm, West Kootenay variant (ICH dw1) can also be found throughout lower elevations in the Slocan Valley and accounts for 20% of the AOI - primarily along the lower slopes of the valley. This subzone is characterized by “moist, warm springs; hot to very hot, dry summers; and mild, dry winters” (MacKillop & Ehman, 2016). A moderately shallow snowpack usually persists from January through March (MacKillop & Ehman, 2016). The “Kootenay Mix” is common on zonal sites within ICH dw1, while lodgepole pine, Douglas-fir, and Ponderosa Pin can be found on drier sites (MacKillop & Ehman, 2016). Frequent stand-initiating events are associated with the ICH dw1. This disturbance regime is referred to as a Natural Disturbance Type 3 regime (NDT 3). These ecosystems historically experienced frequent wildfires that ranged in size from small spot fires to large fires covering thousands of hectares. The mean disturbance return interval is 150 years in the NDT3, ICH (BC Ministry of Forests, 1995). The ICHdw1 –in particular – has a broad range of fire regimes; from low intensity burns with a 20 year return interval to stand-replacing fires occurring on a 200-year return interval (MacKillop & Ehman, 2016). Traditional First Nations burning as well as burning for land clearing during the mining boom has created fire-initiated stands throughout the Slocan Valley (MacKillop & Ehman, 2016).

A component of the AOI is part of the ESSF Wet Hot, Columbia variant (ESSF wh1) and ESSF Wet Cold, Selkirk variant (ESSF wc4). The ESSF is found in higher elevations throughout the Slocan Valley – with the ESSF wh1 occurring below the ESSF wc4 and above the ICH (MacKillop & Ehman, 2016). These ecosystems experience rare stand initiating disturbances and wildfires are not a common occurrence. This disturbance regime is referred to as a Natural Disturbance Type 1 regime (NDT 1). NDT1 stands are typically uneven-aged or multi-storied even-aged (BC Ministry of Forests, 1995). Infrequent disturbances typically affect individual or small groups of trees, creating small gaps in the forest for regeneration (BC Ministry of Forests, 1995). The mean disturbance return interval is 350 years in the ESSF NDT1 ecosystems (BC Ministry of Forests, 1995).

Table 8: AOI BEC Zone and NDT Summary

BEC Zone	Description	NDT	Description	Area (hectares)	Percent
ICH mw2	ICH Moist Warm, Shuswap variant	2	Infrequent stand-initiating events	17,751	57%
ICHdw1	ICH Dry Warm, West Kootenay variant	3	Frequent stand-initiating events	3,963	13%
ICH wk1	ICH Wet Cool, Wells Grey Variant	1	Rare stand-initiating events	400	1%
ESSF wh1	ESSF Wet Hot, Columbia variant	1	Rare stand-initiating events	1,763	6%
ESSF wc4	ESSF Wet Cold, Selkirk variant	1	Rare stand-initiating events	1,497	5%
ESSF wcw	ESSF Wet Cold Woodland	1	Rare stand-initiating events	481	2%
ESSF wcp	ESSF Wet Cold Parkland	5	Alpine Tundra and Subalpine Parkland ecosystem	93	< 1%
Water				5,114	16%
TOTAL		-		31,062	100

Forest health agents - including insects and disease - can have a significant effect on forest structure, associated fire behaviour, and wildfire threat. Bark beetles are a current forest health concern throughout the Slocan Valley. Insect activity in general is expected to increase as an impact of climate change. The Forest Health Strategy for the Arrow Timber Supply Area (2017/2018) identifies Douglas-fir beetle (*Dendroctonus pseudotsugae*), spruce bark beetle (*Dendroctonus rufipennis*), mountain pine beetle (*Dendroctonus ponderosae*), western balsam bark beetle (*Dryocoetes confusus*) as having a “Very High” potential impact on forests. Aerial overview surveys from 2017 indicate an estimated 5,516 hectares of forests are currently affected by bark beetles in the Arrow TSA. Douglas-fir beetle and spruce bark beetle are of particular concern with infestations increasing throughout the Arrow TSA since 2016 (Christianson, 2018). Notable areas of significant Douglas-fir beetle attack in 2017 include Slocan Junction to Passmore – in the southern portion of the valley and the Red Mountain area south of Silverton. Douglas-fir beetle and spruce beetle outbreaks have been closely associated with windthrow events (Christianson, 2018). According to the Arrow TSA Forest Health Strategy “*Prompt removal of spruce and Douglas-fir windthrow trees are imperative to avoid the buildup of these two bark beetles.*” Fuel management activities can be coordinated to address blow down in Douglas-fir and spruce dominated stands with the objective of reducing both wildfire and beetle hazards. All fuel management activities should consider - and aim to minimize - post-treatment wind throw potential; particularly in treatments that involve partial cutting or thinning.

Armillaria root disease (*Armillaria ostoyae*) and wildfire are considered as having a “Very High” potential impact on forest management within the Arrow TSA (Christianson, 2018). Other notable forest health agents in the area include birch decline, aspen leaf miner (*Phyllocristis populiella*),

Dothistroma needle blight (*Dothistroma septosporum*) and larch needle blight (*Hypodermella laricis*) (Christianson, 2018; Maclauchaln & Buxton, 2016). Significant amounts of dead and downed timber and fine fuels (branches and upper crowns) associated with forest health agents can cause fuel loading, lead to further forest health outbreaks, and result in an increased wildfire threat around communities.

Larch dwarf mistletoe (*Arceuthobium laricis*) is active in many of the 100+ year old fire originated stands in the AOI, as was observed during the CWPP field surveys. Larch is a fire resilient and drought resistant tree species which regenerates well on burned areas, can grow exceptionally quickly in early years, and is a very desirable leave tree or regeneration choice in fuel management areas. Mistletoe is a plant that parasitizes larch trees, resulting in reduced vigor and tree growth which, over time, can lead to tree death, and increased dead, dry fuel loads. Mistletoe infections of young larch trees are especially damaging. Mistletoe spreads well from infected overstory larch trees to adjacent larch regeneration, which creates silvicultural challenges when using a mixture of overstory retention and regeneration in a silvicultural system designed to create fuel managed, fire and drought resilient stands. Latent dwarf mistletoe infections also may be activated by increased light to tree crowns, providing an additional factor for consideration in silviculture system choice.

White pine blister rust (*Cronartium ribicola*) is an introduced pathogen which has caused extensive mortality of western white pine in the AOI. The CWPP field surveys found that white pine is rarely a leading species in forests in the AOI, but is common as a minor stand component. The blister rust causes high mortality levels in white pine natural regeneration and death or partial crown death in mature trees, both leading to increased dry fuel loads. Mature white pine are resilient to low intensity fire, and the species can be a valuable component of silvicultural systems in fuel managed areas. Blister rust resistant white pine planting stock with a 65% survival rate (Christianson, 2018) is available, and should be part of the silvicultural species mix in low elevation fuel management areas.

4.1.2 Fire Weather Rating

The BC Wildfire Service operates roughly 260 weather stations throughout the province. These stations collect data regarding temperature, relative humidity, precipitation, wind speed, and wind direction in order to support the Canadian Forest Fire Danger Rating System (CFFDRS). The CFFDRS is a decision-aid that provides fire managers with information regarding potential for ignition, fire spread rates and fire intensity. The Fire Danger Rating is used to describe the risk of a wildfire occurring, and is updated daily during the fire season. The following description of the Fire Danger Ratings has been provided by the BC Wildfire Service¹⁰:

- **Low:** Fires may start easily and spread quickly but there will be minimal involvement of deeper fuel layers or larger fuels.
- **Moderate:** Forest fuels are drying and there is an increased risk of surface fires starting. Carry out any forest activities with caution.
- **High:** Forest fuels are very dry and the fire risk is serious. New fires may start easily, burn vigorously, and challenge fire suppression efforts. Extreme caution must be used in any forest activities. Open burning and industrial activities may be restricted.

¹⁰ Fire Danger Class Rating Description from the BCWS webpage: <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/fire-danger>

- **Extreme:** Extremely dry forest fuels and the fire risk is very serious. New fires will start easily, spread rapidly, and challenge fire suppression efforts. General forest activities may be restricted, including open burning, industrial activities and campfires.

Data from the BCWS Slocan weather station was reviewed to assess the average Fire Danger during a typical summer (Table 9). The Fire Danger is higher during the months of July and August throughout the AOI. In 2018, 36 “High” and 13 “Extreme” danger class days were recorded by the Slocan station.

Table 9: Average Number of High and Extreme Danger Class Rating Days per Year

Weather Station	Geographic Location	Elevation (meters)	Average Number of High Danger Class Days/Year	Average Number of Extreme Danger Class Days/Year
Slocan	3km north-east of the Village of Slocan	1,230	20.1	5.1

4.1.3 Climate Change

Climate change is predicted to have a significant effect on forest ecosystems and wildfire regimes throughout the province. 2050 climate change projections for the Kootenay Boundary Region include:¹¹

- an increase in annual temperature by 1.2 °C to 2.8 °C
- a 6% decrease in summertime precipitation
- a 24 day increase in frost free days

The implications of these changes include a higher frequency and intensity of wildfires throughout the Kootenay Boundary Region and an increase in annual area burned (Utzig, Boulanger, & Holt, 2011). Longer and more intense wildfire seasons, with an increased number of high and extreme fire danger days, are also predicted throughout BC.

Further effects of climate change include shifts in vegetation and BEC zones (Utzig, 2012) as well as the facilitation of forest health agents (Woods, et.al., 2010). Droughts, increased frequency of winter storms, severe weather events, and warmer temperatures associated with climate change are predicted to increase bark beetle infestations - including Douglas-fir beetle and mountain pine beetle (Woods, et. al., 2010). Dead and downed timber and fine fuels from insect outbreaks, and increased blow-down can dramatically increase the availability of forest fuels – as discussed in Section 4.1.1 - Local Ecology and Fire Regime.

Wildfire mitigation and forest management should consider how climate change may influence the success of fuel treatments and species survival. From 2010 to 2012, SIFCo participated in the West Kootenay Resilience and Climate Change research project. The objective of the project was to explore the potential implications of climate change for West Kootenay ecosystems, and to undertake an

¹¹ Projections from the Pacific Climate Impacts Consortium, <http://www.plan2adapt.ca/tools/planners?pr=45&ts=8&toy=16>. Projected changes from 1961-1990 baseline. Precipitation and frost free days displayed as “ensemble mean” projections

ecological vulnerability assessment for the West Kootenays using a range of climate change scenarios. As a result of this research, SIFCo included the following concepts into the Slokan Valley Strategic Landscape Level Wildfire Protection Plan – these concepts should be integrated into all fuel management activities in the Slokan Valley. Other forest management activities in the region should also consider these concepts – many of which can be implemented through the use of approved WUI Stocking Standards:

- Climate change will result in dramatic shifts in species composition and vegetation density over the next 60 years.
- Species currently at the edge of their ecological/climate niche (e.g. red cedar in much of the southern portions of the valley) will no longer establish and grow.
- Drought tolerant and fire resistant species (e.g. ponderosa pine) will become the most ecologically suitable species on many low elevation sites, and should be introduced as quickly as possible.
- Current forest density in the ICH subzones will not be supportable under coming moisture and temperature regimes. Forest density will be reduced by management (harvesting, thinning, fuel management) or by wildfire. As temperatures rise and summer moisture inputs decrease, wildfires will be more likely to be catastrophic events that degrade soil and water resources and negatively impact forest structure, composition and function.
- Retaining established large trees of fire resistant species in a reduced forest density/ fuel load environment to increase ecosystem resiliency. These trees will have the best chance of surviving the future drought stress and fire events, and will maintain forest ecosystem values.

The effects of climate change on wildfire frequency and intensity, wildfire season length, vegetation patterns, and biotic and abiotic disturbances will influence wildfire threat in the AOI. Current climate change projections highlight the importance of ongoing wildfire planning and prevention within the WUI.

4.2 Provincial Strategic Threat Analysis (PSTA)¹²

The PSTA is a high-level spatial estimate of the wildfire threat throughout BC. The PSTA utilizes vegetation cover data, historical fire occurrence data, topography, and historic weather data to evaluate the three conditions necessary for a wildfire to threaten a community (SWPI, 2018):

6. an ignition occurs (Fire History)
7. the resulting fire generates intensity (Head Fire Intensity) and spreads rapidly, and
8. the fire spreads into and/or transports embers into the community (Spotting Impact)

These PSTA components (spotting impact, head fire intensity, and historic fire density) are weighted to determine the overall PSTA threat rating.

4.2.1 PSTA Final Wildfire Threat Rating

The PSTA “Threat Rating” classifies the province into 10 classes. Polygons ranked as 7 or higher are considered as having a “High to Extreme” wildfire threat. 16.3% of the AOI included in the PSTA¹³ is

¹² BC Wildfire Service. 2015. Provincial Strategic Threat Analysis 2015 Wildfire Threat Analysis Component.

classified as “High to Extreme” (Table 10). Notable areas of high PSTA Threat are around the community of Hills (Appendix 1, Map 4 - PSTA).

Table 10: Overall PSTA Threat Rating

PSTA Threat Rating	Area (hectares)	Percent
1-5	14,199	46%
6	4,698	15%
7	1469	5%
8	1490	5%
9	363	1%
10	249	1%
Water	5,168	17%
No Data - Private Land	3,428	11%
TOTAL	31,063	100%
The difference in water area in this table compared to others is because the PSTA Threat data is in a 50 m raster format that obscures the fine detail of water features.		

The PSTA rating is a valuable tool that provides a high-level overview of potential wildfire threat. For the purpose of this CWPP development, the PSTA threat rating was used to guide field assessments. High PSTA threat areas were a priority for field verification. Overall, the PSTA generally produced a fair representation of the actual fire threat in areas where WTA plots were located.

Limitations regarding the PSTA should be noted. Variations in understory fuel loads commonly observed in the AOI are generally not well modelled in the FBP fuel types used in the PSTA calculation (refer to Section 4.3.1 – Fuel Type Verification for details). Assumptions and inaccuracies associated with the underlying data used to determine the PSTA can significantly influence threat ratings.

4.2.2 Spotting Impact

During a wildfire, “spotting” occurs when embers and firebrands carried by air currents, ignite fuels outside of the main fire perimeter. Depending on weather and fuel conditions, spotting can occur up to several kilometers away from the head of a fire. Spotting poses a significant challenge to fire suppression effort as fuel breaks and containment lines can be compromised by spotting embers. Spotting is a characteristic of extreme fire behaviour and ember showers associated with spotting are a main cause of structure loss during an interface fire.

The PSTA Spotting Impact layer estimates the threat of embers affecting a given point on the landscape based on surrounding fuel types. Areas of higher spotting impact are generally where C3 and C7 fuel

¹³ Water, private managed forest land, and private lands were not included.

types are more prevalent. Closed, mature fuel types, high fuel loading, and ladder fuels are more likely to support crown fires and result in a higher spotting potential. Wind speed and direction also have a significant effect on spotting which was not considered in the PSTA spotting impact determination. Due to the variability of wind throughout the AOI, actual spotting that occurs during a wildfire may vary substantially on any given day (see section 4.3.3 for details). Spotting impact in the AOI is shown in Appendix 1, Map 4.

4.2.3 Head Fire Intensity

Head Fire Intensity (HFI) represents the energy output of a flaming wildfire front; measured in kilowatts per meter (kW/m). High HFI values are related to faster spread rates, greater fuel consumption, and increasing suppression difficulties. Fire managers and firefighters often use fire intensity to predict suppression challenges and select appropriate control tactics. Fire behaviour advisories are issued to suppression crews when intensity values are predicted to be in excess of 4000 kW/m - at which point direct fire suppression will likely be challenged.

Table 11 describes the likely fire behaviour associated with various HFI values. The majority of the area assessed falls within the PSTA HFI Class 3 – with vigorous surface fire as a likely fire behaviour. Pockets of higher HFI class are located around Hills (Appendix 1, Map 4).

Table 11: Head Fire Intensity Classes and Associated Fire Behavior (SWPI, 2018)

PSTA - HFI Class	Fire Intensity kW/m	Fire Intensity Class ¹⁴	Flame Length (meters) ¹⁵	Likely Fire Behaviour ¹⁶
1	0.01 – 1,000	2	< 1.8	Smouldering surface fire
2	1,000.01 – 2,000	3	1.8 to 2.5	Moderate vigour surface fire
3	2,000.01 – 4,000	4	2.5-3.5	Vigorous surface fire
4	4,000.01 – 6,000	5	3.5 to 4.2	Vigorous surface fire with occasional torching
5	6,000.01 – 10,000	5	4.2 to 5.3	Vigorous surface fire with intermittent crowning
6	10,000.01 – 18,000	6	12.3 to 18.2	Highly vigorous surface fire with torching and/or continuous crown fire
7	18,000.01 – 30,000	6	18.2 to 25.6	Extremely vigorous surface fire and continuous crown fire
8	30,000.01 – 60,000	6	>25.6 ¹⁷	Extremely vigorous surface fire and continuous crown fire, and aggressive fire behaviour
9	60,000.01 – 100,000	6	>25.6	Blowup or conflagration, extreme and aggressive fire behavior
10	≥ 100,000	6	>25.6	Blowup or conflagration, extreme and aggressive fire behaviour

NB: The descriptions in this table will vary by fuel type and should only be used as guidance for expected fire behaviour.

4.2.4 Fire History

The BCWS maintains historical records of fire starts, sizes and causes throughout the province. This data can be used to detect patterns in ignition locations and fire spread.

The PSTA Fire Density layer provides a spatial overview of the frequency of historical fire occurrences, shown as weighted fire density since 1950 within 10 km of a location. The layer considers fires greater

¹⁴ Head fire intensity should be classified by intensity class not fire rank. Fire rank is a visual description of conifer fires for air operations.

¹⁵ For calculating Flame Length, Bryam (1959) was used for surface fire (<10 000 kW/m) and Thomas (1963) was used for crown fire situations (>10 000 kW/m).

¹⁶ These characteristic will be different in open and closed forest fuel.

¹⁷ With HFI over 30 000 kW/m the function of the equation are stretched beyond the expectation of the equation, fire is under the influence too many other factors.

than 4 ha, that is, fires where initial attack efforts have not been successful. Larger fires are given more emphasis, as they have the highest impact on values. Appendix 1, Map 5 shows the PSTA historical fire density of both human and natural fires.

In the AOI, approximately 68% of fires are caused by lighting, while human caused ignitions account for roughly 32% of fire starts. Generally, human caused ignitions are more likely to occur in high-use recreational areas. Increased recreation use and tourism in the valley has the potential to also increase the occurrence of human caused fires – highlighting the importance of education and outreach as part of a comprehensive FireSmart program (see Section 5.2 – FireSmart Planning Activities - for details and recommendations).

The BCWS maintains a very effective initial attack program which successfully contains 94% of all fires in the province by 10 am the following day¹⁸. Within the AOI, the majority of fires are contained under the 4 ha target set by the BCWS. In order to maintain high initial attack success in the WUI, fuel management activities should aim to create opportunities for efficient fire response. Firefighter access is a key factor in facilitating successful initial attack and suppression. Fuel treatments that create or improve access for firefighters should be considered during prescription development.

¹⁸ Fires Ranks 1-4. Provided by <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/about-bcws/wildfire-response>

SECTION 5: Local Wildfire Threat Assessment

Local Wildfire Threat (section 4.3.5) was determined following the 2013 Wildland Urban Interface Wildfire Threat Assessments Guide. Map 7 provides a spatial overview of forest polygons in the AOI which pose a threat to communities, high value areas, and critical infrastructure. The assessment was combined with local expertise of the area to determine suitable and strategic locations for proposed fuel treatment as described in Section 5.1 – Fuel Management. The 2013 process relies on WTA field plots and incorporates fuel hazard, topography, and values at risk in order to determine a wildfire behaviour threat and a wildland urban interface threat.

5.1.1 Fuel Type Verification

Extensive field sampling throughout the AOI was conducted in the summer of 2018. WTA plots were used to determine wildfire threat and to verify the provincial fuel type layer. The provincial fuel type layer uses the Vegetation Resources Inventory (VRI) data set and a fuel typing algorithm to classify the province into 17 fuel types consistent with the Canadian Forest Fire Behavior Prediction (FBP) System. The FBP system is used by fire managers, firefighters and fire behaviour specialists to estimate potential head fire spread rate, fuel consumption, and fire intensity based on fuel type, weather, topography, foliar moisture content, and type and duration of prediction inputs.

It should be noted that the VRI based *“FBP fuel typing process is inherently subjective, and the vegetation communities of BC frequently fall through the cracks between the FBP fuel types”* (Perrakis, Eade, & Hicks, 2017). Furthermore, *“some vegetation communities in B.C. are, at best, a poor match with any of the FBP fuel types. Uncertainty in fire behavior is probably associated with... mixed-conifer stands of the interior wet belt – species such as western white pine and western larch growing in multi-story canopies, usually associated with Douglas-fir, red cedar, lodgepole pine, or other species* (Perrakis, Eade, & Hicks, 2017).”

Also note that some of the detailed names of the FBP fuel types are based on eastern and northern forests, where the initial fuel type and fire behaviour correlation work was done.

The field assessments found that – overall - the provincial fuel type layer provided a fair representation of the appropriate best-fit FBP fuel type; however understory fuel loading is not well represented by the 17 fuel types, particularly the C5 fuel type found throughout the AOI.

Table 12 explains the relationship between the various FBP fuel types and crown fire/spotting potential. Much of the AOI is classified as C5 fuel type (Red and White Pine) – which is associated with low potential for crown fire and spotting. A full breakdown of the AOI by fuel type has been included in Table 13 and shown visually in Appendix 1, Map 6 – Fuel Type.

Table 12: Fuel Type Categories and Crown Fire Spot Potential (SWPI, 2018)

Fuel Type Categories	Fuel Type - Crown Fire/ Spot Potential
1: C-1, C-2, C-4, M-3/4 (>50% C/DF)	High
2: C-3, C-7, M-3, M-4 (<50% C/DF) M-1/2 >50% Conifer	Moderate
3: C-5, C6, O-1a/b, S-1- S-3, M-1/2 (26-49% Conifer)	Low
4: D-1/2, M-1/2 (<26% Conifer)	Very Low

Table 13: Area of FBP Fuel Types in the AOI

FBP Fuel Type	Descriptor	Area Assessed (hectares)	Percent
C-1	Spruce-Lichen Woodland	1	0%
C-2	Boreal Spruce	99	0%
C-3	Mature Jack or Lodgepole Pine	2,396	8%
C-5	Red and White Pine	12,848	41%
C-7	Ponderosa Pine– Douglas-Fir	2,558	8%
D-1/2	Aspen (Leafless/Green)	4,193	13%
M-1/2	Boreal Mixedwood Leafless/Green	2,665	9%
O-1a/b	Grass	721	2%
S-1	Jack or Lodgepole Pine Slash	135	0%
S-3	Coastal Cedar-Hemlock-Douglas-Fir Slash	253	1%
N	No Fuels	79	0%
W	Water	5,116	16%
TOTAL		25,113	100 %

5.1.2 Proximity of Fuel to the Community and Values

Typically, fuels closest to the community and critical infrastructure represent the highest hazard and should be a priority for treatment. Retained pockets of untreated fuels - between treatment areas, values or structures - should be avoided as they can provide an opportunity for an interface fire to build intensity within the WUI. In order to ensure continuity in fuel treatment, mitigation efforts should be implemented progressively outwards from the community or value.

The 2013 wildfire threat assessment process subdivides the WUI into 3 areas –the first 200 meters from values, 201 to 500 meters from values, and 501 to 2000 meters from values. These zones are slightly different than those used in the 2017 CWPP Template Risk Process. The 2013 zones were used to determine the WUI Wildfire Threat Score and have been described in Table 14.

Table 14: Interface Proximity Zones (adapted from the 2018 CRI template)

Proximity to Values <i>(based on 2013 WTA guide)</i>	Explanation
0-200m	This Zone is always located adjacent to the value at risk. Treatment would modify the wildfire behaviour near or adjacent to the value. Treatment effectiveness would be increased when the value is FireSmart.
201-500m	Treatment would affect wildfire behaviour approaching a value, as well as the wildfire’s ability to impact the value with short- to medium- range spotting; should also provide suppression opportunities near a value.
501-2,000m	Treatment would be effective in limiting long - range spotting but short-range spotting may fall short of the value and cause a new ignition that could affect a value.
>2,000m	This should form part of a landscape assessment and is generally not part of the zoning process. Treatment is relatively ineffective for threat mitigation to a value, unless used to form a part of a larger fuel break / treatment.

Ensuring continuity in fuel treatment throughout the WUI can be difficult due to a variety of factors, including land ownership, availability of funding, site-specific operational constraints, a lack of public support, and the challenge of balancing multiple values on the landscape. A combination of mitigation efforts including FireSmart, operational fuel treatment, and public education can help overcome some of these challenges.

These challenges are particularly common adjacent to the community, where much of the area containing fuels that pose a risk to values is private, municipal, or regional land. Within this area FireSmart activities should be a top priority. FireSmart can focus on reducing hazard directly adjacent to structures and can target high risk private land.

Despite the obstacles associated with WUI fuel treatment, the recently completed landscape level fire break near Silverton demonstrates that a continuous fuel treatment around a populated area can be accomplished.

Proposed fuel treatment units described in Section 5.1 consider both the proximity of fuel to the community, as well as the need for treatment continuity throughout the WUI.

5.1.3 Fire Spread Patterns: Weather Related

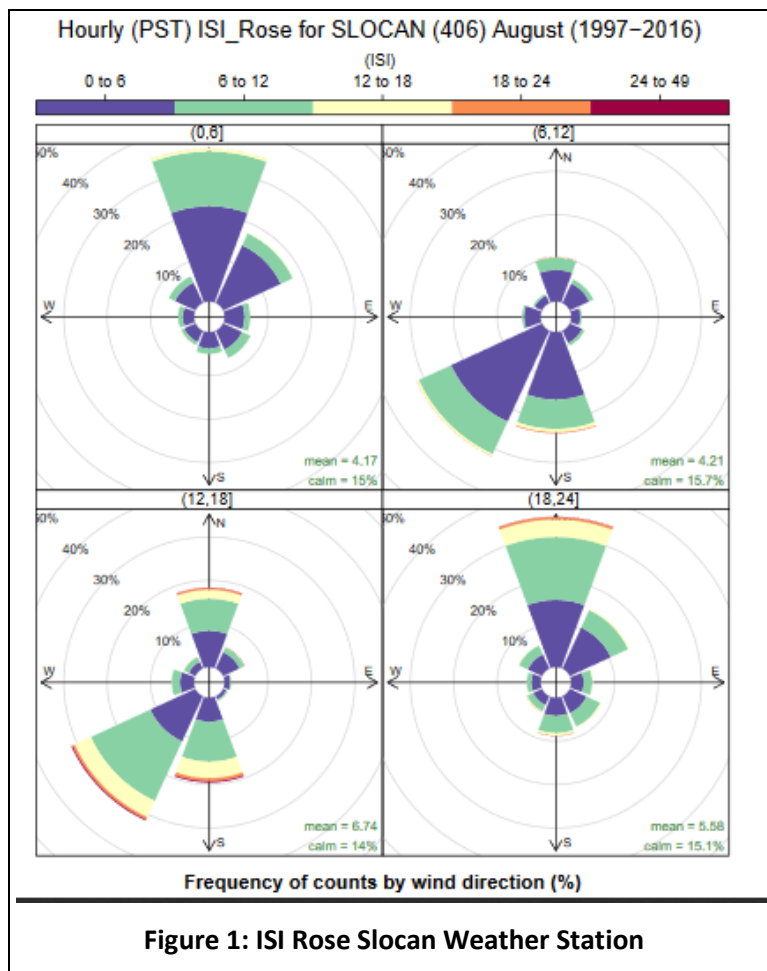
Wind has a significant effect on fire rate of spread, trajectory, and behaviour. Wildfire intensity, spotting, firefighter safety, and suppression success are all greatly influenced by wind speed and direction. While actual winds speed and direction are the parameters that matter during a wildfire, planning fire risk management should consider the most prevalent wind patterns during the fire season, and the most prevalent patterns during the times of day (mid to late afternoon) when fire behaviour is typically aggressive. Wildfires that occur upwind of a community pose a much more significant threat than fires that occur downwind.

General wind patterns in the area were assessed based on the BCWS weather data (ISI Roses) and local knowledge.

The BCWS ISI Roses provide an indication of predominant fire spread patterns during the peak burning period. The ISI (Initial Spread Index) is a numeric rating of expected fire spread rates determined by combining the effects of wind with fine fuel moisture. “Each rose shows the frequency of counts by wind direction with the frequency of the ISI values during that time period” (MFLNRO, 2017).

The nearest BCWS weather station to the AOI is located 3 km north east of Slocan. The August ISI Rose for the Slocan weather station (Figure 8) can be interpreted as follows:

- During peak burning times (12:00-18:00), prevailing winds are typically out of the south-west, indicating a fire spread pattern towards the north-east.
- In the late evening and into the night (18:00-24:00), prevailing winds are typically out of the north, indicating a fire spread pattern towards the south.



Considering the ISI rose and advice from local experts¹⁹, a general north/north-east spread pattern can be expected for wind-driven fires in the main valley. It should be noted that local topography plays a strong role in fire spread pattern (as discussed in section 4.3.4) and can greatly influence local wind

¹⁹ Personal Communications Jonathan Fox, BCWS

speed and direction. Numerous drainages in the AOI - such as Carpenter Creek (New Denver) and Four Mile Creek (Silverton) - can channel and funnel winds, creating variations in surface wind patterns.

Thunderstorm events occur regularly, but not predictably, in the AOI during the fire season. High speed swirling winds and downdrafts from these storms interact with terrain and can blow in any direction, usually for brief periods. Thunderstorm winds and lightning can create unsafe working conditions in forest areas, and the strong winds can increase fire behaviour and spotting distance.

Downslope, evening winds are also a common occurrence. Since most of the communities in the AOI are located in the valley bottom and are bordered by west-facing slopes to the east, the potential for downslope (easterly) evening winds towards the community should not be overlooked.

Understanding local wind patterns in the area is particularly important for wildfire response. Shifting winds can compromise containment efforts and firefighter safety. Firefighters and emergency response personnel should remain vigilant and expect shifting winds throughout the Slocan Valley. As always, the time of day, local topography, and the effects on localized winds should be considered when developing suppression strategies and evacuation plans. The following generalizations should be considered during wildfire response and fuel management planning:

- Generally, southerly winds can be expected throughout the main valley.
- Upslope daytime winds and downslope evening winds are common.
- Topographical features can influence local winds significantly (i.e. potential funnelling and channeling of wind through drainages or chutes, ridge top winds and eddies).

Fire Spread Patterns described above are not part of the 2013 Wildfire Threat Assessment process and were not included in the Local Wildfire Threat Analysis for this CWPP (Section 4.3.5). Spread patterns, however, should still be considered when determining priority areas for fuel treatment and landscape level fire breaks.

5.1.4 Fire Spread Patterns: Terrain Related

The Slocan Valley is located in mountainous terrain, bordered by the Valhalla and Slocan Ranges. The general topographic pattern in the AOI is a 2 km wide area of flat valley bottom and moderate gradient lower slopes, which transition abruptly to steep mountainous hillsides. In much of the AOI, the valley bottom is occupied by Slocan Lake.

The steep topography throughout Slocan Valley can have a significant effect on fire behaviour and spread patterns. Slope is an important factor in fire trajectory and rate of spread - with fires typically spreading faster up slope due to increased radiation and preheating of fuels. On steep slopes, flames bathe upslope fuels, leading to very rapid and unpredictable spread. Convection winds from active fires can carry spotting material upslope into areas preheated by the fire.

Slope aspect also plays a role in fire behaviour, with south and west facing slopes typically receiving more solar radiation, resulting in dryer fuels and increased fire activity.

The relationship between weather and topography is particularly evident in steep terrain. Local topography can have a substantial effect on weather and winds; as described in section 4.3.3. One common summertime occurrence is upslope daytime winds which can further amplify spread rates up hill. Downslope evening winds – also common – can push fires towards populated areas in the valley bottom.

Inversions and thermal belts - which occur when cold air close to the ground is trapped by a layer of warmer air above – can also influence wildfire behaviour and fire response. A thermal belt occurs when the top of an inversion makes contact with valley walls or mountain slopes. Overnight thermal belt development can result in temperature and relative humidity reaching near daytime levels - leading to intense nighttime fire behaviour. Intense and erratic fire behaviour can also be expected when an inversion or thermal belt breaks – leading to increased wind activity. Inversions can further challenge fire response by trapping smoke in the valley, effectively grounding aircraft used in wildfire operations and limiting the ability to detect new fires and spot fires until conditions clear.

Operational constraints associated with steep slopes can significantly limit both fuel treatment and suppression efforts. Challenging access, equipment and aircraft limitations, and reduced firefighter productivity due to difficult terrain are common limitations on steep slopes. These limitations, combined with both rolling burning debris igniting fuels downslope of the main fire and increased upslope spread rates, make wildfire response on steep slopes exceptionally difficult.

Narrow valleys bordered by steep slopes can also prove to be challenging in the event of an evacuation – particularly if egress is limited to one major route (ex. Sandon).

Although this CWPP is not intended to assess post-wildfire hazards, it should also be noted that wildfires in steep terrain can increase the likelihood of flooding, debris flows, and landslides long after a wildfire has been extinguished.

Slope, aspect, and the position of values relative to the slope are components in the 2013 WUI WTA assessment process.

Slope Class

General fire behaviour implications of slope classes are summarized in Table 15. Slope classes shown are based on the 2013 WTA guide used in the Threat Assessment for this CWPP.

Table 15: Slope Percentage and Fire Behaviour Implications (adapted from the 2018 CRI Template)

Slope Percent Class <i>(based on 2013 WTA guide)</i>	Fire Behaviour Implications
<16%	Very little flame and fuel interaction caused by slope, normal rate of spread.
16-29%	Flame tilt begins to preheat fuel, increase rate of spread.
30-44%	Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.
45-54%	Flame tilt preheats fuel and bathes flames into fuel, very high rate of spread.
>55%	Flame tilt preheats fuel and bathes flames into fuel well upslope, extreme rate of spread.

Slope Position of the Value

Slope position of a value relates to the ability of a wildfire to gain momentum during an uphill run. Structures or values located in the upper 1/3 of a slope would be impacted by high preheating and faster rates of spread (Table 16). The majority of communities and structures within the AOI are

located at the bottom of a slope, adjacent to Slocan Lake. Watersheds and some recreational areas are located in steep terrain, which put these values at an increased risk. General fire behaviour implications of slope position to the value are summarized in Table 16.

Table 16: Slope Position of Value and Fire Behaviour Implications (SWPI, 2018)

Slope Position of Value	Fire Behaviour Implications
Bottom of Slope/ Valley Bottom	Impacted by normal rates of spread.
Mid Slope - Bench	Impacted by increase rates of spread. Position on a bench may reduce the preheating near the value. (Value is offset from the slope).
Mid slope – continuous	Impacted by fast rates of spread. No break in terrain features affected by preheating and flames bathing into the fuel ahead of the fire.
Upper 1/3 of slope	Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel.

5.1.5 Local Wildfire Threat

The local wildfire threat provides a spatial overview of forest polygons that pose an increased threat to communities, high value areas, and critical infrastructure (Appendix 1, Map 7). The local wildfire threat differs from the PSTA in a number of ways. The PSTA provides a general, coarse scale threat calculated from spatial data and computer models. As mentioned in Section 4.3, the PSTA is not intended to represent absolute, site-specific values. The local wildfire threat, on the other hand, is based on field surveys (WTA Plots), as well as spatial data analysis – providing a more accurate localized threat at the forest stand level. The PSTA was used to inform areas of potentially high threat in order to conduct field assessments for the local wildfire threat.

There are two components to the local wildfire threat classification:

1. Wildfire Behaviour Threat Class
2. The Wildland Urban Interface Threat Class

5.1.5.1 Wildfire Behaviour Threat Class

The Wildfire Behaviour Threat represents the expected wildfire behaviour potential based on fuel, weather, and topography components.

Summary

The process used to determine local Wildfire Behaviour Threat class was:

1. 137 full field assessments were completed to assess the variable forest cover and topography within the AOI.
2. Field measured threat ratings were extrapolated to areas with similar forest cover and vegetation composition based on the VRI data set.

3. The majority of polygons were classified with a high wildfire behaviour threat rating - reflective of the wildfire behaviour threat observed in the field.

The resulting local wildfire behaviour threat generated from this process differs from the PSTA rating primarily due to the fact that understory fuel loading is underrepresented by the current FBP fuel types for the Slocan Valley - as discussed in section 4.3.1.

Details

A total of 137 field sample plots were measured in the Area H North CWPP AOI, using the procedures set out in Wildland Urban Interface Wildfire Threat Assessments in B.C. (Morrow, Johnson and Davies 2013). Wildfire Behaviour Threat Class was determined on each plot using the parameters and scoring shown in the table on the following page.

COMPONENT /Subcomponent		LEVELS				
Fuel		A	B	C	D	E
1	Duff Depth and Moisture Regime (cm)	1-<2 3	2-<5 Dry Zonal Wet 5 3 1	5-<10 Dry Zonal Wet 10 6 2	10-20 Dry Zonal Wet 12 8 4	>20 Dry Zonal Wet 15 10 5
2	Surface Fuels Continuity (% cover)	<20 0	20-40 2	41-60 3	61-80 4	>80 5
3	Vegetation Fuel Composition	Moss, Herbs, Irrigated Crops, Low Flammability Weeds 1	Herbs, Deciduous Shrubs 2	Lichen, Conifer Shrubs 3	Pinegrass, Juniper 4	Sagebrush, Bunchgrass, Antelope Brush, Scotch Broom 5
4	Fine Woody Debris Continuity (<=7cm) (% cover)	<1 coverage 1	Scattered, <10 coverage 5	10-25 coverage 7	>25 coverage, < 10 cm deep 10	>25 coverage, > 10 cm deep 15
5	Large Woody Debris Continuity (>7cm) (% cover)	<1 coverage 1	Scattered, <10 coverage 2	10-25 coverage 5	> 25 coverage, not elevated 7	>25 coverage, partially elevated 10
6	Live and Dead Coniferous Crown Closure (%)	<20 2	20-40 5	41-60 10	61-80 15	>80 10
7	Live Deciduous Crown Closure (%)	>80 or <40% coniferous crown closure 0	61-80 2	41-60 3	20-40 4	<20 5
8	Live and Dead Conifer Crown Base Height (m)	5+ or <20% conifer crown closure 0	3-5 5	2-<3 7	1-<2 10	< 1 15
9	Live and Dead Suppressed and Understorey Conifers (stems/ha)	0-500 2	501-1000 5	1001-2000 10	2001-4000 20	>4000 30
10	Forest Health (% of dominant and co-dominant stems)	Standing Dead and Partly Down < 5 or <20 stems/ha 0	Standing Dead and Partly Down 5-25 5	Standing Dead and Partly Down >25-50 10	Standing Dead and Partly Down >50-75 20	Standing Dead and Partly Down >75 30
11	Continuous Forest/Slash Cover within 2km (%)	0-20 0	21-40 3	41-60 5	61-80 7	>80 10
Sub Total						/155*
Weather		A	B	C	D	E
12	Biogeoclimatic Zone	AT, Irrigated 1	CWH, CDF, MH Dry Zonal Wet 5 3 1	ICH, SBS, ESSF Dry Zonal Wet 10 7 3	IDF, MS, SBPS, CWH ds1 & ds2, BWBS, SWB - Dry Zonal Wet 15 10 5	PP, BG 15
13	Historical Wildfire Occurrence (by WMB Fire Zone)	G5, R1, R2, G6, V5, R9, V9, V3, R5, R8, V7 1	G3, G8, R3, R4, V6, G1, G9, V8 5	G7, C5, G4, C4, V1, C1, N6 8	K1, K5, K3, C2, C3, N5, K6, N4, K7, N2 10	N7, K4, K2, N1 15
Sub Total						/30
Topography		A	B	C	D	E
14	Aspects (>15% slope)	North 0	East 5	<16% slope all aspects 10	West 12	South 15
15	Slope (%)	<16 1	16-29 and max score for North slopes 5	30-44 10	45-54 12	>55 15
16	Terrain	Flat 1	Rolling 3	Sloped terrain, minor low relief draws 5	Consistent slope, deep draws or shallow gullies 7	Consistent slope, deep gullies 10
17	Landscape/Topographic Limitations to Wildfire Spread	< 5 ha isolated forest land 1	North and/or east aspects dominate, wildfire spread restricted from South and/or West 2	Mountainous terrain, broken topography, regular aspect and slope changes, multiple restrictions to wildfire spread large water bodies 5	Rolling terrain, minor water bodies, minimal aspect and slope changes, minor restrictions to wildfire spread 10	Continuous, consistent topography No restriction to wildfire spread 15
Sub Total						/55
FUEL, WEATHER AND TOPOGRAPHY						/240**
WILDFIRE BEHAVIOUR THREAT SCORE						

The local Wildfire Behaviour Threat Class was determined by extrapolating the threat assessments on the field survey plots to the larger AOI area based on vegetation cover (VRI) data.

The rationale for this approach was:

1. The Wildfire Behaviour Threat Fuel Subcomponent scores (1 through 11) account for 65% of the Wildfire Behaviour Threat score rating and are closely linked to vegetation cover characteristics. Vegetation cover data is available for the entire AOI.
2. The Wildfire Behaviour Threat Weather subcomponent scores (12 and 13) are uniform for the entire AOI area, and thus do not cause differences in Wildfire Behaviour Threat scores within the AOI.
3. The Wildfire Behaviour Threat Topography scores for aspect and slope (14 and 15) are intrinsically reflected in the vegetation cover data as significant changes in these variables generally result in changes in growing site conditions (soil depth, soil type, available moisture) that result in changes in vegetation cover.
4. The Wildfire Behaviour Threat Topography scores for Landscape (17) are uniform throughout the sampled area and the AOI, and do not cause differences in Wildfire Behaviour Threat scores within the AOI.
5. Ninety six percent of the Wildfire Behaviour Threat Topography scores for Terrain (16) are either Rolling (3 points), Sloped Terrain (5 points) or Consistent Slope (7 points). The remaining 4% of scores are Flat (1 point). The available digital elevation model from TRIM data is not precise enough to model the Terrain classes using GIS. The 4 point spread between Rolling and Consistent Slope that contains 96% of the data was not felt to be diagnostic of Wildfire Behaviour Threat scores. Modelling the Terrain score with an improved LiDAR based DEM should be considered in future CWPP iterations, but extrapolating Wildfire Behaviour Threat scores without a Terrain model was acceptable at this time.

12 of the 137 measured plots were located in areas where fuel management work had been carried out between 2017 and 2019. All of the 12 plots found a Moderate Wildfire Behaviour Threat score.

Enrico Fionda, Tom Bradley and Jesper Nielsen carried out a thorough analysis and discussion of the relationship between the field measured Wildfire Behaviour Threat scores and VRI data. Relationships between measured Wildfire Behaviour Threat scores and leading species, species groups, coniferous vs deciduous species, fuel type, stand age, crown closure, site index, and multiple combinations of these variables were explored.

The extrapolation process identified as providing the best fit to the measured data is as follows. The process uses the result from the first successful "if" statement and does not continue further into the list of possibilities.

1. If Private Land, no threat rating determined.
2. If mapped surveyed right of way with constructed road, class as Moderate threat. The road rights of way generally contain vegetation cover with a moderate to high threat rating combined with a non-flammable road surface.
3. If logged area with post harvest fuel management or other identified fuel managed area (see Table 3), class as Moderate threat.

4. If other logged area, use PSTA Public Threat Rating updated for recent harvesting.
5. If non-forested area, use PSTA Public Threat Rating.
6. If Douglas-fir component of stand is $\geq 10\%$ of stocking, class as High threat. This filter ensures that the deciduous/moderate filter in next line does not capture a set of dryer site stands that should be High threat rating.
7. If aspen, cottonwood or birch is leading species in stand, class as Moderate threat.
8. Otherwise, class as High threat.

This extrapolation method resulted in a 88.3% correlation between measured and extrapolated Wildfire Behaviour Threat score in polygons within which the 137 field measurements were located.

The 11.7% of plots where the extrapolation resulted in a misclassification were as follows:

1. 0.7% was a case where the a field measured WBTC score of 120 points (High) is within a vegetation cover polygon classified as Moderate due to deciduous leading species. The upper threshold of Moderate is 95 points. The plot was located in a coniferous patch within a deciduous leading stand, and reflects both the in-stand variability in the area and the high fuel load in the coniferous areas. Two other plots in areas of deciduous forest in the same vegetation cover type measured moderate WBTC scores. This level of in-stand variability is not captured in the forest inventory data, and can only be addressed a the prescription stage.
2. 11% were cases where field measured WBTC scores of from 80 to 95 points (Moderate) were within polygons classified as High. Average WBTC score in the this data set of misclassified plots was 90. The lower threshold of High is 96 points. This results in an overestimate of threat levels, which can be addressed during prescription preparation stage and which is precautionary in nature.

Table 17 shows a summary of the extrapolated Wildfire Behaviour Threat in the AOI.

Table 17: Area of Wildfire Behavior Threat Classes in AOI

Wildfire Behavior Threat Class	Area (hectares)	Percent of Area Assessed
No Data - Private Land	3,395	11%
Very Low - Water	5,119	16%
Low	649	2%
Moderate	3,668	12%
High	17,979	58%
Extreme	252	1%
Total	31,062	100%

The following provides a description of the Wildfire Behaviour Threat classes as outlined in the 2013 WUI Wildfire Threat Assessment Guide.

Fire Behaviour Threat Class Summary

- **Very Low (blue):** These are lakes and water bodies that do not have any forest or grassland fuels. These areas cannot pose a wildfire threat and are not assessed.
- **Low (green):** This is developed and undeveloped land that will not support significant wildfire spread.
- **Moderate (yellow):** This is developed and undeveloped land that will support surface fires only. Homes and structures could be threatened.
- **High (orange):** Landscapes or stands that: are forested with continuous surface fuels that will support regular candling, intermittent crown and/or continuous crown fires; often include steeper slopes, rough or broken terrain with generally southerly and/or westerly aspects; can include a high incidence of dead and downed conifers; are areas where fuel modification does not meet an established standard.
- **Extreme (red):** Consists of forested land with continuous surface fuels that will support intermittent or continuous crown fires. Polygons may also consist of continuous surface and coniferous crown fuels. The area is often one of steep slopes, difficult terrain and usually a southerly or westerly aspect.

5.1.5.2 Wildland Urban Interface Threat Class

“High or Extreme wildfire behaviour threat polygons can pose unacceptable wildfire threats when in close proximity to a community or development” (Morrow, Johnston, & Davies, 2013).

The WUI is defined as an area with combustible vegetation adjacent to homes and valuable Critical Infrastructure (CI). The Wildland Urban Interface Threat Class evaluates the threat of forested stands as they relate to values in the AOI. Per Morrow, Johnston, & Davies, the Wildland Urban Interface

Threat Class was only calculated for areas that have a Wildfire Behaviour Threat Class of High or Extreme.

A combination of the outcomes of two GIS analysis procedures were used to assess the WUI threat class.

The first GIS analysis procedure was used to estimate the Wildland Urban Interface Threat Class for High or Extreme wildfire behaviour threat polygons located in close proximity to a community or development(s).

The location of community or development was modelled based on structure density per square kilometer (km²). The updated structure location mapping prepared for the CWPP was analyzed with Zonal Statistics to create a 100 m square grid with a structure count per grid cell. A FocalSum analysis using a 10 x 10 cell window (i.e. 1 km²) was used to create a set of various structure density per km² raster data sets. A review of the structure density per km² outcomes selected the surface showing the area with greater than or equal to 30 structures/ km² as the best representation of community and development. The 30 structures/ km² polygon achieved a reasonable balance between including fairly densely to densely settled areas as community and development and excluding sparsely settled areas.

The following provides a description of the Wildland Urban Interface Threat classes around community and developments as outlined in the 2013 WUI Wildfire Threat Assessment Guide.

WUI Threat Classes

- **N/A:** Wildfire behaviour threat class is not high or extreme
- **Low:** The high or extreme wildfire behaviour threat class polygon is a sufficient distance away from any developments not to have a direct impact. The polygon is likely over two kilometers from any developments
- **Moderate:** The high or extreme wildfire behaviour threat class polygon is a sufficient distance away from any developments not to have a direct impact. The polygon is likely over five hundred meters from any developments.
- **High:** The high or extreme wildfire behaviour threat class polygon has the potential for a direct impact on a community or development. The polygon is within five hundred meters of a community or development(s).
- **Extreme:** The high or extreme wildfire behaviour threat class polygon has the potential for a direct impact on a community or development. The polygon is immediately adjacent to a community or development(s).

"Immediately adjacent to a community" is defined by SWPI (2018) as within 100 meters of the values at risk.

A set of fixed width buffers - 100 m, 500 m, 2000 m - were generated around the 40 structures/ km² based community and development areas.

High or extreme wildfire behaviour threat class polygons within or within 100 m of the community and development areas were classed as Extreme WUI Threat Class, and **are** shown on Map 7.

High or extreme wildfire behaviour threat class polygons from 100 to 500 m removed from the community and development areas were classed as High WUI Threat Class, and **are** shown on Map 7.

High or extreme wildfire behaviour threat class polygons more than 500m from the community and development areas received a Moderate or Low WUI threat class rating, and **are not** shown on Map 7.

The second GIS analysis procedure was used to identify WUI threats in relation to Critical Infrastructure value points and other values at risk points identified on Map 2. Spatial data inputs were a high resolution multispectral image, a digital elevation model (DEM), and a feature class of points showing both regular structures and Critical Infrastructure.

The model calculates a score for each of the three Structural assessments shown in the table below.

Structural	A	B	C	D	E
18 <i>Position of Structure/Community on Slope</i>	No Structures Values within 2 km 0	Bottom of slope, valley bottom 5	Mid-slope benchland, elevated valley, <16% slope 10	Mid-slope continuous, >15% slope 12	Upper 1/3 of Slope 15
19 <i>Type of Development</i>	No Structures Values within 2 km 0	Perimeter Interface, no inclusions 3	Perimeter Interface, with inclusions 5	Intermix > 1 structure/ha 8	Intermix <1 structure/ha Infrastructure 10
20 <i>Position of Assessment Area Relative to Values</i>	No Structures Values within 2 km 0	Above >500 200-500 <200 m 1 10 20	Sidehill >500 200-500 <200 m 1 12 25	Flat/Rolling >500 200-500 <200 m 1 12 25	Below >500 200-500 <200 m 1 15 30
WILDLAND URBAN INTERFACE WILDFIRE THREAT SCORE					/55

The WUI Threat score for the Position of a Structure on a Slope was determined as follows:

- Slope classes of 0-16 and >16 percent were created from the DEM to differentiate between 18C and 18D.
- Contour lines were created and analysed to identify the elevation break points between the valley bottom and bottom of slope(18B), mid slope(18C/D), and upper third of slope(18E).
- Scores were assigned based on the contour values and slope.

The WUI Threat score for the Type of Development was determined as follows:

- Urban(19B/C) vs rural(19D/E) areas were differentiated by point structure density. The ArcMap Point Density tool was used to calculate the density of point features (structures) around each output raster cell. A 100 m radius neighbourhood was defined around each raster cell center, and the number of points that fall within the neighbourhood was totalled and divided by the area of the neighbourhood.

Gaming with the model was used to select a suitable density threshold. Locations with a point (structure) density > 4.2 were classed as being in an urban area. Structures that did not meet this threshold were classed as being in a Rural area.

- Within areas identified as Rural, Score 19E was assigned to areas with <= 1 structure per hectare. The remaining rural areas were assigned the score 19D.
- To differentiate between 19B and 19C in Urban areas, inclusions were identified. Inclusions are areas of unmodified forest that exist within urban areas. A red and near infrared band collected from the Sentinel 2 satellite was converted to a Normalized Differential Vegetation Index (NDVI). An NDVI threshold value was then identified to distinguish between inclusions and non vegetated areas. A 25 meter buffer was created around the inclusion and this area was assigned the score 19C. The remaining urban area was then assigned the score 19B.

The WUI Threat score for the Position of Assessment Area Relative to Values was determined as follows:

- A Euclidean Distance (ED) surface was created based on location of critical infrastructure (CI), and categorized into <200 meters, 200-500 meters, and >500 meters classes.
- A digital elevation model (DEM) elevation raster, terrain slope raster, and ED raster were then combined into a single raster.
- Score 20D was calculated from the raster for areas with slopes < 16%.
- For other areas, elevation values from the DEM were then added to each CI point. A program loop created a 2 kilometer buffer around each point and clipped the DEM to this buffer. Each cell of the clipped DEM was compared to the CI's elevation and it was determined if the cell is above, below, or beside the CI. An appropriate score was then created for 20B, 20C, and 20E.

Review of the model outputs met the general expectation that areas with the highest WUI threat are in upper portions of slopes, rural, and located below critical infrastructure. In contrast, urbanized areas with no inclusions pose a minimal threat to the community.

The outcomes of the two analyses were combined to display on Map 7. Any area with a High or Extreme WUI Threat Class in either analysis is shown thusly on Map 7.

Table 18 shows a summary of the Wildland Urban Interface Threat Class. Areas with a High or Extreme Wildland Urban Interface Threat should be priorities for fuel treatment.

Table 18: Area of WUI Threat Classes in AOI

WUI Threat Class	Area (hectares)	Percent of AOI
Not Applicable	12,832	42%
Low	10,346	23%
Moderate	7,509	31%
High	324	4%
Extreme	52	1%
Total	31,062	100%

SECTION 6: Risk Management and Mitigation Factors

Ongoing fuel management and FireSmart initiatives can help mitigate the wildfire risk throughout the Slocan Valley. Proposed activities aim to reduce the amount of high threat fuels near the community, reduce the susceptibility of values to wildfires, and reduce the occurrence of human caused fires through education and outreach.

6.1 Fuel Management

In wildland fire suppression, fire containment lines are constructed from an advantageous location - usually a barrier to fire spread - known as an anchor point. Anchor points prevent firefighters from being outflanked during progressive fireline construction. A similar concept can be applied to fuel treatments. Ensuring treatments are continuous and anchored into strategic locations (such water bodies, roads, or gravel pits) will increase their effectiveness in the event of a wildfire. Treated areas should not be expected to stop a running crown fire; however they can help reduce fire intensity and increase access and opportunities for first responders to action a wildfire in the WUI.

Locations for fuel treatment were identified and prioritized based on wildfire threat and operational feasibility. An overview of treatment areas has been provided below, while Table 19 (Fuel Treatment Summary) and Appendix 1, Map 8 (Fuel Treatment) provide additional site specific details for each proposed treatment unit.

The following types of potential fuel management treatments were considered during preparation of the CWPP.

6.1.1 Type 1 - Wildland Urban Interface Fuel Management

The Type 1 treatment method addresses dead and non-merchantable live fuels in a forest area to achieve fuel management goals. Most Type 1 work is carried out by hand crews. Machine piling of cut fuels is an option in gently sloped terrain.

A professional, site specific treatment prescription that considers local circumstances will be developed prior to treatment in each area. Generic Type 1 treatment parameters are listed below.

- Tree Removal
 - Overstory stems > 17.5 cm will be retained.
 - Understory conifers < 17.5 cm in diameter will be thinned to create a final stand density of 500 to 700 stems/ha, or approximately 4 m intertree spacing.
 - Understory leave tree spacing and density will vary depending on overstory tree distribution prior to treatment.
 - Small clumps of conifer regeneration < 17.5 cm in diameter will be retained for structural diversity and habitat values. Areas which provide a visual screen for part of the unit will be the first priority for clump location. Retained clumps may occupy up to 5% of the treatment Area. The clumps may not create a fire pathway within the treated unit, considering terrain, wind patterns and adjacent vegetation types/fuel types.
 - Deciduous trees and western yew will be to be retained as 'ghost trees' and do not count towards target density.
- Pruning

- All retained conifer stems outside of retained clumps will be pruned to a height of 2.5 m or 1/3 of total height, whichever is less, to remove ladder fuels.
- Live branches and dead branches which retain needles and fine branches will be pruned.
- Fine Fuel Abatement
 - Reduce accumulations of fine surface fuels <7 cm diameter to approximately 0.75 kg/m² (7.5 tonnes per hectare).
 - Reduce accumulations of fuels 7 to 12 cm diameter to approximately 2.5 kg/ m² (25 tonnes per hectare).
 - Discontinuous areas of fine fuels up 10 m x 10 m in size may be left untreated to retain biodiversity values. Untreated fine fuel area may occupy up to 4% of the treatment area.
- Coarse Woody Debris
 - A minimum of 10 logs per ha of coarse woody debris, each >5 meters in length and >20 cm diameter, will be retained if present.
- Debris Disposal
 - Cut stems and other fuels will be disposed of by chipping or by piling and burning.
 - Burn piles will be a maximum of 5 meters in diameter and 5 meters high. Piles will be located away from retained trees.
 - All pile burning will be done in accordance with the Wildfire Act and Regulations.
- Smoke Management
 - Burning will be conducted in accordance with Ministry of Environment regulations.
- Safety
 - All will be carried out in compliance with applicable Worksafe BC regulations.
- Reserves
 - Riparian reserves will be established per regulations and will not be treated.
 - Slopes >60% may not be treated if terrain and site conditions create an unsafe workspace.
 - Additional reserves may be established based on site specific factors. Any additional reserves will be mapped and supported with a rationale.
- Revegetation
 - Disturbed areas from machine traffic will be seeded with an appropriate revegetation seed mix of Canada #1 grade seed within 18 months of disturbance.
- Information Sharing
 - Information on planned activities will be shared with all holders of a government tenure or licence, First Nations per CAD database, and adjacent landowners a minimum of 30 days prior to work start.

6.1.2 Type 2 - Post-Harvest Fuel Management

This treatment method is used in areas that have been previously harvested to reduce fuel loads and initiate climate change adaptation using a merchantable understory removal / overstory retention approach. The harvest pass creates an open forest of established large trees of fire resistant species, per the SIFCo WUI stocking standards. Post harvest fuel assessment and abatement per the wildfire regulations will be carried out by licensee.

The Type 2 post harvest treatment completes the creation of a fuel managed area by removing sub-merchantable understory stems, ladder fuels, and fine fuels.

Type 2 treatment uses an excavator to pile concentrations of fine and medium fuels for disposal. Following the machine piling phase, the hand treatment crew will go through the unit to address remaining fuel loads.

A professional, site specific treatment prescription that considers local circumstances will be developed prior to treatment in each area. Generic Type 2 treatment parameters are listed below.

- Tree Removal
 - Overstory stems > 17.5 cm will be retained.
 - Understory conifers < 17.5 cm in diameter will be thinned to create a maximum final stand density of 500 to 700 stems/ha, or approximately 4 m intertree spacing. Poor quality understory stems with low live crown percentage, deformed stems, severe suppression and/or logging damage will not be retained.
 - Final understory leave tree spacing and density will vary depending on (a) overstory tree distribution prior to treatment and (b) existence of suitable understory leave trees.
 - Clumps of conifer regeneration < 17.5 cm in diameter may be retained for structural diversity and habitat values. Areas where no overstory harvest took place and areas which provide a visual screen from roads or trails will be the first priority for clump location. Retained clumps may occupy up to 15% of the treatment Area. The clumps may not create a fire pathway within the treated unit, considering terrain, wind patterns and adjacent vegetation types/fuel types.
 - Deciduous trees and western yew will be to be retained as 'ghost trees' and do not count towards target density.
- Fine Fuel Abatement
 - Reduce accumulations of fine surface fuels <7 cm diameter to approximately 0.75 kg/m² (7.5 tonnes per hectare).
 - Reduce accumulations of fuels 7 to 12 cm diameter to approximately 2.5 kg/ m² (25 tonnes per hectare).
 - Discontinuous areas of fine fuels up 10 m x 10 m in size may be left untreated to retain biodiversity values. Untreated fine fuel area may occupy up to 4% of the treatment area.
- Debris Disposal
 - Cut stems and other fuels will be disposed of by chipping or by piling and burning.
 - Burn piles will be a maximum of 5 meters in diameter and 5 meters high. Piles will be located away from retained trees.
 - Machine piling of fuels will be used in locations with slopes < 35% and stable soils that are suitable for machine travel.
 - All pile burning will be done in accordance with the Wildfire Act and Regulations.
- Reserves
 - Riparian reserves will be established per regulations and will not be treated.
 - Slopes >60% may not be treated if terrain and site conditions create an unsafe workspace.
- Coarse Woody Debris, Smoke Management, Safety, Revegetation and Information Sharing
 - Same targets and standards described under Type 1 treatments.

6.1.3 Type 3 - Machine Based Interface Cleanup

This treatment method is similar to Type 2 – Post-Harvest Fuel Management – but is carried out in interface areas where combinations of insect attack, root disease, blowdown and past high-grading have depleted the stock of merchantable timber to the point where no viable harvest volume remains.

Type 3 treatment uses an excavator to pile fine and medium fuels for disposal, or to mulch fuels in place using a mulching head. The machine access routes will create open strips in the treated area, but machine access will be constrained to limit impacts on stocking density and soil disturbance.

No Type 3 treatments are identified in this CWPP. Type 3 treatment areas may be identified during the prescription preparation process within the proposed treatment areas.

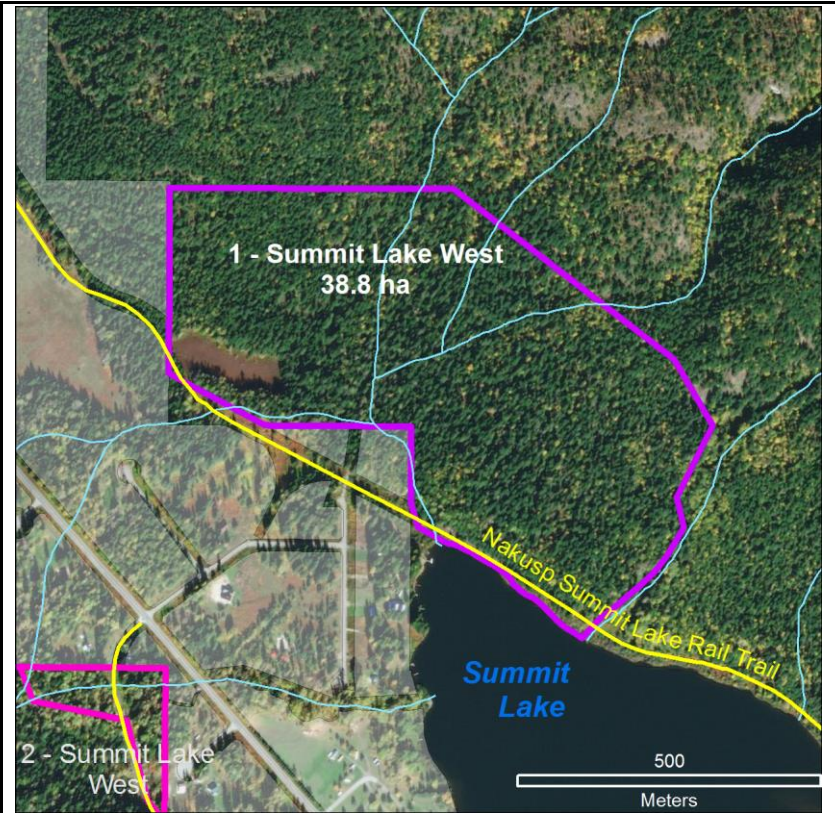
A professional, site specific treatment prescription that considers local circumstances will be developed prior to treatment in each area. Generic Type 3 treatment parameters are listed below.

- Tree Removal
 - Where present, overstory stems > 17.5 cm will be retained. Creation of machine access trails may require that some overstory stems be felled. This will be minimized as much as possible.
 - Understory conifers < 17.5 cm in diameter will be thinned to create a maximum final stand density of 400 to 700 stems/ha, or approximately 4 m intertree spacing. Poor quality stems with low live crown percentage, deformed stems, and/or severe suppression will not be retained.
 - Final understory leave tree spacing and density will vary depending on (a) overstory tree distribution prior to treatment and (b) existence of suitable understory leave trees.
 - Clumps of conifer regeneration < 17.5 cm in diameter may be retained for structural diversity and habitat values. Areas which provide a visual screen from roads or trails are the first priority for clump location. Retained clumps may occupy up to 25% of the treatment Area. The clumps may not create a fire pathway within the treated unit, considering terrain, wind patterns and adjacent vegetation types/fuel types.
 - Deciduous trees and western yew may be retained as 'ghost trees' and do not count towards target density.
- Fine Fuel Abatement
 - Reduce accumulations of fuels 7 to 12 cm diameter to approximately 4.0 kg/ m² (40 tonnes per hectare).
 - Discontinuous areas of fine fuels up 10 m x 10 m in size may be left untreated to retain biodiversity values. Untreated fine fuel area may occupy up to 4% of the treatment area.
- Debris Disposal
 - Fuels will be disposed of by chipping or by piling and burning.
 - Burn piles will be a maximum of 5 meters in diameter and 5 meters high. Piles will be located away from retained trees.
 - Machine piling of fuels will be used in locations with slopes < 35% and stable soils that are suitable for machine travel.
 - All pile burning will be done in accordance with the Wildfire Act and Regulations.
- Reserves
 - Riparian reserves will be established per regulations and will not be treated.
 - Slopes >60% may not be treated if terrain and site conditions create an unsafe workspace.
- Coarse Woody Debris, Smoke Management, Safety, Revegetation and Information Sharing
 - Same targets and standards described under Type 1 treatments.

6.1.4 Summary of Proposed Fuel Treatment Units

Table 19: Summary of Proposed Fuel Treatment Units

Treatment Unit	Treatment Type(s)	Total Area
1 - Summit Lake West Map Code: 1-SLW_P ²⁰	Primary Fuel Break. Estimate: 50% Type 1 WUI 50% Type 2 Post Harvest Fuel Management	38.8 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	94% High 6% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
Moderately sized treatment unit located at west end of Summit Lake. Mix of varied stand ages and coniferous and deciduous forests. Moderately sloped, conventionally operable terrain. Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement and recreational values, and reduces the likelihood of a wildfire expanding to landscape scale.		
Overlapping Values		
Visuals, recreation values (Summit Lake, recreation properties, private resort, provincial park and Rail Trail tenure), riparian ecosystems, Bonanza Biodiversity Corridor, western toad habitat.		
Treatment Constraints		



²⁰ The Map Code is the Proposed_Treatment_ID value for the treatment unit that is contained in the CWPP spatial data submission.

Terrain in unit is suited to Type 2 treatment, but diverse overlapping values will constrain area of Type 2 treatment.

Existing access for Type 1 treatment excellent using rail trail. Existing access for Type 2 harvesting poor. Access to site for Type 2 Treatment will require cooperation of private land owners and trail tenure holder.

Need to maintain forest canopy for water and visual management.

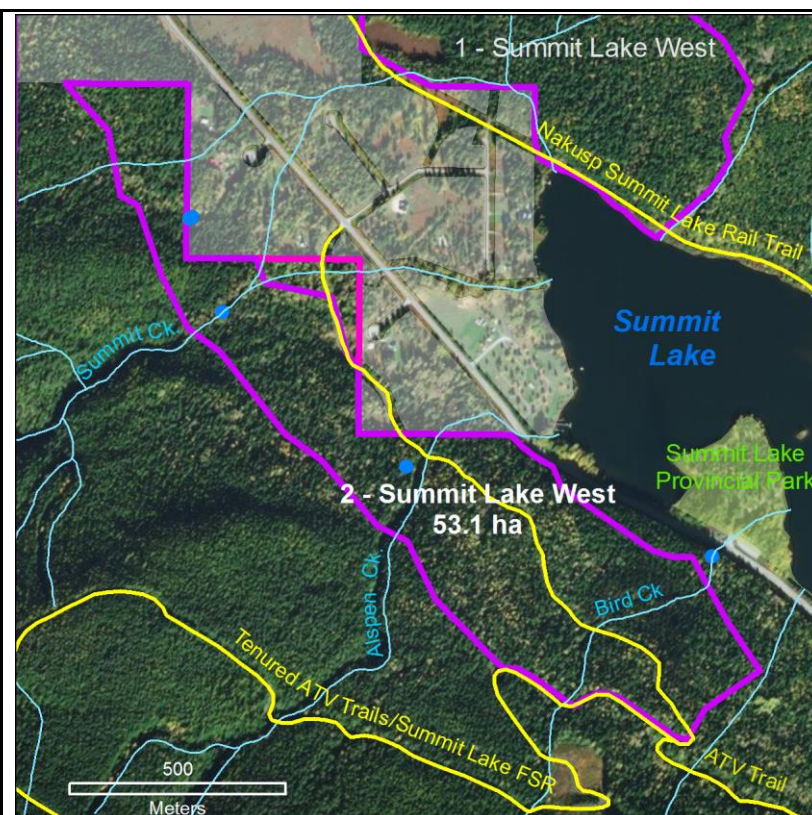
Riparian reserves will be identified around streams, Summit Lake and open wetland along west boundary during development of prescription.

Area is within identified western toad habitat associated with Summit Lake and biodiversity corridor. Treatment will be constrained by biodiversity management.

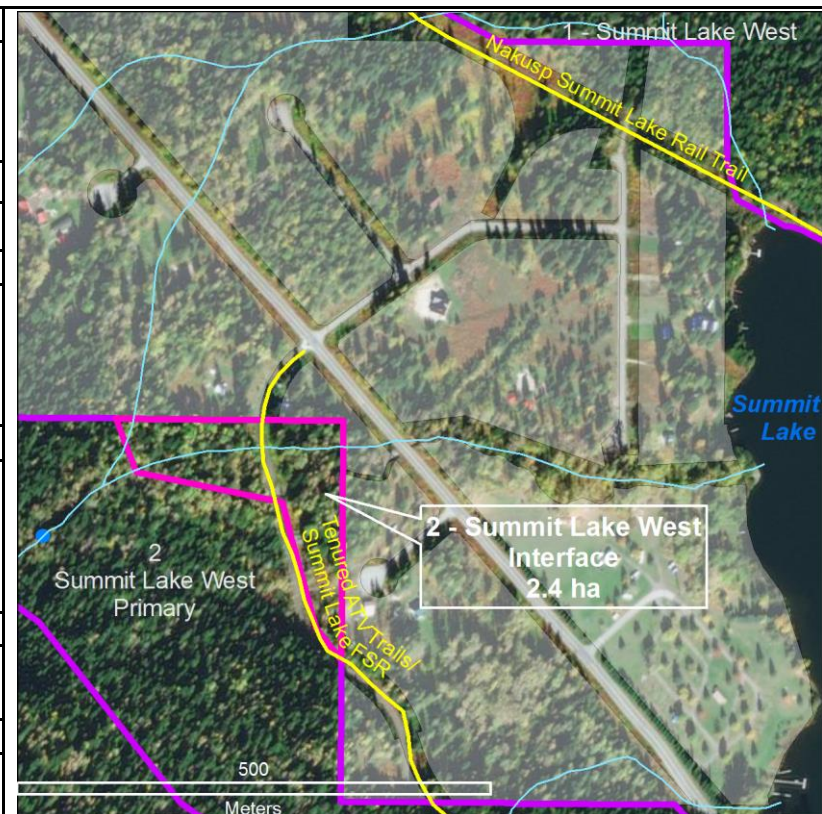
Area is highly visible from Summit Lake and Summit Lake Provincial Park, which are important recreational resources.

Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.

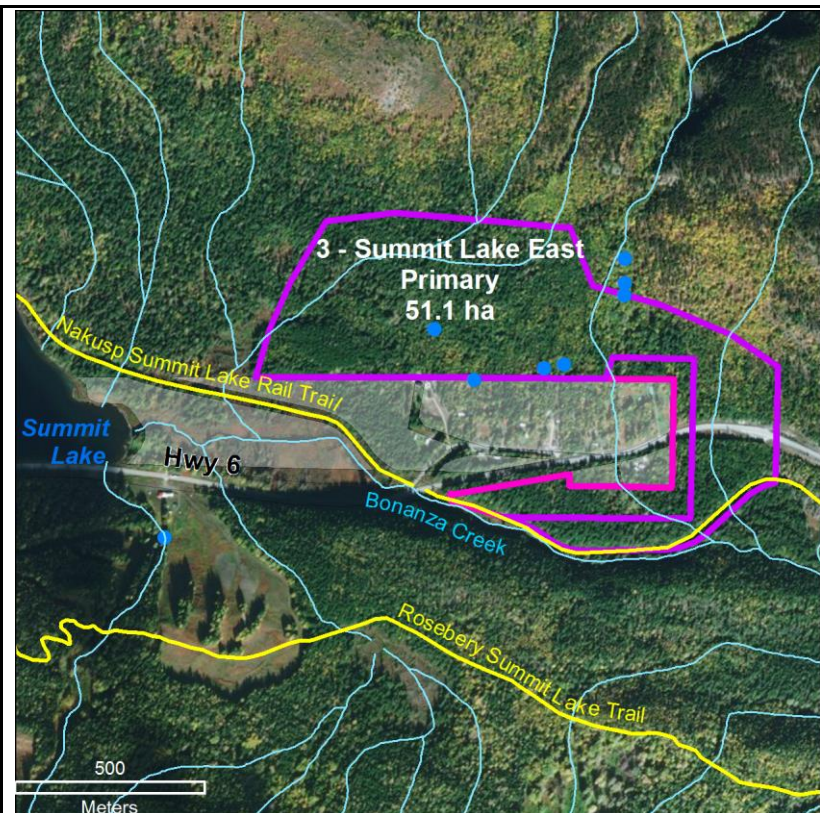
Treatment Unit	Treatment Type(s)	Total Area
2 - Summit Lake West - Primary Map Code: 2-SLW_P	Primary Fuel Break. Estimate: 25% Type 1 WUI 75% Type 2 Post Harvest Fuel Management	53.1 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2S, TSA	96% High 4% Moderate	High
Treatment Objectives		
<p>Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.</p> <p>Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.</p>		
Treatment Rationale		
<p>Moderately large treatment unit located at west end of Summit Lake. Mix of varied stand ages and coniferous and deciduous forests. Predominantly moderately sloped, conventionally operable terrain.</p> <p>Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement and recreational values, and reduces the likelihood of a wildfire expanding to landscape scale.</p>		
Overlapping Values		
<p>Visuals, domestic water intakes, recreation values (Summit Lake, recreation properties, private resort, provincial park and trail tenures), riparian ecosystems, Bonanza Biodiversity Corridor, western toad habitat.</p>		
Treatment Constraints		
<p>Majority of terrain in unit is suited to Type 2 treatment, but diverse overlapping values will constrain area of Type 2 treatment.</p> <p>Existing access along Summit Lake FSR and old trails to south 80% of unit is excellent. Access to north portion of unit will require cooperation of private land owners.</p> <p>Area is visible from Summit Lake and Summit Lake Provincial Park, which are important recreational resources.</p> <p>Need to maintain forest canopy for water and visual management.</p> <p>Riparian reserves around streams and setbacks near water intakes will be identified at prescription stage. Deeply incised stream valleys may not be suited for treatment.</p> <p>Area is within identified western toad habitat associated with Summit Lake and biodiversity corridor. Treatment will be constrained by biodiversity management.</p> <p>Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.</p>		



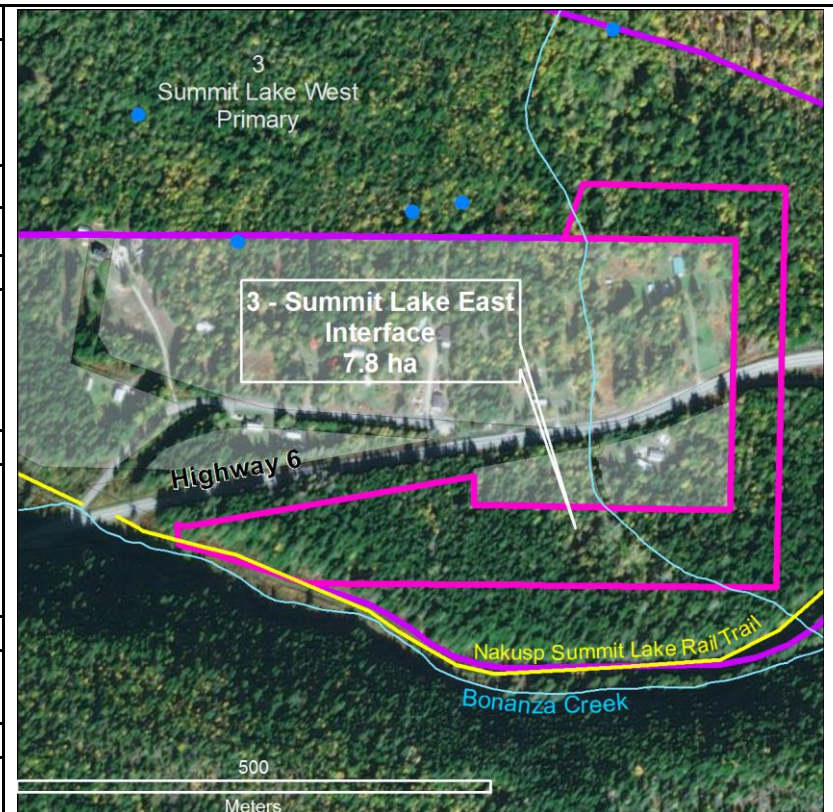
Treatment Unit	Treatment Type(s)	Total Area
2 - Summit Lake West - Interface Map Code: 2-SLW_I	Interface Fuel Break. 100% Type 1 WUI	2.4 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2S	13% High 87% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Improve suppression opportunities and reduce risk of a high intensity fire immediately adjacent to residences.		
Treatment Rationale		
Small treatment area of dense forest on moderately sloped terrain immediately adjacent to residences. Treatment area is mixed deciduous/coniferous forest. Treatment needs will be limited in deciduous dominated areas.		
Overlapping Values		
Visuals, recreation values, adjacent residences, riparian ecosystems, Bonanza Biodiversity Corridor, western toad habitat.		
Treatment Constraints		
Riparian reserves around streams and setbacks near water intakes will be identified at prescription stage. Area is within identified western toad habitat associated with Summit Lake and biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment area.		



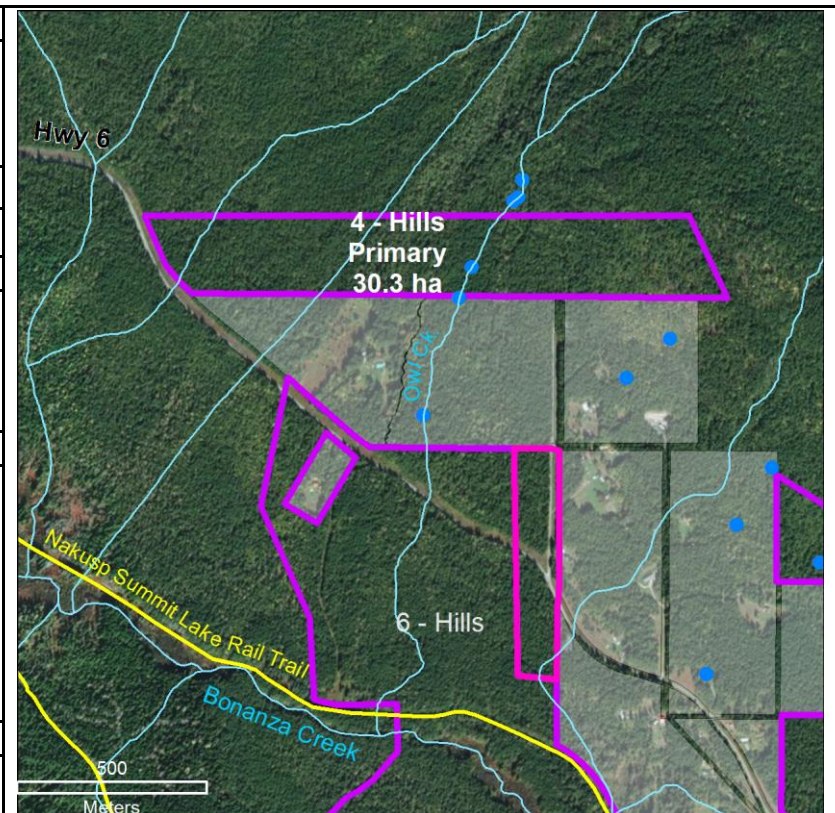
Treatment Unit	Treatment Type(s)	Total Area
3 - Summit Lake East - Primary Map Code: 3-SLE_P	Primary Fuel Break. Estimate: 40% Type 1 WUI 60% Type 2 Post Harvest Fuel Management	53.1 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	53% High 47% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
Moderately large treatment unit located at east end of Summit Lake. Mix of varied coniferous and deciduous forests. Moderately sloped, conventionally operable terrain. Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement and recreational values, and reduces the likelihood of a wildfire expanding to landscape scale.		
Overlapping Values		
Visuals, domestic water intakes, recreation values (Summit Lake, trail tenures), riparian ecosystems, Bonanza Biodiversity Corridor, western toad habitat.		
Treatment Constraints		
Majority of terrain in unit is suited to Type 2 treatment, but diverse overlapping values will constrain area of Type 2 treatment. Access to unit south of Highway 6 is good. Access to much of unit north of highway is poor, and is further complicated by many streams and wet areas in unit. Effective treatment will require cooperation of private land owners. Area is visible from Summit Lake and Summit Lake Provincial Park, which are important recreational areas. Need to maintain forest canopy for water and visual management. Riparian reserves around streams and setbacks near water intakes will be identified at prescription stage. Additional currently unmapped wet areas will reduce area suitable for treatment. Area is within identified western toad habitat associated with Summit Lake and biodiversity corridor. Treatment will be constrained by biodiversity management and need for biodiversity reserves. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		



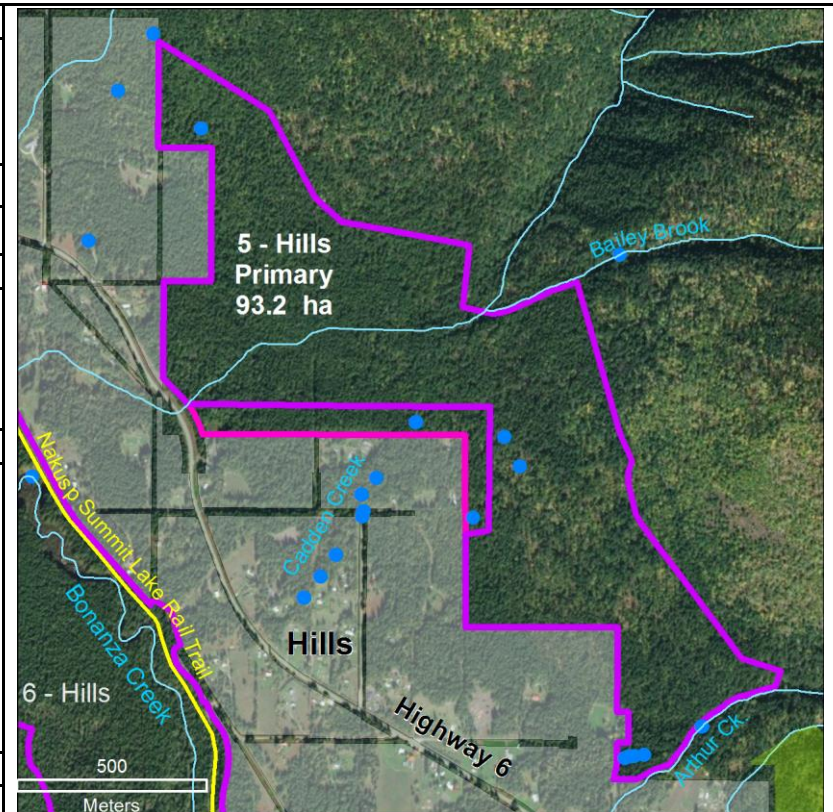
Treatment Unit	Treatment Type(s)	Total Area
3 - Summit Lake East - Interface Map Code: 3-SLE_I	Interface Fuel Break. Estimate: 70% Type 1 WUI 30% Type 2 Post Harvest Fuel Management	7.8 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	69% High 31% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Improve suppression opportunities and reduce risk of a high intensity fire immediately adjacent to residences.		
Treatment Rationale		
Small treatment area of dense forest on moderately sloped to flat terrain immediately adjacent to residences. Treatment area is mixed deciduous/coniferous forest and contains forested wetlands. Deciduous forests and wetland areas will not require treatment.		
Overlapping Values		
Visuals, recreation values, adjacent residences, riparian ecosystems, Bonanza Biodiversity Corridor, western toad habitat.		
Treatment Constraints		
Good access to unit from Highway 6. Riparian reserves around streams and wetlands will be identified at prescription stage. Area is within identified western toad habitat associated with Summit Lake and biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime, and extent of area suited for Type 2 treatment.		



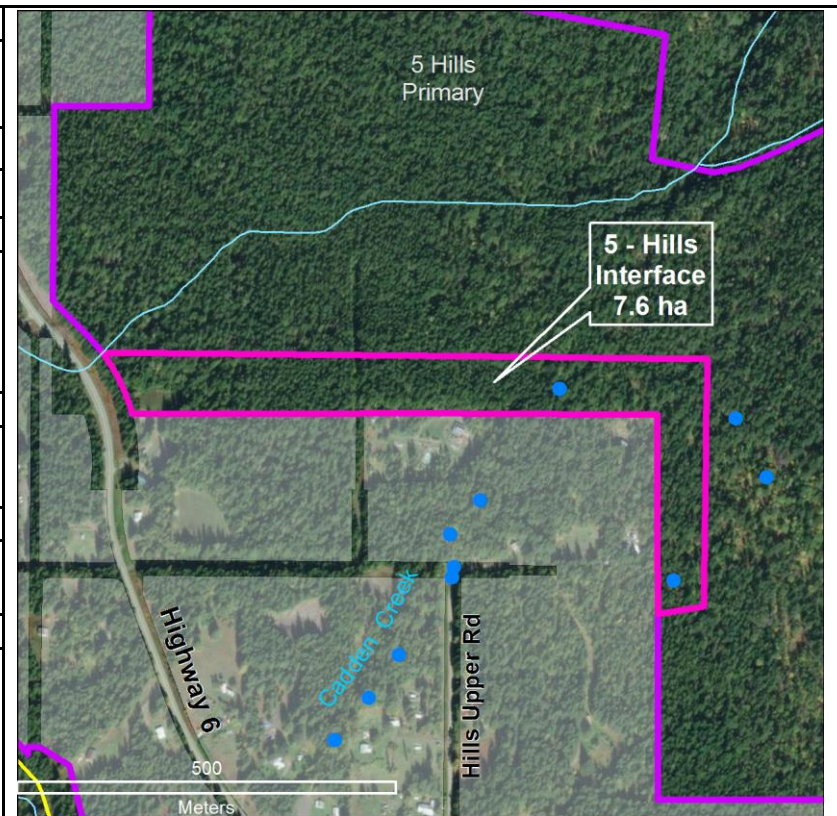
Treatment Unit	Treatment Type(s)	Total Area
4 - Hills Primary Map Code: 4-Hil_P	Primary Fuel Break. Estimate: 20% Type 1 WUI 80% Type 2 Post Harvest Fuel Management	30.3 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	88% High 12% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A moderate sized treatment unit designed to create a fuel reduced area and an anchor for fire suppression along the north edge of the rural community of Hills. Mixed conifer species forests on predominantly moderately sloped, conventionally operable terrain. Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale.		
Overlapping Values		
Visuals, domestic water intakes, riparian ecosystems, ungulate winter range, Bonanza Biodiversity Corridor.		
Treatment Constraints		
Majority of terrain in unit is suited to Type 2 treatment, but diverse overlapping values will constrain area of Type 2 treatment. Access to unit from Highway 6 and public roads and rights of way is good. Need to maintain forest canopy for water, ungulate winter range and visual management. Riparian reserves around streams and setbacks near water intakes will be identified at prescription stage. Area is within identified biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		



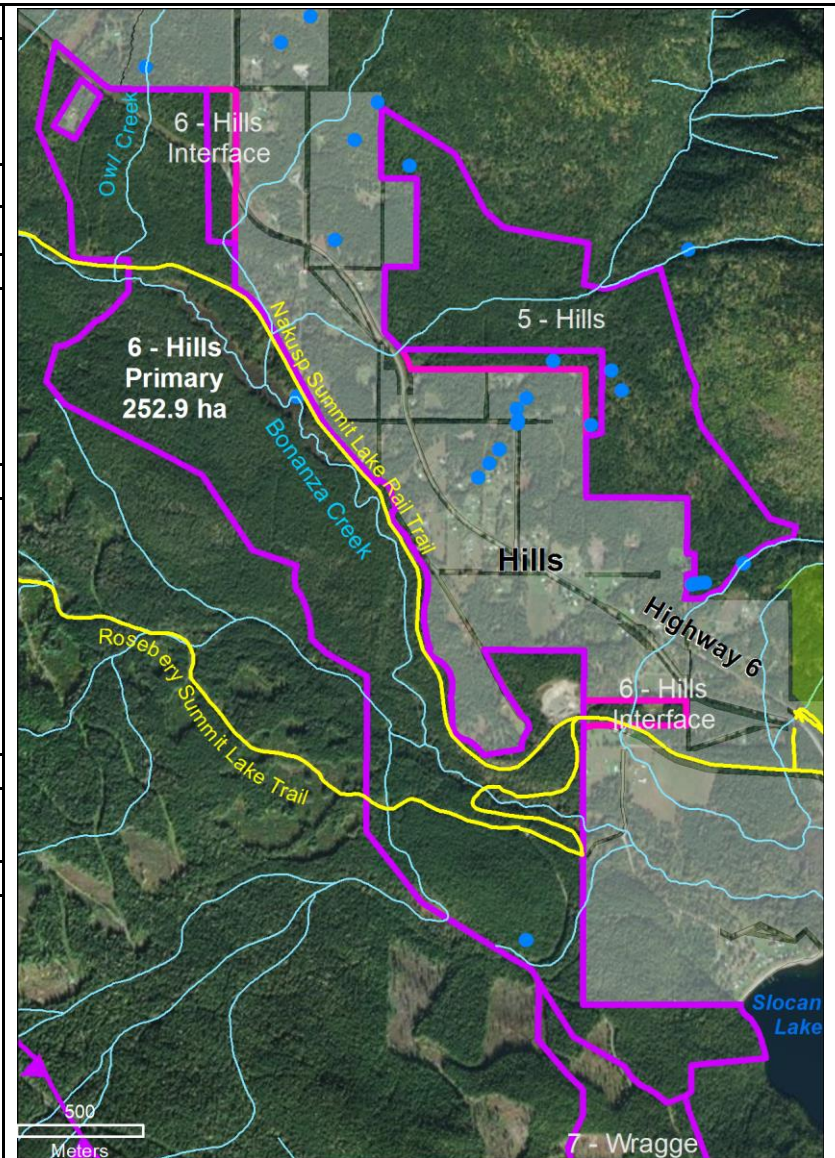
Treatment Unit	Treatment Type(s)	Total Area
5 - Hills Primary Map Code: 5-Hil_P	Primary Fuel Break. Estimate: 35% Type 1 WUI 65% Type 2 Post Harvest Fuel Management	93.2 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	100% High	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A large treatment unit designed to create a fuel reduced area and anchor for fire suppression along the east edge of the rural community of Hills. Mixed conifer species forests on predominantly moderately sloped, conventionally operable terrain. Steeper slopes and deciduous stocking in southern/eastern part of unit. Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale.		
Overlapping Values		
Visuals, domestic water intakes, riparian ecosystems, ungulate winter range, Bonanza Biodiversity Corridor.		
Treatment Constraints		
Majority of terrain in unit is suited to Type 2 treatment, but diverse overlapping values will constrain area of Type 2 treatment. Access to north half of unit along public roads and rights of way is good. Access to south half of unit best achieved with cooperation of adjacent landowners. Need to maintain forest canopy for water, ungulate winter range and visual management. Riparian reserves around streams and setbacks near water intakes will be identified at prescription stage. Area is within identified biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		



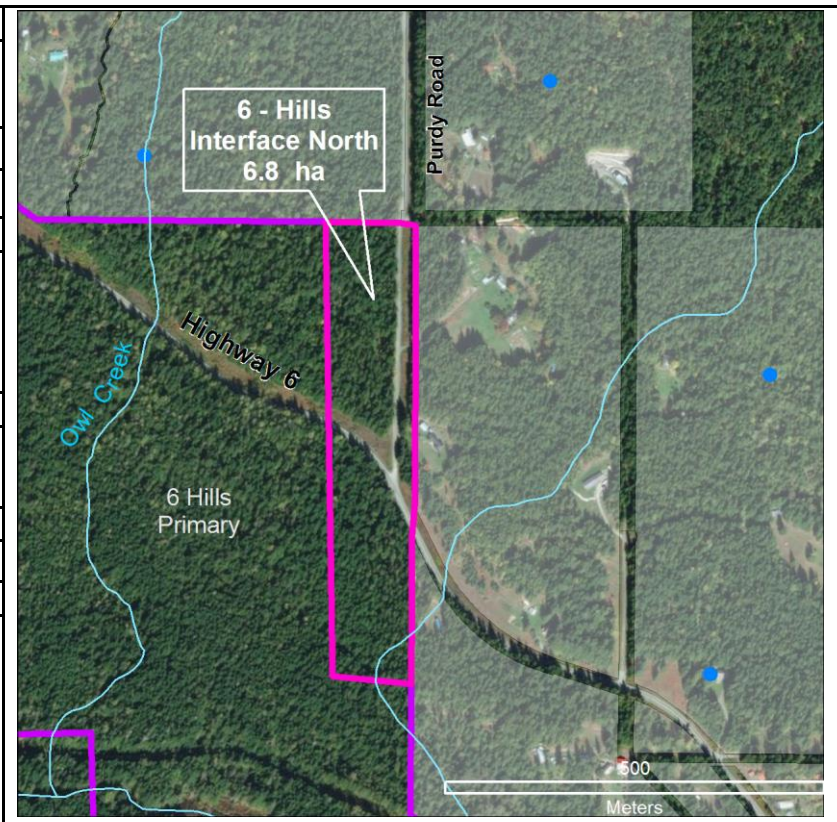
Treatment Unit	Treatment Type(s)	Total Area
5 - Hills - Interface Map Code: 5-Hil_I	Interface Fuel Break. 100% Type 1 WUI	7.6 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	97% High 2% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Improve suppression opportunities and reduce risk of a high intensity fire immediately adjacent to residences.		
Treatment Rationale		
Small treatment area of dense mixed species coniferous forest on moderately sloped to flat terrain immediately adjacent to residences.		
Overlapping Values		
Visuals, adjacent residences, riparian ecosystems, water intakes, Bonanza Biodiversity Corridor.		
Treatment Constraints		
Good access along public roads and rights of way. Riparian reserves around streams and setbacks near water intakes will be identified at prescription stage. Area is within identified biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine extent of operational treatment.		



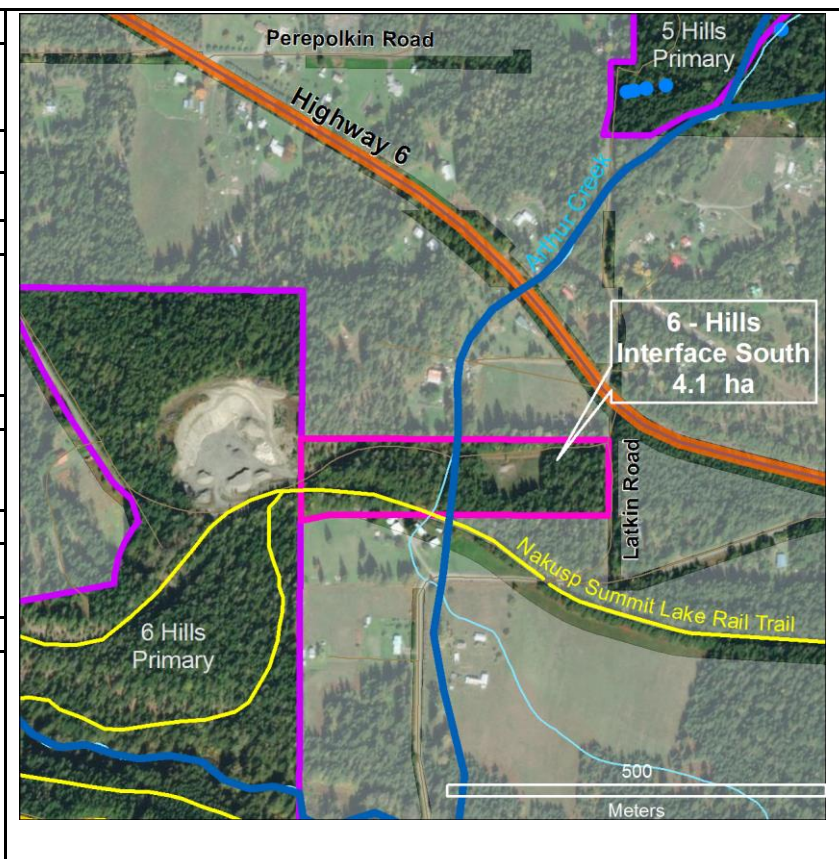
Treatment Unit	Treatment Type(s)	Total Area
6 - Hills Primary Map Code: 6-Hil_P	Primary Fuel Break. Estimate: 30% Type 1 WUI 70% Type 2 Post Harvest Fuel Management	252.9 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	1% Extreme 89% High 4% Mod 6% Low	High
Treatment Objectives		
<p>Create a landscape scale fuel managed area to west of / upwind of Hills.</p> <p>Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.</p> <p>Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.</p>		
Treatment Rationale		
<p>A large treatment unit designed to create a fuel reduced area and anchor for fire suppression along the western edge of the rural community of Hills.</p> <p>Mixed conifer species forests on predominantly moderately sloped, conventionally operable terrain. Steeper slopes in southern area near lake.</p> <p>Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale.</p>		
Overlapping Values		
Visuals, domestic water intakes, riparian ecosystems, wetlands, ungulate winter range, Bonanza Creek valley, Bonanza Biodiversity Corridor.		
Treatment Constraints		
<p>Majority of terrain in unit is suited to Type 2 treatment, but diverse overlapping values will constrain area of Type 2 treatment.</p> <p>Access to unit is old via old logging road network and Highway 6</p> <p>Need to maintain forest canopy for water, ungulate winter range and visual management.</p> <p>Riparian reserves around streams and wetlands and setbacks near water intakes will be identified at prescription stage. Area is within identified biodiversity corridor, and contains the Bonanza Creek valley and extensive wetlands that are key to biodiversity concept. Treatment will be constrained by biodiversity management and need for biodiversity reserves.</p> <p>Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.</p>		



Treatment Unit	Treatment Type(s)	Total Area
6 - Hills - Interface North Map Code: 6-HiIN_I	Interface Fuel Break. 100% Type 1 WUI	6.8 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	88% High 12% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Improve suppression opportunities and reduce risk of a high intensity fire immediately adjacent to residences.		
Treatment Rationale		
Small treatment area of dense mixed species coniferous forest on moderately sloped to flat terrain immediately adjacent to residences.		
Overlapping Values		
Visuals, adjacent residences, riparian ecosystem, Bonanza Biodiversity Corridor.		
Treatment Constraints		
Good access along public roads and Highway 6. Riparian reserves around stream will be identified at prescription stage. Area is within identified biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine extent of operational treatment.		



Treatment Unit	Treatment Type(s)	Total Area
6 - Hills - Interface South Map Code: 6-HIS_I	Interface Fuel Break. 100% Type 1 WUI	4.1 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	61% High 31% Low	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Improve suppression opportunities and reduce risk of a high intensity fire immediately adjacent to residences.		
Treatment Rationale		
Small treatment area of dense mixed deciduous and coniferous forest on moderately sloped to flat terrain immediately adjacent to residences.		
Overlapping Values		
Visuals, adjacent residences, riparian ecosystem, recreational trail, Bonanza Biodiversity Corridor.		
Treatment Constraints		
Good access along public roads Riparian reserves around stream will be identified at prescription stage. Area is within identified biodiversity corridor. Treatment will be constrained by biodiversity management. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine extent of operational treatment.		



Treatment Unit	Treatment Type(s)	Total Area
7 - Wragge Map Code: 7-WragP	Primary Fuel Break. Estimate: 10% Type 1 WUI 90% Type 2 Post Harvest Fuel Management Treatment regimes in previously logged areas will be determined by further assessments.	524.5 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	12% Extreme 56% High 25% Mod 7% Low	Moderate
Treatment Objectives		
Create a landscape scale fuel managed area along west side of Slocan Lake. Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
Very large moderate priority treatment unit designed to create a fuel reduced area and anchor for fire suppression along the north western shore of Slocan Lake. This treatment area would be a long term project to manage fuels and fire risk in a timber management context. Mixed conifer species forests on predominantly moderately sloped, conventionally operable terrain. Extensive previous timber harvesting in area. Unit is a strategic landscape level fuel break that: <ul style="list-style-type: none"> • improves suppression opportunities and reduces the likelihood of a wildfire expanding to landscape scale, • improves suppression opportunities adjacent to high use lakeshore areas with increased chance of human caused ignition, • reduces the chance of a fire in the area causing an ember shower that could cause ignitions on east side of lake, and • improves the likelihood of successful evacuation of high use recreational areas in the event of wildfire. 		
Overlapping Values		
Visuals, ungulate winter range, riparian ecosystems, recreational use.		
Treatment Constraints		
Majority of terrain in unit is suited to Type 2 treatment, but overlapping values will constrain area of Type 2 treatment.		

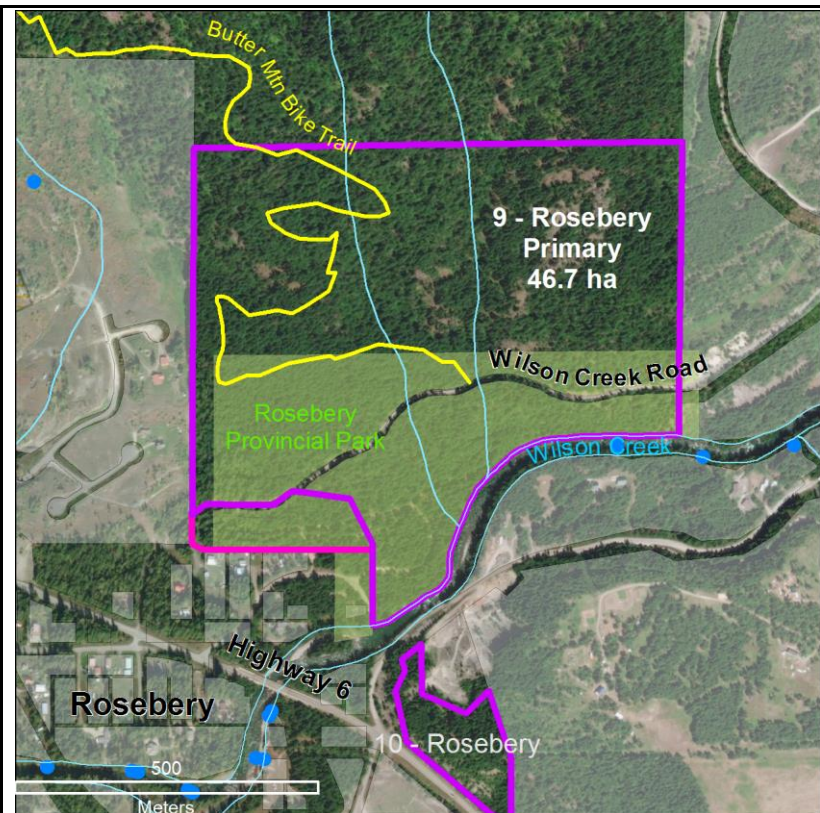


<p>Access to unit is old via old logging road network.</p> <p>Need to maintain forest canopy for ungulate winter range and visual management.</p> <p>Riparian reserves will be identified at prescription stage.</p> <p>Treatment regime and/or need for treatment in previously harvested areas is complex issue that will be addressed by future site specific assessments.</p> <p>Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.</p>	
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Treatment Unit	Treatment Type(s)	Total Area
8 - Rosebery Primary Map Code: 8-Ros_P	Primary Fuel Break. Estimate: 75% Type 1 WUI 25% Type 2 Post Harvest Fuel Management	19.9 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	77% High 23% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.		
Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A small treatment unit designed to create a fuel reduced area and anchor for fire suppression along the north edge of the rural community of Rosebery.		
Mixed deciduous and coniferous forests with forest heath problems on moderately sloped to steep terrain.		
Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to a high public use area adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale.		
Overlapping Values		
Visuals, ungulate winter range.		
Treatment Constraints		
Access to unit is good. Potentially operable terrain for Type 2 treatment is above Hwy 6 and south of refuse transfer station.		
Steep slopes between lake and highway, and in upper part of treatment unit.		
Need to maintain forest canopy for visual management.		
Detailed fuel and fire hazard assessment during development of prescription will determine operational treatment regime and extent of treated area.		

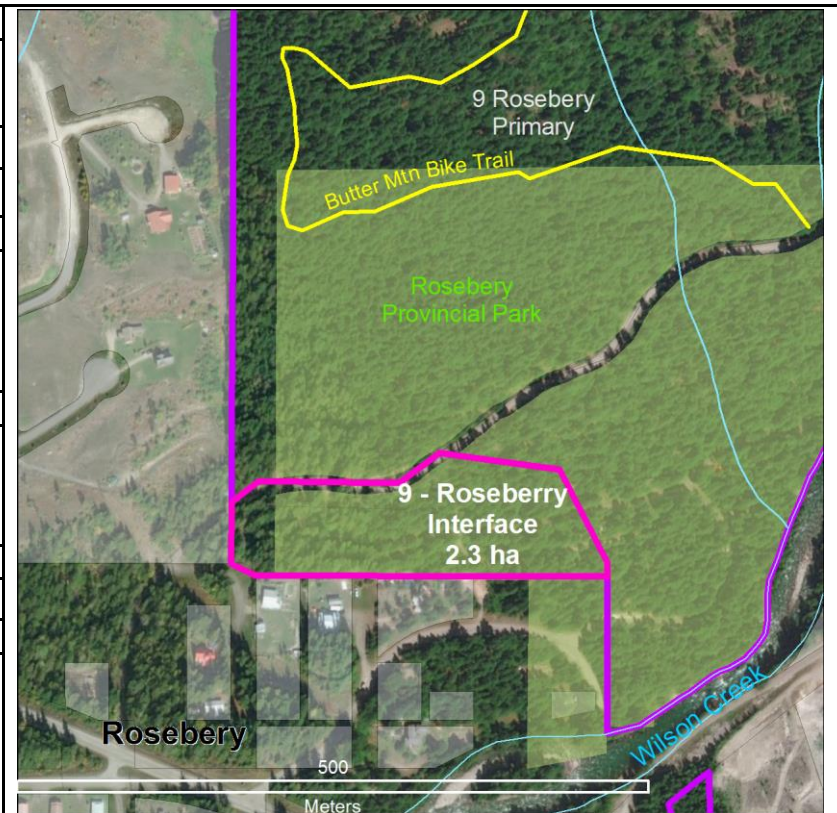


Treatment Unit	Treatment Type(s)	Total Area
9 - Rosebery Primary Map Code: 9-Ros_P	Primary Fuel Break. Estimate: 75% Type 1 WUI 25% Type 2 Post Harvest Fuel Management	46.7 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA and Provincial Park	97% High 3% Moderate	High
Treatment Objectives		
<p>Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.</p> <p>Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn</p> <p>Protect recreational and ecological values in a provincial park by improving resiliency to wildfire.</p>		
Treatment Rationale		
<p>A mid sized treatment unit designed to:</p> <ul style="list-style-type: none"> • create a fuel reduced area and anchor for fire suppression along the north edge of the rural community of Rosebery, • improve resiliency to fire of forest in a provincial park, which is a developed recreation area and forested reserve, and • demonstrate fuel management practices, and how they can accommodate multiple interests, to the park users. <p>Variable density coniferous forests on moderately sloped to steep terrain.</p> <p>Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to a high public use area adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale.</p>		
Overlapping Values		
Provincial Park, recreational trail, visuals, ungulate winter range, riparian values.		
Treatment Constraints		
<p>Recreational and ecological values in provincial park are of prime importance. Fuel management can help maintain these values by improving resiliency to fire and climate change, but park values take precedence.</p> <p>Steep slopes in upper part of treatment unit are suitable for Type 1 treatment only. Potentially operable terrain for Type 2 treatment is in upper part of unit above Wilson Creek Road.</p> <p>Access to lower unit is good. Access to upper unit for Type 2 Treatment will require road construction in provincial park and/or cooperation of adjacent landowners.</p>		

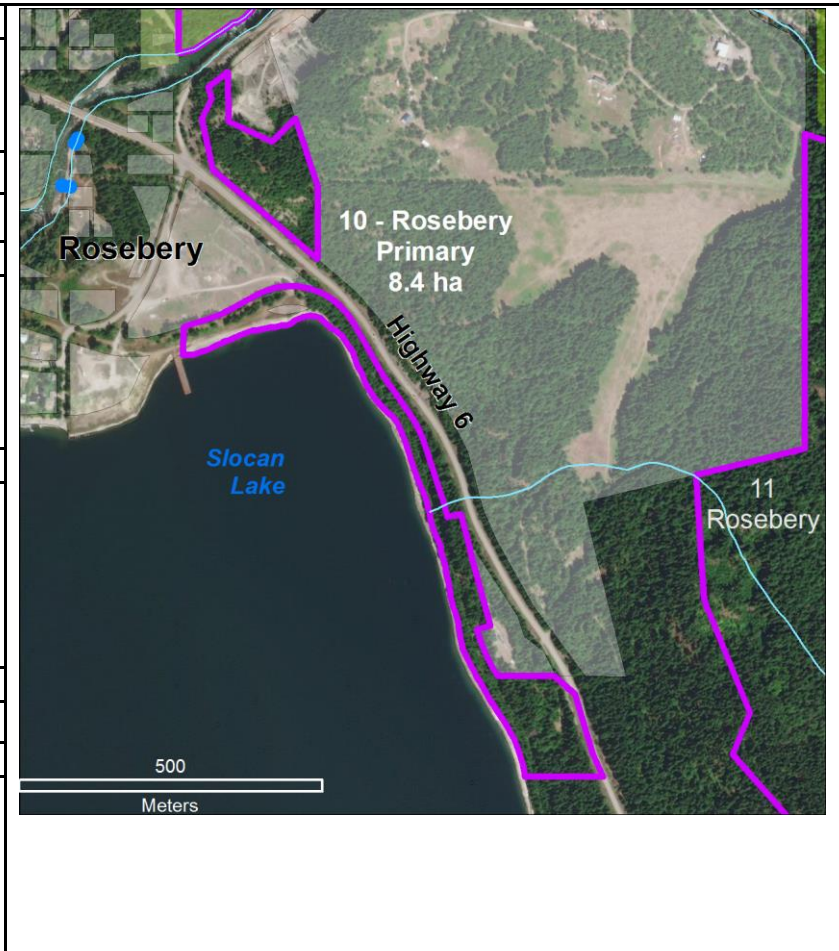


Need to maintain forest canopy for ungulate winter range and visual management.
Riparian reserves will be identified at prescription stage.
Detailed fuel and fire hazard assessment during development of prescription in conjunction with BC Parks will determine operational treatment regime and extent of treated area.

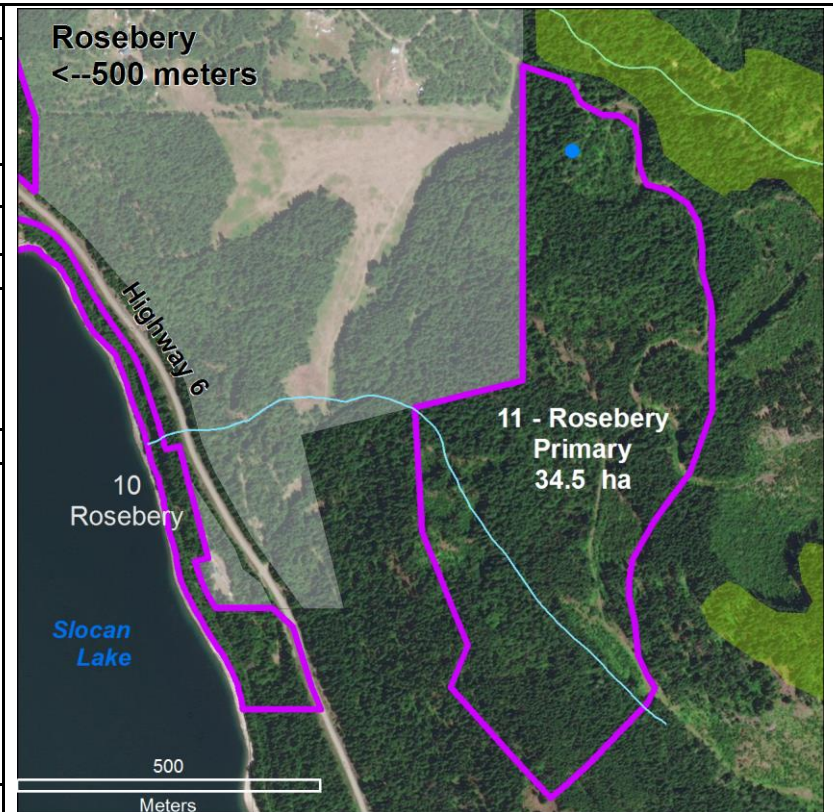
Treatment Unit	Treatment Type(s)	Total Area
9 - Rosebery - Interface Map Code: 9-Ros_I	Interface Fuel Break. 100% Type 1 WUI	2.3 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
Provincial Park	82% High 18% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Improve suppression opportunities and reduce risk of a high intensity fire immediately adjacent to values.		
Treatment Rationale		
A small interface unit immediately adjacent to residences and the developed recreation site in provincial park. Dense mixed deciduous and coniferous forest on moderately sloped to flat terrain.		
Overlapping Values		
Adjacent residences, provincial park, developed campsites.		
Treatment Constraints		
Recreational and ecological values in provincial park are of prime importance. Fuel management can help maintain these values by improving resiliency to fire and climate change, and improve community resilience to wildfire. Good access along public roads Detailed fuel and fire hazard assessment during development of prescription in conjunction with BC Parks will determine extent of treated area.		



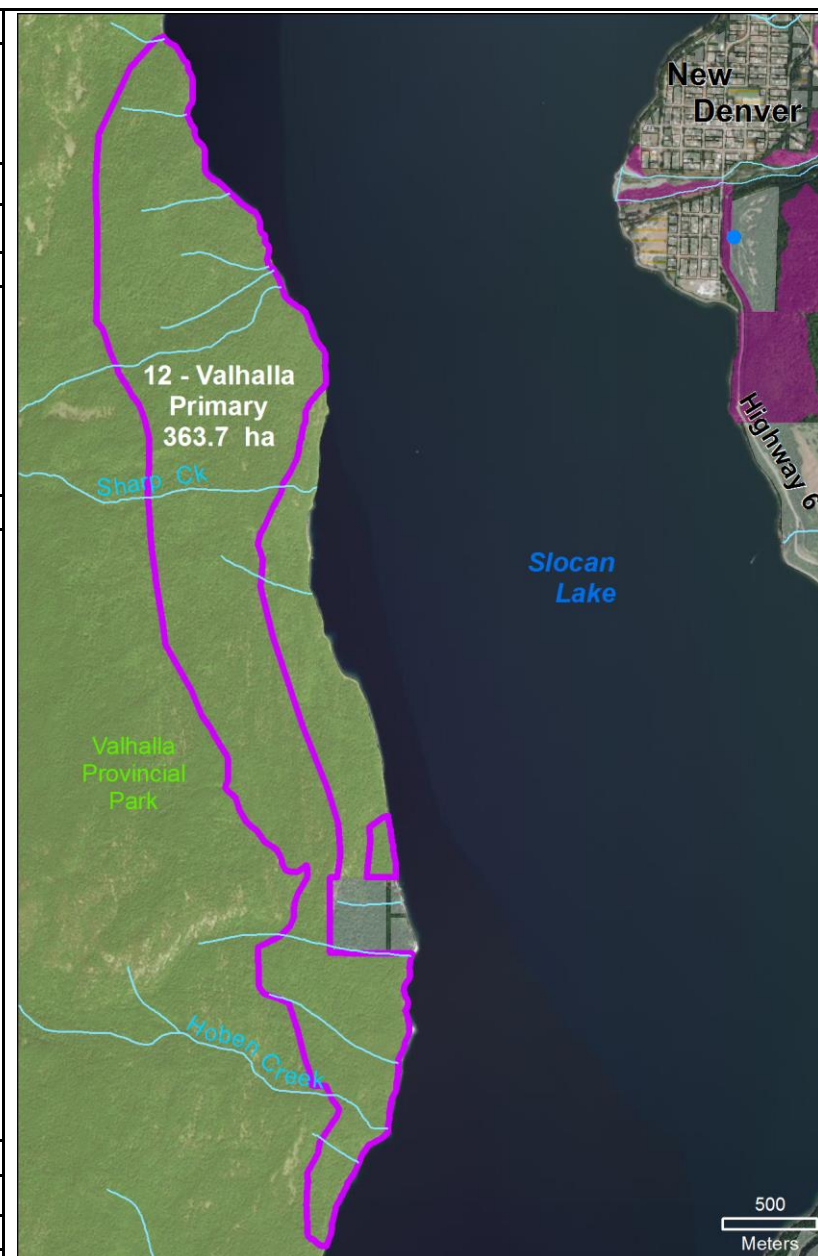
Treatment Unit	Treatment Type(s)	Total Area
10 - Rosebery Primary Map Code: 10-RosP	Primary Fuel Break. 100% Type 1 WUI	Two units, 8.4 ha total area
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	63% High 17% Moderate 30% Low	High
Treatment Objectives		
<p>Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.</p> <p>Create an area where fire suppression crews and resources can work safely to suppress a wildfire in forested terrain with increased likelihood of fire start due to human activity immediately south of Rosebery..</p>		
Treatment Rationale		
<p>A small two part treatment unit designed to improve fire suppression chances above and below Hwy 6 immediately south of Rosebery, and reduce the likelihood of a wildfire expanding to landscape scale..</p> <p>Mixed deciduous and coniferous forests with forest health problems on moderately sloped to steep terrain.</p>		
Overlapping Values		
Visuals, recreation.		
Treatment Constraints		
<p>Access to unit is good.</p> <p>Steep slopes between lake and highway, and in upper part of treatment unit.</p> <p>Visual management adjacent to community.</p> <p>Detailed fuel and fire hazard assessment during development of prescription will determine operational treatment regime and extent of treated area.</p>		



Treatment Unit	Treatment Type(s)	Total Area
11 - Rosebery Primary Map Code: 11-RosP	Primary Fuel Break. Estimate: 25% Type 1 WUI 75% Type 2 Post Harvest Fuel Management	34.5 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
TSA	56% High 44% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A mid sized treatment unit designed to create a fuel reduced area and anchor for fire suppression south east of the rural community of Rosebery. Mixed deciduous and coniferous forests on rolling, predominantly moderately sloped, conventionally operable terrain. Steeper slopes and deciduous stocking in southern/eastern part of unit. Area has been extensively previously logged over many decades. Unit is a strategic landscape level fuel break that improves suppression opportunities adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale.		
Overlapping Values		
Visuals, domestic water intake, riparian ecosystem, ungulate winter range.		
Treatment Constraints		
Majority of terrain in unit is suited to Type 2 treatment, but overlapping values and access limits will constrain area of Type 2 treatment. Access to most of unit along existing logging roads is good. Access to south western unit is adverse, and may not be feasible for Type 2 treatments. Need to maintain forest canopy for water, ungulate winter range and visual management. Riparian reserve around stream and setbacks near water intakes will be identified at prescription stage. Treatment regime and/or need for treatment in previously harvested areas is complex issue that will be addressed by site specific assessments. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		



Treatment Unit	Treatment Type(s)	Total Area
12 - Valhalla Map Code: 12-ValP	Primary Fuel Break. Not feasible to estimate treatment regime distribution at this time.	363.7 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
Provincial Park	66% High 34% Moderate	Moderate
Treatment Objectives		
<p>Conduct fuel treatments to create residual stand characteristics that do not support active crown fire.</p> <p>Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.</p> <p>Protect recreational and ecological values in provincial park by improving resiliency to wildfire.</p>		
Treatment Rationale		
<p>Very large moderate priority treatment unit designed to create a fuel reduced area and anchor for fire suppression along the western shore of Slovan Lake.</p> <p>This treatment area will be a long term project to manage fuels and fire risk in a provincial park management context, working in cooperation with BC Parks. This is reflected by moderate priority rating.</p> <p>Mixed conifer species forests on predominantly moderately sloped, conventionally operable terrain.</p> <p>Unit is a strategic landscape level fuel break that:</p> <ul style="list-style-type: none"> • improves suppression opportunities and reduces the likelihood of a wildfire expanding to landscape scale, • improve resiliency to fire of forests in a provincial a park, • improves suppression opportunities adjacent to high use lakeshore areas with increased chance of human caused ignition, • reduces the chance of a fire in the area causing an ember shower that could cause ignitions on east side of lake, and • improves the likelihood of successful evacuation of high use recreational areas in the event of wildfire. 		
Overlapping Values		
Provincial Park, visuals, recreation values, riparian values.		
Treatment Constraints		
Recreational and ecological values in provincial park are of prime importance. Fuel management can help maintain these values by improving resiliency to fire and climate change, but park values take precedence.		



Area is highly visible and forested viewscape is highly valued. Visual management will be a primary constraint.

There is no land access to treatment unit. Any Type 2 fuel management will have to be carried out using water access. Feasibility of working with water access after closure of Slocan mill infrastructure is not known.

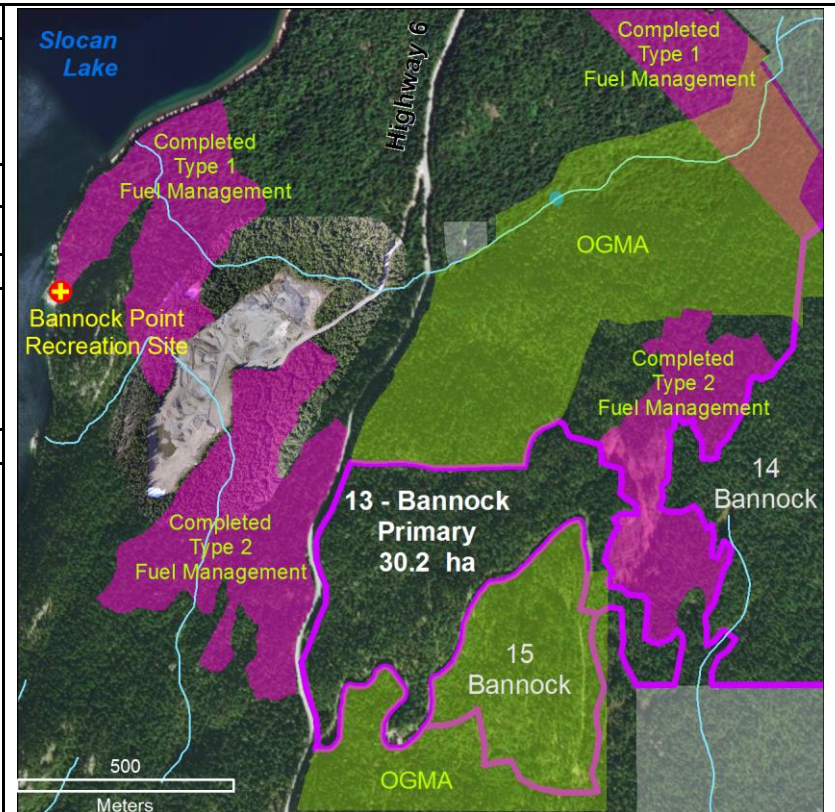
Majority of terrain in unit is suited to Type 2 treatment, but overlapping values will constrain area of Type 2 treatment.

Riparian reserves, ecological reserves and recreational area reserves will be identified at prescription stage.

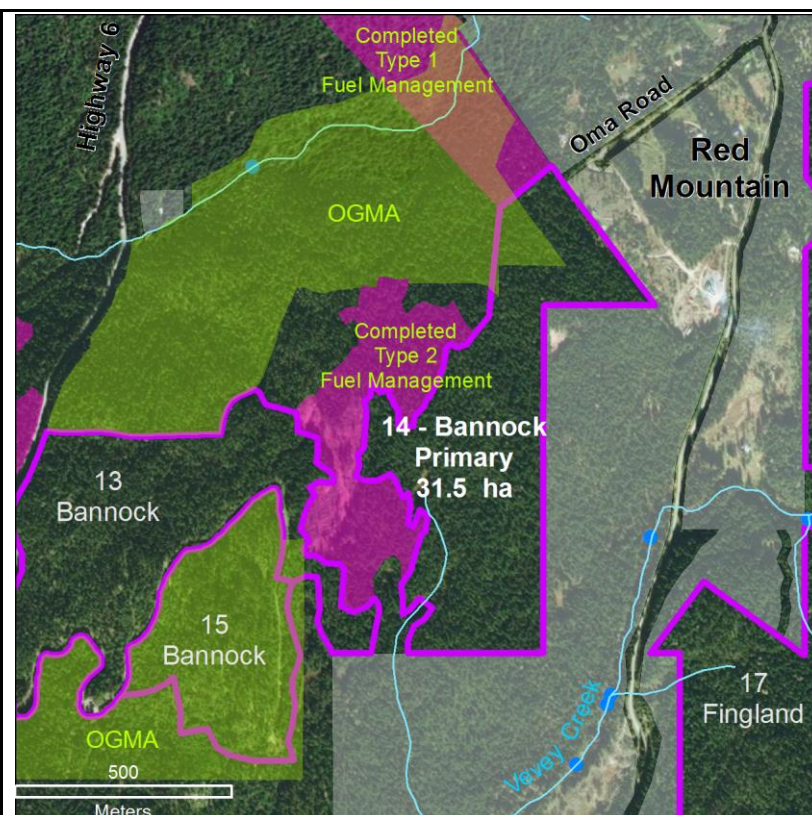
Detailed fuel and fire hazard assessment during development of prescription in conjunction with BC Parks will determine operational treatment regime and extent of treated area.



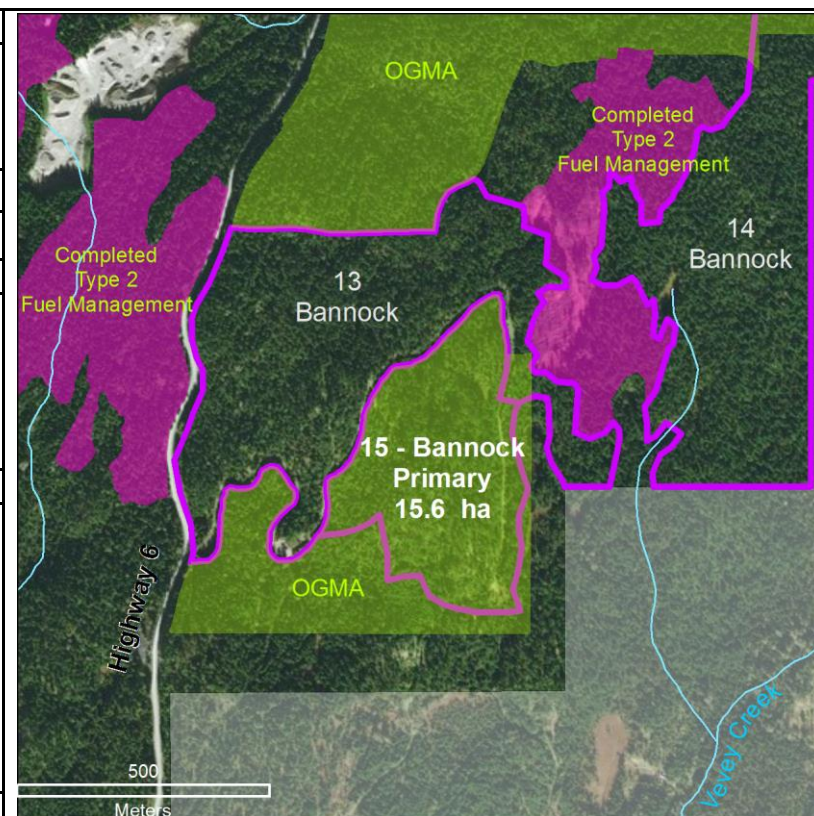
Treatment Unit	Treatment Type(s)	Total Area
13 - Bannock Primary Map Code: 13-BanP	Primary Fuel Break. Estimate: 20% Type 1 WUI 80% Type 2 Post Harvest Fuel Management	30.2 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	73% High 27% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A moderately large treatment unit that is part of a landscape level strategic fuel break south of Silverton and the rural community of Red Mountain. Fire behaviour modeling shows the fuel break extends across a fire movement path in the Red Mountain Landscape. The fuel break improves suppression opportunities adjacent to settlement, and reduces the likelihood of a wildfire expanding to landscape scale. Unit enhances value of previous investments in fuel management in adjacent treated areas. Mixed coniferous forests on rolling, moderately sloped, conventionally operable terrain. Steeper slopes and deciduous stocking occur within unit. Area has been previously logged in approximately 1960. Type 2 Treatment is scheduled for September 2019.		
Overlapping Values		
Visuals, ungulate winter range.		
Treatment Constraints		
Access to unit along existing logging roads is good. Need to maintain forest canopy for ungulate winter range and visual management.		



Treatment Unit	Treatment Type(s)	Total Area
14 - Bannock Primary Map Code: 14-BanP	Primary Fuel Break. Estimate: 30% Type 1 WUI 70% Type 2 Post Harvest Fuel Management	31.5 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	98% High 2% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A moderately large treatment unit that is part of a landscape level strategic fuel break south of Silverton and the rural community of Red Mountain. Fire behaviour modeling shows the fuel break extends across a fire movement path in the Red Mountain Landscape. Unit enhances value of previous investments in fuel management in adjacent treated areas. Mixed coniferous forests on rolling, moderately sloped, conventionally operable terrain. Steeper slopes and deciduous stocking occur within unit. Area has been previously logged in approximately 1950.		
Overlapping Values		
Old Growth Management Area (OGMA), visuals, wetlands, riparian areas.		
Treatment Constraints		
Access to unit from Oma Road at north edge or through cooperation with neighbouring landowners. Need to maintain forest canopy to maintain ecological values in OGMA and visual management. Steep slopes, rock knolls, and currently unmapped wet areas will receive Type 1 treatment. Riparian reserves and other reserves will be identified at prescription stage. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		



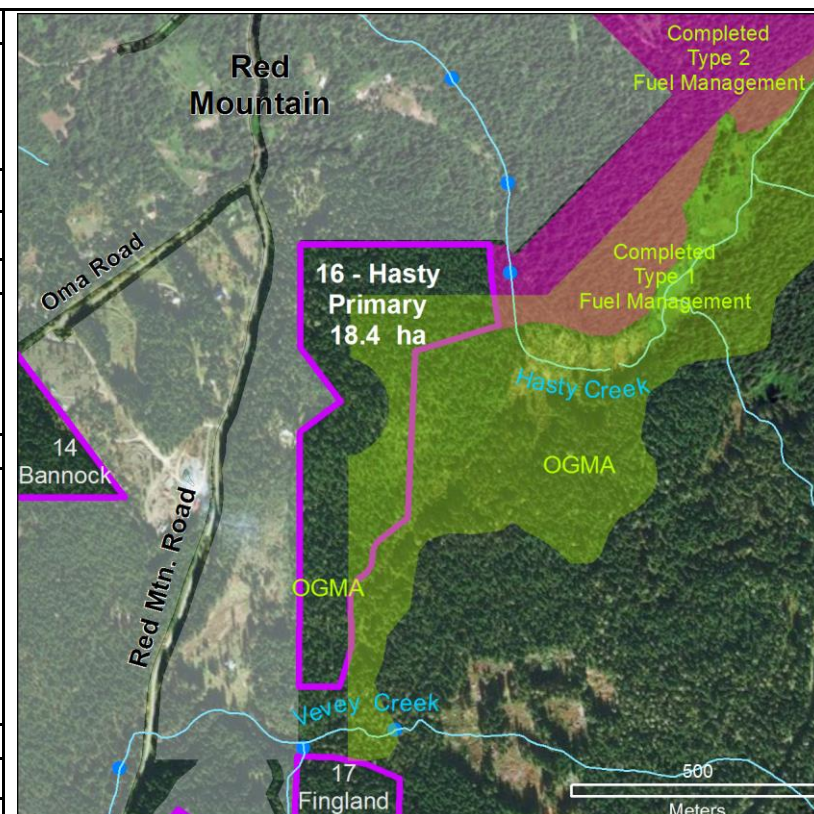
Treatment Unit	Treatment Type(s)	Total Area
15 - Bannock Primary Map Code: 15-BanP	Primary Fuel Break. Estimate: 20% Type 1 WUI 80% Type 3 Machine Cleanup	15.6 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	100% Moderate	Moderate
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire. Improve resiliency to fire of old growth management area.		
Treatment Rationale		
A small treatment unit that is part of a landscape level strategic fuel break south of Silverton and the rural community of Red Mountain. Fire behaviour modeling shows the fuel break extends across a fire movement path in the Red Mountain Landscape. Unit enhances value of previous investments in fuel management in adjacent treated areas. Unit contains a two layered coniferous forest of large old Douglas-fir above very dense FdPwHw regeneration. Area was logged in 1987. Rolling, moderately sloped, conventionally operable terrain with inclusions of steeper slopes.		
Overlapping Values		
Old Growth Management Area (OGMA), visuals.		
Treatment Constraints		
Access to unit from existing logging road. Challenging treatment area. Forest was partially cut with a retained open overstory of large Douglas-fir in 1987. Designated as an OGMA during KBLUP planning processes in 1990s. Since that time, dense coniferous regeneration has occupied the growing space beneath the large trees, leading to significant moisture stress on the submesic site. Bark beetles and root disease have killed many residual stems, and forest health agent activity levels and impacts may be increasing. Residual stems and the ecological values to be protected in the OGMA are also now at risk to high intensity wildfire due to the high fuel load on site. The high intensity fire this area would support also poses a risk to the surrounding landscape. Treatment plan is to used machine piling and burning to reduce understory density. Need to maintain forest overstory to maintain ecological values in OGMA. If a significant portion of the remaining large overstory survives the current high stress		



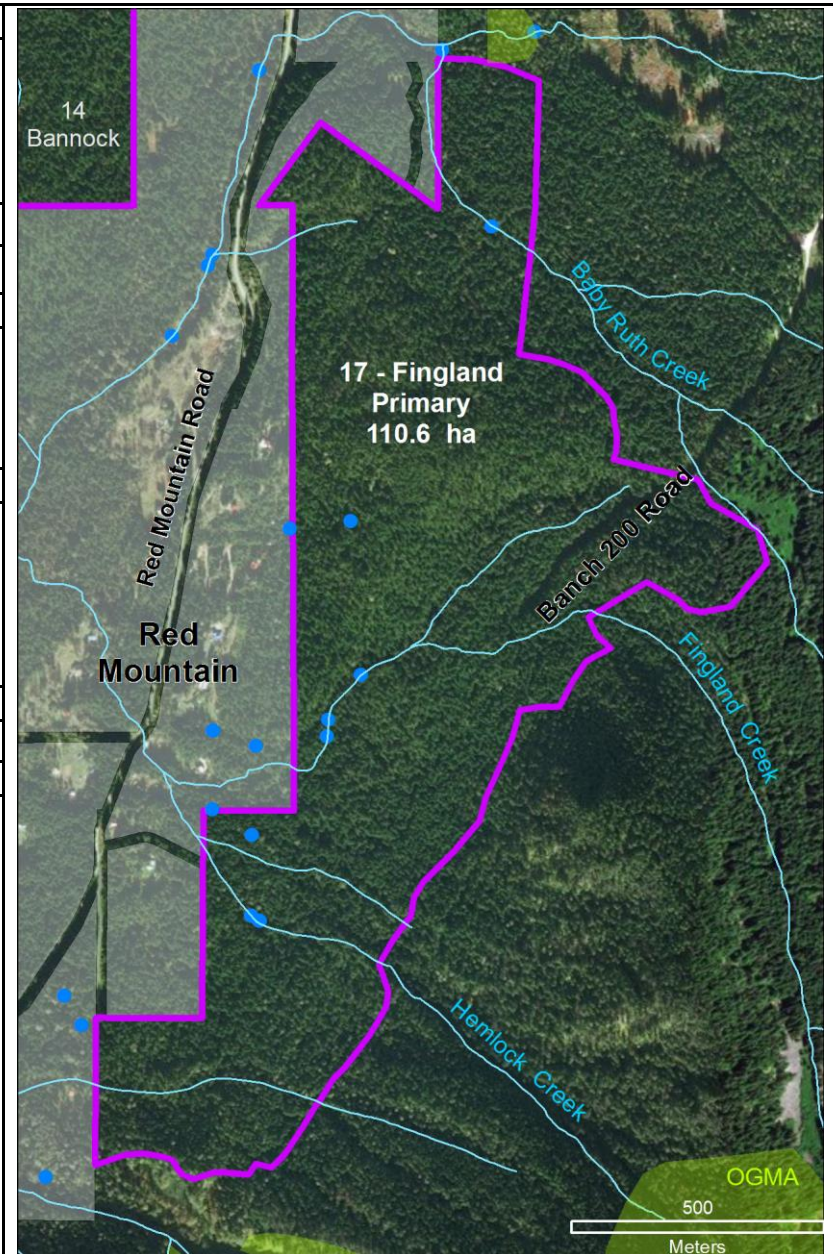
conditions and the remedial treatment, site should be maintained in an open forest condition using prescribed burning in the future.

Steep slopes and rocky knolls are not suited for Type 3 treatment, and will receive Type 1 treatment, as will the area immediately adjacent to retained large stems.

Treatment Unit	Treatment Type(s)	Total Area
16 - Hasty Primary Map Code: 16-HasP	Primary Fuel Break. Estimate: 40% Type 1 WUI 60% Type 2 Post Harvest Fuel Management	18.4 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	100% High	Moderate
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A mid sized treatment unit designed to improve suppression opportunities adjacent to settlement, and to reduce the likelihood of a wildfire expanding to landscape scale. Unit enhances value of previous investments in fuel management in adjacent treated areas. Mixed coniferous forests on rolling, moderately sloped, conventionally operable terrain. Steeper slopes and deciduous stocking occur within unit. Area has been previously logged in approximately 1950.		
Overlapping Values		
Old Growth Management Area (OGMA), wetlands, visuals, riparian areas.		
Treatment Constraints		
Access to unit will require cooperation with neighbouring landowners. Landowner perspectives could influence the amount of area available for Type 2 Treatment. Moderate priority reflects access situation. Need to maintain forest canopy to maintain ecological values in OGMA and for visual management. Steep slopes, rock knolls, and wet areas will receive Type 1 treatment. Riparian reserves and other reserves will be identified at prescription stage. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		

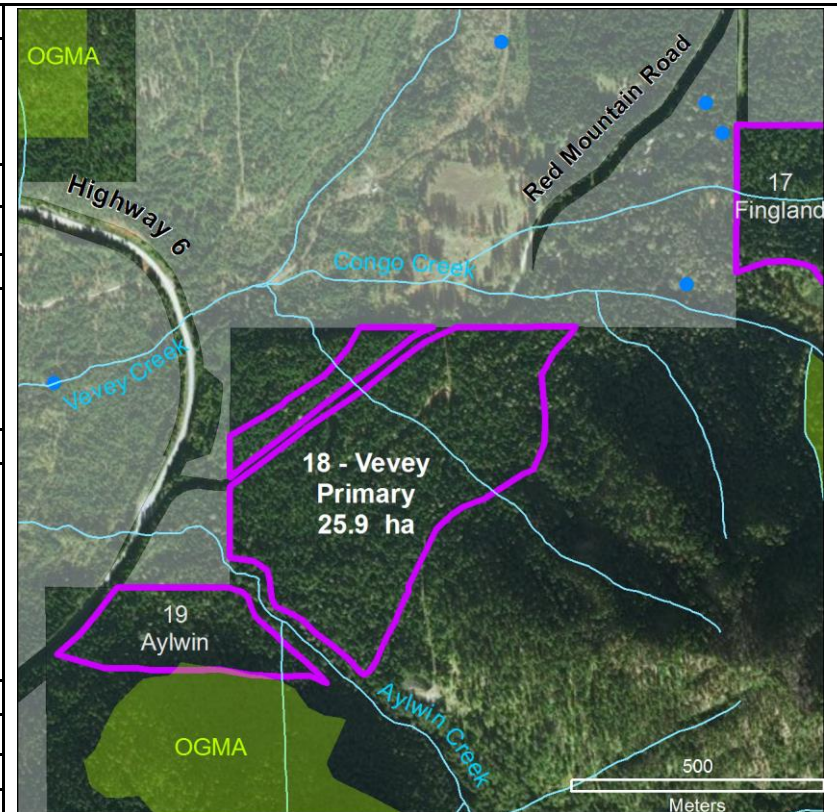


Treatment Unit	Treatment Type(s)	Total Area
17 - Finland Primary Map Code: 17-FinP	Primary Fuel Break. Estimate: 25% Type 1 WUI 55% Type 2 Post Harvest Fuel Management 20% No Treatment	110.6 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	72% High 28% Moderate	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A large treatment unit that is designed to create a landscape level strategic fuel break east of the rural community of Red Mountain. Mixed coniferous forests on rolling, moderately sloped, conventionally operable terrain. Steeper slopes, deciduous stocking and extensive wet valley bottom flats occur within unit. Area has been previously logged from 1900 to approximately 1950.		
Overlapping Values		
Domestic water intakes, domestic use watersheds, visuals, wetlands, riparian areas.		
Treatment Constraints		
Access to unit from existing Branch 200 Road from north, along rights of way through private land, and/or through cooperation with neighbouring landowners. There is an extensive 1950's and older logging road system in area, but the old roads tend to lead into wet riparian areas and are often not suitable for current use. Complex mix of conditions within unit that will be mapped during more detailed planning include: <ul style="list-style-type: none"> • Wet, flat valley bottom riparian ecosystems that do not require treatment and will be ecological reserves, • Forested wetlands that do not require treatment, • Cedar hemlock forests on low to moderate slopes which are suitable for fuel management, and • Douglas-fir forests on moderate to steeper slopes which are suitable for fuel management. Need to maintain forest canopy to maintain watershed values and for visual management. Steep slopes, rock knolls, and currently unmapped wet areas will either not be treated		

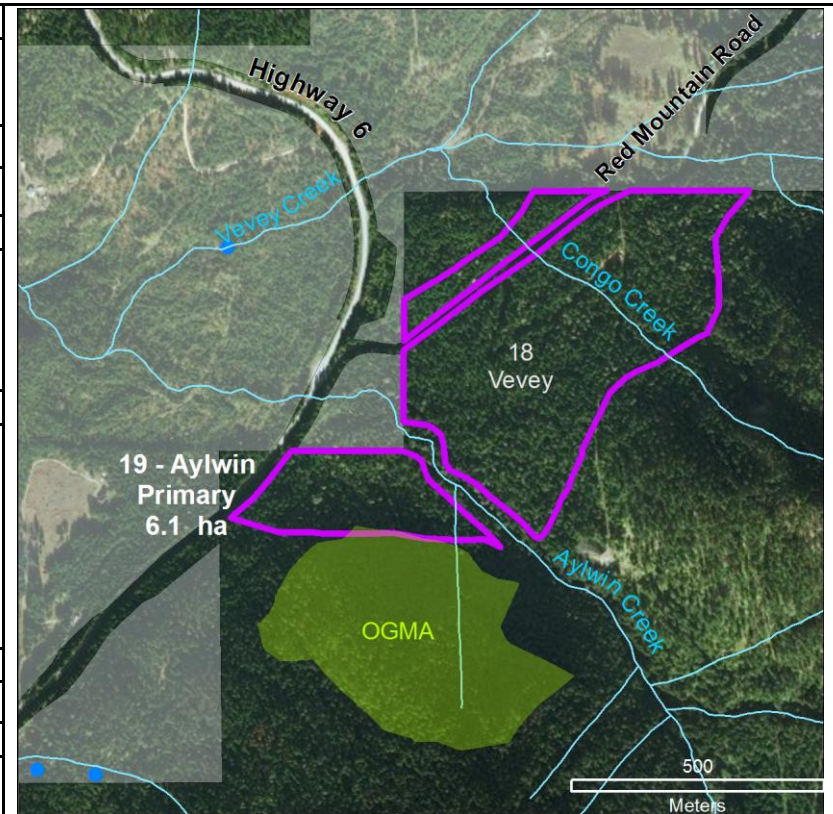


or will receive Type 1 treatment.
Riparian reserves, setbacks around water intakes, and other reserves will be identified at prescription stage.
Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.

Treatment Unit	Treatment Type(s)	Total Area
18 - Vevey Primary Map Code: 18-VevP	Primary Fuel Break. Estimate: 25% Type 1 WUI 75% Type 2 Post Harvest Fuel Management	25.9 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	100% High	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A mid sized treatment unit designed to improve suppression opportunities south of the Red Mountain area, and reduce the likelihood of a wildfire expanding to landscape scale. Mixed coniferous forests on rolling, moderately sloped, conventionally operable terrain. Steeper slopes, deciduous stocking and wet areas occur within unit. Area has been previously logged in approximately 1950.		
Overlapping Values		
Domestic use watershed, visuals, riparian areas, mining waste.		
Treatment Constraints		
Access to unit via Red Mountain Road and mine road. Need to maintain forest canopy or watershed and visual management. North west portion of unit, north of Red Mountains Road, is not suited for Type 2 treatment due to wet soils and adjacency to electrical transmission line, and will receive Type 1 treatment. Steep slopes, rock knolls, and wet areas in other part of unit will also receive Type 1 treatment. Mining tailings and piled crushed rock will not be disturbed. Riparian reserves and other reserves will be identified at prescription stage. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine operational treatment regime and extent of treated area.		



Treatment Unit	Treatment Type(s)	Total Area
19 - Aylwin Primary Map Code: 19-AyLP	Primary Fuel Break. Estimate: 100% Type 1 WUI	6.1 ha
Forest Tenure	CWPP Threat Rating Summary in Unit	Priority
CFA K2R	100% High	High
Treatment Objectives		
Conduct fuel treatments to create residual stand characteristics that do not support active crown fire. Create an area where fire suppression crews and resources can work safely to suppress a wildfire, or which can be used as a firing line to back burn into an oncoming fire.		
Treatment Rationale		
A mid sized treatment unit designed to improve suppression opportunities south of the Red Mountain area, and reduce the likelihood of a wildfire expanding to landscape scale. Unit will support and be most effective in conjunction with 18 - Vevey, which is located immediately to the north. Mixed coniferous forests on rolling, moderately to steeply sloped terrain.		
Overlapping Values		
Domestic use watershed, visuals, riparian areas.		
Treatment Constraints		
Access to unit via Red Mountain Road and mine road. Need to maintain forest canopy or watershed and visual management. Size and shape of area combined with location of steep terrain and riparian areas within unit likely render unit impractical for Type 2 treatment. Riparian reserves and other reserves will be identified at prescription stage. Detailed fuel and fire hazard assessment and consideration of overlapping values during development of prescription will determine extent of treated area.		



6.2 FireSmart Planning & Activities

FireSmart is a national initiative with the goal of encouraging communities and private landowners to live responsibly in wildfire prone areas. FireSmart aims to empower local governments and community members with the knowledge and support needed to reduce the wildfire hazard on their property. With a significant portion of the AOI considered private lands (11.5%), FireSmart is a proven, effective way to reduce the risk of wildfire throughout the community.

Current FireSmart Activities within the Slovan Valley

The RDCK manages a comprehensive FireSmart program which includes Area H and the villages of Silverton and Slovan. In 2018, the RDCK hired eight full-time, seasonal Wildfire Mitigation Specialists from June 1 – Nov 1. Mitigation Specialists conducted ongoing educational and outreach activities, collected critical infrastructure data, and provided free FireSmart assessments to residents on a voluntary basis. Mitigation Specialists were assigned sub-regional areas to support two FireSmart programs: the FireSmart Community Recognition Program, and the Home Partners Program. The Community Recognition Program helps community members to organize and reduce the risk of wildfire damage for their whole community. The Home Partner Protection Program intends to engage homeowners in voluntary wildfire mitigation activities through the use of professional home assessments with property-specific recommendations. In 2018 -as part of the Home Partners Protection Program - the RDCK completed 79 FireSmart Assessments in Area H. These assessments provided homeowners with a detailed work-plan outlining steps to mitigate the wildfire hazard on their property.

The RDCK FireSmart web page provides information on how community members can participate in both FireSmart Programs, register for free home assessments, and access FireSmart educational information.

Both the RDCK and the municipalities in the AOI intend to support ongoing FireSmart programs. The Villages of New Denver, Silverton, and Slovan have partnered to implement a joint FireSmart Program in 2019 -with the role of lead applicant assumed by the Village of Silverton. Both the RDCK and the municipalities have applied for FireSmart program funding available through the CRI program.

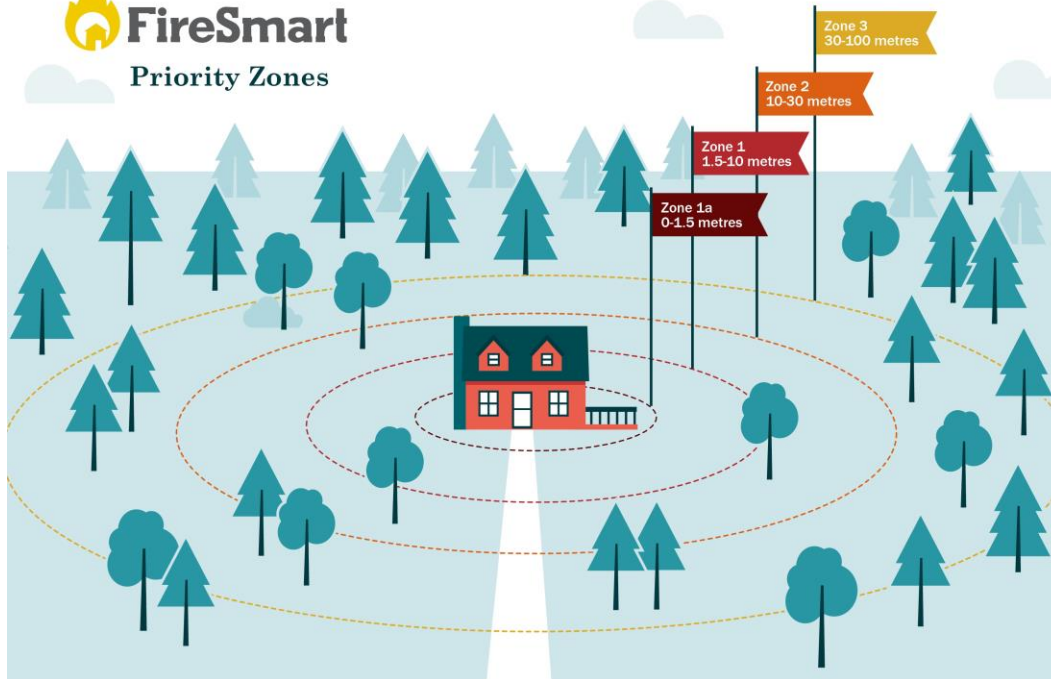
6.2.1 FireSmart Goals & Objectives

The 2016 Horse River wildfire in Fort McMurray, Alberta was the largest ever insured loss in Canada – destroying over 2,400 structures (Westhaver, 2016). A recent study has shown that properties which adopted FireSmart principles in Fort McMurray were more likely to survive the catastrophic wildfire (Westhaver, 2016). FireSmart focuses on reducing wildfire hazard within the Wildland Urban Interface, where wildland fuels are found adjacent to home and structures. A community that has adopted FireSmart principles has a number of advantages in the event of an interface fire, including:

1. Reduced likelihood of structure ignition and loss through radiant heat, direct flame contact, and ember transport
2. Reduced fire behaviour in the community
3. Improved first responder safety and suppression effectiveness through the creation of defensible spaces

Wildfires can damage structures in three ways: by direct flame, through radiant heat, and by sparks and embers landing on structures. All three of these can cause structures to ignite and burn. In order to mitigate these risks, property owners are encouraged to work from their property outwards using the following FireSmart zoning approach (Figure 13):

- **Zone 1a:** A minimum 1.5 metre non-combustible surface should extend around the entire home and any attachments, such as decks.
- **Zone 1:** Focus on reducing the susceptibility of the structure and a 10m buffer to wildfire. This should be a fire resistant zone. Actions include removing all materials that can easily ignite from a wildfire, using flame resistant building materials, cleaning out gutters, and using tempered double pane windows.
- **Zone 2:** Focus on reducing fuels 10-30m from structures. Actions include reducing ladder fuels and tree density, planting fire resistant species, and removing flammable materials. Thin and prune evergreen trees to reduce hazard in this area. Regularly clean up accumulations of fallen branches, dry grass and needles from on the ground to eliminate potential surface fuels.
- **Zone 3:** Focus on creating FireSmart landscapes and communities (30-100m from structures and values). Look for opportunities to create a fire break by creating space between trees and other potentially flammable vegetation. Actions include reducing ladder fuels and tree density through thinning and pruning, and encouraging neighbours to adopt FireSmart principles. These actions will help reduce the intensity of a wildfire.



Work with your neighbours in any overlapping priority zones!

Zone 1a (0-1.5 metres)	<p>Zone 1A is the noncombustible zone. Reduce the chance of wind-blown embers igniting materials near your home. A noncombustible surface should extend around the entire home and any attachments, such as decks. Creating a noncombustible surface can be as easy clearing vegetation and combustible material down to mineral soil. To add to your landscape design, use noncombustible materials such as gravel, brick, or concrete in this critical area adjacent to your home. Woody shrubs, trees or tree branches should be avoided in this zone, any that are present should be properly mitigated.</p>
Zone 1 (1.5-10 metres)	<p>Create a landscape that will not easily transmit fire to the home. A FireSmart yard includes making smart choices for your plants, shrubs, grass and mulch. Selecting fire-resistant plants and materials can increase the likelihood of your home surviving a wildfire. Plant a low density of fire-resistant plants and shrubs. Avoid having any woody debris, including mulch, as it provides potential places for fires to start. Storing items such as firewood piles, construction materials, patio furniture, tools and decorative pieces against or near a house is a major fire hazard. Move firewood piles, trailers/ recreational vehicles, storage sheds and other combustible structures out of this zone and into Zone 2. If unable to move, store firewood inside your mitigated garage, shed or other ember resistant structures, create a noncombustible zone underneath and for 1.5 metres around trailers/ vehicles and mitigate sheds and other structures to the same standards as those of your home.</p>
Zone 2 (10-30 metres)	<p>If your property extends out to this zone, thin and prune evergreen trees to reduce hazard in this area. Within 30 metres of your home, selectively remove evergreen trees to create at least 3 metres of horizontal space between the single or grouped tree crowns and remove all branches to a height of 2 metres from the ground on the remaining evergreen trees. If possible, pruning trees up to 100 metres from your home (Zone 3) is recommended. Regularly clean up accumulations of fallen branches, dry grass and needles from on the ground to eliminate potential surface fuels. Consider seeking the guidance of a forest professional with wildland fire knowledge on appropriate management options for this zone.</p>
Zone 3 (30-100 metres)	<p>Taking FireSmart actions in Zone 3 on your property will influence how a wildfire approaches your home. You can change the dynamics of wildfire behaviour by managing vegetation within this zone. Look for opportunities to create a fire break by creating space between trees and other potentially flammable vegetation. Thinning and pruning is effective here as well. These actions will help reduce the intensity of a wildfire. Consider seeking the guidance of a forest professional with wildland fire knowledge on appropriate management options for this zone.</p>

Figure 2: FireSmart Zoning Approach²¹

²¹ From <https://www.firesmartcanada.ca/mdocs-posts/firesmart-priority-zones-2017>

6.2.2 Key Aspects of FireSmart for Local Governments

Property owners, residents, businesses, and governments all have important roles in developing fire resilient communities. Table 20 provides recommended FireSmart activities that should be reviewed and implemented to mitigate the wildfire risk throughout the Slokan Valley. Activities include education and outreach, vegetation management, incorporating FireSmart into community planning and development, and increasing local capacity to defend against an interface fire. Recent changes to the CRI program funding allow for a wider range of eligible FireSmart activities - particularly on private land. In conjunction with FireSmart home assessments, the use of a rebate program should be explored to incentivise FireSmart activities on private property. Local governments should ensure that publicly owned buildings and spaces meet FireSmart standards which can then be used to demonstrate FireSmart principles.

Table 20: Recommended FireSmart Practices and Activities

Topic	Recommended FireSmart Practices and Activities	Priority
Communication, Education & Partnerships	Work with fire departments and BCWS to host FireSmart events. Events should emphasize FireSmart principles, emergency preparedness and evacuation, pre-fire-season readiness, and post-wildfire hazards.	High
	Develop FireSmart educational materials. This may include creating a school education module to inform youth about wildfire preparedness and prevention - can be in conjunction with current forestry, ecology or fire education programs.	High
	Utilize newsletters, social media, webpages, and radio to promote FireSmart principles and fire prevention. Provide local landscape companies and hardware stores with FireSmart landscaping and building guides; and outreach to Real Estate agents for new home owners.	High
	Work with local stakeholders and interest groups to undertake FireSmart activities throughout the AOI.	High
	Coordinate and share FireSmart/fuel management initiatives with forest licensees that operate in the Slokan Valley, including woodlot owners, SIFCo, NACFOR, Kalesnikoff, Interfor and BCTS.	High
	Hold FireSmart information sessions at local schools and community events. Work with the BCWS and fire departments to host joint information sessions. Include information on emergency evacuations and procedures.	High
	Continue the use of Wildfire Mitigation Specialists to implement FireSmart activities. Municipal FireSmart programs may consider hiring their own dedicated FireSmart coordinator to implement FireSmart/CWPP initiatives.	High
	Continue to encourage homeowners to undertake FireSmart site assessments and complete actions recommended.	High
	Ensure adequate signage at high-use recreation areas. Signs should include information on fire danger and prevention.	High
	Consider implementing a FireSmart sticker or lawn-sign program to recognize FireSmart properties, or create incentives for FireSmart activities on private property.	Low

	Encourage FireSmart Local Representative or Community Champion training for interested community members.	Moderate
	Apply for FireSmart Community Recognition.	Moderate
Vegetation management	Develop policies and practices for FireSmart maintenance of public spaces - such as parks and open spaces.	High
	Offer local rebate programs to home owners on private land that complete eligible FireSmart activities.	Moderate
	Use landscaping requirements in zoning and development permits to require fire resilient landscaping.	High
	Provide access to a chipper or dumpster for debris drop-off from pruning or thinning on private property. Consider integrating with existing events or planned FireSmart events.	High
	Conduct FireSmart assessments of public buildings and spaces and undertake necessary actions to meet FireSmart standards. Post educational signs and use as an example for FireSmart Programs.	High
Planning & Development	Develop policies and practices for FireSmart construction and maintenance of public buildings and lands.	High
	Consider wildfire prevention and suppression in the design of subdivisions (e.g. road widths, turning radius for emergency vehicles, and access and egress points). Consider joining dead-end roads in current areas with limited access and egress.	High
	Coordinate the review of new developments across multiple departments, including the fire department.	High
	Amend Official Community Plans, Comprehensive Community Plans and/or land use, engineering and public works bylaws to incorporate FireSmart policies.	High
	Consider the establishment of Development Permit Areas for Wildfire Hazard ²² . These areas could require FireSmart exterior finishing and building materials.	Moderate
	Develop a Local Community FireSmart Plan and Communication Strategy to guide FireSmart initiatives.	High
	Establish a community FireSmart board/planning table to guide FireSmart activities. Community Committees provide local knowledge and expertise.	High
Increasing local capacity	Increase cross-training between local Fire Departments, Fire Brigades, and the BCWS.	High
	Develop and maintain Structural Protection Units (SPU), community fire caddies and water trucks where there are gaps in fire department coverage.	High
	Explore providing sprinkler kits to property owners (at cost or at a reduced rate), or provide resources for homeowners to develop their own "home	High

²² Refer to Changes for Local Governments under Section 5 of the Building Act: Appendix to Section B1 of the Building Act Guide (Revised February 2017) for information on the use of development permits for wildfire hazard.

	sprinkler kits.”	
	Explore opportunities to provide Basic Fire Suppression and Safety S-100 training to members of the public – at a reduced rate or free of charge.	Moderate

6.2.3 Identify Priority Areas within the Area of Interest for FireSmart

All communities within the Slocan Valley would benefit from ongoing FireSmart activities. Within the AOI, priority areas for FireSmart have been identified and described in Table 21 to provide a starting point for FireSmart programs. Due to the high fire risk throughout the AOI, FireSmart initiatives should not be limited to these locations.

Table 21: Summary of FireSmart Priority Areas

Geographic	Area ID	Recommended FireSmart Activities
Hills	Residences throughout north Hills, particularly along dead end roads (Hills Upper Road, Owl Road).	Conduct FireSmart assessments and distribute FireSmart educational materials. Coordinate yard a clean-up event and provide incentives for FireSmart on private property.
Rosebery	Rosebery Provincial Park and adjacent residences.	Work with stakeholders and agencies (BC Parks) to ensure adequate signage and to promote responsible campfire and recreational use. FireSmart assessments and distribution of FireSmart educational materials targeting residences near the park. Coordinate yard clean-up event and provide incentives for FireSmart on private property.
New Denver	Residences along Highway 31A, and south east of town (near Denver – Three Forks Road).	Conduct FireSmart assessments and distribute FireSmart educational materials. Coordinate yard a clean-up event and provide incentives for FireSmart on private property.
Silverton	Bannock Point.	Work with stakeholders and agencies (BC Parks) to ensure adequate signage and to promote responsible campfire and recreational use.
Silverton	Residences along Standard Road, and Silver Street; Victoria Street and near the Anderson gravel Pit.	Conduct FireSmart assessments and distribute FireSmart educational materials. Coordinate yard a clean-up event and provide incentives for FireSmart on private property.
Red Mountain	Residences along Red Mountain Road.	Conduct FireSmart assessments and distribute FireSmart educational materials. Coordinate yard a clean-up event and provide incentives for FireSmart on private property.
West shore of Slocan Lake	Structures along the west shore of Slocan Lake adjacent to Valhalla Park.	Ensure property owners are aware of the wildfire risk and have an emergency evacuation plan in place – including boat access. Conduct FireSmart

		assessments and provide incentives for FireSmart on private property. Work with BC Parks to coordinate evacuation plan for West Slovan Lake and potential fuel management near structures.
Throughout AOI	Publicly owned buildings and spaces throughout the AO.I	Conduct FireSmart assessments and undertake necessary actions to meet FireSmart standards. Post educational signs and locations as an example of FireSmart properties.

6.3 Community Communication and Education

Effective wildfire mitigation – including the implementation of this CWPP – depends heavily on community support, buy-in, and social license to operate. Educated and informed communities are more likely to support and participate in wildfire mitigation efforts, including fuel management and FireSmart programs. The following recommendations intend to garner community support for the successful implementation of this CWPP.

- Make summaries of this report and associated maps publicly available through web pages, social media, and public FireSmart meetings. This includes posting this CWPP on the RDCK²³ and SIFCo websites²⁴.
- Integrate this CWPP into existing and proposed FireSmart education and outreach initiatives – at both local and regional levels.
- Distribute a CWPP summary package to households through bulk mail or newspaper insert.
- Add wildfire threat spatial data to the RDCK interactive web-map - allowing residents to view the threat of wildfire adjacent to their property.
- Create a position based in the Slovan Valley to implement CWPP recommendations, FireSmart programs, and coordinate with RDCK Fire Mitigation Specialists.
- Engage in appropriate community engagement during fuel treatment prescription development.

Table 22 provides additional resources that can assist with the implementation of community education and outreach activities.

²³ <http://www.rdck.ca/EN/main/services/emergency-management/community-wildfire-protection-plans.html>

²⁴ <https://www.sifco.ca/>

Table 22: Education and Outreach Resources

Resource	Description	Link
BC FireSmart	Information and resources regarding BC's FireSmart Initiative. Includes training courses and FireSmart events.	https://firesmartbc.ca/
FireSmart Homeowners Manual	A guide for home owners to FireSmart their property.	https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/wildfire-management/prevention/prevention-home-community/bcws_homeowner_firesmart_manual.pdf https://www.firesmartcanada.ca/images/uploads/resources/Laura_Stewart_-_FS_HomeownersManual_Booklet-Jul2017.pdf
FireSmart Homeowners Checklist	A risk assessment for homeowners to evaluate their property's wildfire risk.	https://www.firesmartcanada.ca/images/uploads/resources/FS_HomeownersAssessment_Booklet-Jul2017.pdf
FireSmart Guide to Landscaping	Recommends fire resistant trees and plants for landscaping purposes. This resource could be made available at local garden and hardware stores.	https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Guide-to-Lanscaping.pdf
FireSmart Home Development Guide	A FireSmart guide for new structure development or renovations. Includes information on fire resistant building materials.	https://www.firesmartcanada.ca/images/uploads/resources/FSCanada_HomeDevBooklet_5.5x8.5-V6-Mar20.pdf
FireSmart: Protecting your Community from Wildfire	An in-depth guide on how to mitigate wildfire risk throughout the community.	https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Protecting-Your-Community.pdf
Becoming a FireSmart Community Brochure	Provides information on the FireSmart Canada Community Recognition Program.	https://www.firesmartcanada.ca/images/uploads/resources/64120_FireSmart_Brch_Proof_3_hi_res.pdf
FireSmart Last Minute Checklist	A last-minute checklist for homeowners in the event of a wildfire.	https://www.firesmartcanada.ca/images/uploads/resources/FireSmartCanada_Wildfire_Evac_Checklist.pdf
FireSmart Canada	Information and resources regarding the FireSmart program.	https://www.firesmartcanada.ca/
FireSmart Lesser Slave Region, Education Resources	Contains FireSmart educational material as well as pre-made programs for teachers.	https://www.livefiresmart.ca/education/

BCWS Prevention Webpage and Resource List	Contains information and resources regarding FireSmart specific to BC.	https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/for-your-home-community https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/wildfire-management/prevention/prevention-home-community/bc_firesmart_program_-_resource_descriptions.pdf
RDCK FireSmart Webpage	Information on the RDCK FireSmart program including home evaluations.	http://www.rdck.ca/EN/main/services/emergency-management/firesmart.html
RDCK Emergency Management Web Page	Information on emergency preparedness, post-wildfire hazard reports, active wildfires, evacuation information, and Emergency Notification System registration.	https://rdck.ca/EN/main/services/emergency-management.html https://rdck.ca/EN/main/services/emergency-management/wildfires.html
SIFCo WUI Management	Information on forest fuel treatments types and landscape level wildfire planning.	https://www.sifco.ca/wui-management
SIFCo Fuel Management Operations	Educational video library explaining how fuel management treatments are planned and carried out.	https://www.sifco.ca/video-gallery-2
Wildfire And Climate Change in the Kootenays Conference	Videos of expert presentations on climate change and wildfire preparedness.	https://www.kootenaywildfire.ca/presentations-
Government of Canada "Get Prepared" Website	Information on how to prepare for emergencies and evacuations.	https://www.getprepared.gc.ca/index-en.aspx
PrePared BC	Information on how to prepare for emergencies and evacuations.	https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/preparedbc

6.4 Other Prevention Measures

Hiking, camping, and mountain biking are popular recreational activities in the Slokan Valley. Ensuring trails and high-use recreation areas contain appropriate signage and campfire rings in designated areas can help mitigate the risk of human caused fires. Signs posting the Fire Danger Rating, information on fire prevention and what to do in the event of a wildfire should be maintained throughout the region - particularly at trailheads, forestry roads and along the highway. Posting signage at completed fuel treatment sites should be ongoing with the goal of educating the public on fuel management

treatments. Stakeholder groups, the BCWS, BC Parks, and local government can all work together to promote responsible outdoor recreation throughout the WUI.

6.5 Recommendations for Fire Risk Management and Mitigation

Table 23 provides recommendations with the objective of reducing wildfire risk through fuel management and FireSmart programs.

Table 23: Risk Management and Mitigation Recommendations

Number	Recommendation
Objective: To garner community support for wildfire mitigation efforts	
14	Undertake education and outreach with the goal of obtaining community support to implement CWPP recommendations. Consider: <ul style="list-style-type: none"> • Making summaries of this report and associated maps publicly available through web pages, social media, and public FireSmart meetings. This includes posting this CWPP on the RDCK²⁵ and SIFCo websites²⁶. • Integrating this CWPP into existing and proposed FireSmart education and outreach initiatives – at both local and regional levels. • Distribute a CWPP summary package to households through bulk mail or newspaper insert. • Adding wildfire threat spatial data to the RDCK interactive web-map - allowing residents to view the threat of wildfire adjacent to their property. • Creating a position based in the Slokan Valley to implement CWPP recommendations and FireSmart programs. •
Objective: To reduce wildfire threat through fuel treatment	
15	Work with licensees (BCTS, Interfor NACFOR, SIFCo) and other partners (BC Hydro, MOTI, and FWCP) to implement fuel treatment as recommended in Table 19. Treatments should increase opportunities for fire suppression, including reducing fuel loads, improving firefighter access and treating areas that are continuous and anchored to strategic locations (such as water bodies, roads, or gravel pits) when possible. Consider funding streams provided by the CRI and Forest Enhancement Society of BC (FESBC).
16	Continue to monitor previously treated areas and re-treat as required to maintain a moderate or low fire threat.
Objective: To reduce wildfire risk through FireSmart programs	
17	Maintain FireSmart programs throughout Area H and municipalities. Coordinate activities between the RDCK and municipalities to reduce program costs and increase efficiencies.
18	Review, select and implement activities from Table 20 as part of an ongoing FireSmart program. Activities include education and outreach, vegetation management, incorporating FireSmart into community planning and development, and increasing local capacity to defend against interface fires.

²⁵ <http://www.rdck.ca/EN/main/services/emergency-management/community-wildfire-protection-plans.html>

²⁶ <https://www.sifco.ca/>

19	Explore rebate programs to create incentives for FireSmart on private land. Continue to advance proposal that public funds should be invested in fuel management on private land that forms part of a strategic, landscape level fuel break.
20	Maintain sufficient signage at high-use recreational areas and completed fuel treatment sites. Signage should include fire danger ratings, information on fire prevention, emergency contact information, and evacuation procedures on trails. Explore opportunities to work with other agencies to maintain and increase fire prevention signage at trailheads, forestry roads, along the highway, and within communities.
21	Coordinate trail development and maintenance with wildfire mitigation efforts in high-risk areas. Information regarding trail development should be shared with response agencies and incorporated into evacuation and emergency response plans.

SECTION 7: Wildfire Response Resources

Interface fires are complex, dynamic incidents that typically require the coordination of various resources from multiple agencies. The RDCK has undertaken a recent initiative to collect data on firefighting and emergency response resources. Continuing this initiative will facilitate efficient emergency response and coordination. The following sections describe the resources that are available to respond to an interface fire in the region. Section 6.2 provides recommendations to improve the efficiency of emergency evacuation, preparedness, and response and increase local capacity to respond to wildfires.

7.1 Local Government Firefighting Resources

The availability of firefighting resources can fluctuate significantly throughout the wildfire season depending on the demand for crews throughout the province. The BC Wildfire Service is responsible for responding to wildfires on Crown land and on private property outside of a municipal or regional fire protection area. The AOI is part of the South East Fire Centre, Arrow Fire Zone. The BCWS maintains a seasonal fire base near the Nakusp Airport which is staffed as needed with crews from the Shoreacres Fire Base. The Shoreacres Fire Base – located near the junction of Highway 6 and Highway 3A – is home to seven, 3-person Initial Attack crews; and two, 20 person Unit Crews²⁷. The BCWS coordinates the staffing levels of fire crews throughout the province based on wildfire danger and fire activity. In B.C. these resources are deployed according to BC Provincial Co-ordination Plan for Wildfire²⁸.

The New Denver and Area Volunteer Fire Department services the Village of New Denver, Silverton, and Area H specified fire protection service area Appendix 1, Map 1. The Hills Volunteer Fire Brigade – although not recognized for insurance purposes or funded through parcel assessments – provides additional fire suppression support outside of the New Denver and Area Fire Department response area.

7.1.1 Fire Departments and Equipment²⁹

The New Denver and Area Volunteer Fire Department is led by a Fire Chief, staffed by 18 firefighters, and manages several resources including:

- 1 four-wheel drive tanker (2,000 gal.),
- 1 tanker (1,500 gal.),
- 1 four-wheel drive engine (800 gal.),
- 2 water bladders, portable pumps and hand tools,

²⁷ Personal Communications, Jonathan Fox, BCWS Wildfire Technician.

²⁸ https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/bc-provincial-coord-plan-for-wuifire_revised_july_2016.pdf

²⁹ Information provided by Leonard Casley, New Denver and Area Fire Department; and Nora Hannon, RDCK Wildfire Mitigation Coordinator

- 1 Type 3 SPU trailer,
- 1 boat.

These resources are shared between the two fire halls located in New Denver and Silverton.

The Hills Volunteer Fire Brigade consists of 20 active volunteers, a 500 gal pumper truck, and maintains an operational fire hall in the community of Hills. The fire brigade utilises the “one-call now system” in which residents (and firefighters) register their phone numbers and can be easily contacted in the event of an emergency.

Limited resources and training available to volunteer fire departments can pose a challenge for small communities. A lack of available volunteers in times of need has been identified as a common limitation facing wildfire response throughout the province and in the valley. Although solutions to this issue are limited, encouraging community members to volunteer can be incorporated into FireSmart education and outreach initiatives. Increasing firefighter remuneration is another strategy that the RDCK has explored to both better compensate volunteer firefighters and assist with firefighter recruitment and retention.

The RDCK maintains a mobile command unit, 4 Structure Protection Units (SPUs) and 18 Fire Departments throughout the regional district. Four out of the 18 fire departments operate in the Slovan Valley. Information on the RDCK’s Slovan, Winlaw, Passmore, and Crescent Valley Volunteer Fire Departments are included in the CWPP for Slovan Valley South.

7.1.2 Water Availability for Wildfire Suppression

The Denver Siding water system relies on surface water and contains a 29,916 gal dual chamber concrete reservoir. The Rosebery Highlands system includes a deep-water well and a 60,650 gal concrete reservoir. Neither RDCK water systems have sufficient capacity to support reliable fire protection services (RDCK, 2019).

The Village of Silverton water systems relies on 2 deep water wells (Village of Silverton, 2017). The system includes a 90,000 and a 348,000 gal reservoir and has the option to use Bartlett Creek as a limited backup water source (Village of Silverton, 2010). The Village of New Denver also draws water from two wells and contains a 350,000 gal reservoir (Have Blue Consulting and Design Ltd. & Endemic Mountain Design, 2010). The system relies on wellhead pumps to move water from the wells up to the holding tanks (Have Blue Consulting and Design Ltd. & Endemic Mountain Design, 2010). In the event of a power failure, water systems in Silverton and New Denver are serviced with backup generators.

New Denver, Silverton, and parts of Rosebery have operational fire hydrants. Most of the communities in the AOI are adjacent to Slovan Lake, as well as numerous streams and natural water sources which can be used the event of a wildfire. The RDCK has collected data on draft sites that can be used for fire suppression. Within the AOI, a draft site has been identified on Slovan Lake at the end of 6th Street, in Rosebery.

A detailed review of water sources, access points, and hydrants/standpipes should be conducted to assess water source vulnerability and system capacity for fire suppression needs. This review should continue current efforts to locate and map designated access points to natural water sources. The plan should also consider strategies to ensure access points are clear and usable in the event of an emergency.

7.1.3 Access, Evacuation and Transportation

Access and egress routes for many communities throughout the AOI are limited. The main or only evacuation route in many locations is Highway 6.

The highway evacuation routes within the AOI include:

- Highway 6 (North) towards Nakusp (15 km north west of Summit Lake).
- Highway 6 (South) towards Slocan (28 km south of Silverton). Continuing on highway 6 south will eventually lead to the southern entrance to the valley at Playmor Junction. Highway 6 continues east to Nelson (20 km) while Castlegar is located 22 km south on Highway 3A. There is an alternate route to Castlegar from Crescent Valley via Pass Creek Road (25 km).
- Highway 31A (East) towards the Village of Kaslo (46 km east). The Junction for Highway 31A is located in New Denver.

Areas with only one road access create a challenge for emergency response and evacuation, which is made worse by smoke, poor visibility and evacuee stress. Depending on the location of a fire, access and egress may be limited to one direction along major highways and roads.

Forest resource roads and/or secondary public roads may provide alternate transportation routes throughout the AOI in the event of highway closures. However, most such roads do not connect through to other locations. Any alternate routes using secondary roads should be carefully pre-planned, verified, and incorporated into a comprehensive evacuation plan. Alternate roads may only be suitable for 4x4 vehicles and be impassable with smaller cars or vans. Forest roads are also susceptible to unforeseen blockages due to fallen trees or other natural event.

Non-motorized access options include trails throughout the valley such as the Galena Trail from Rosebery to Three Forks.

Boat access along Slocan Lake provides a potential evacuation option from most of the communities within the AOI - including Hills, Rosebery, New Denver, and Silverton. Evacuation by boat or helicopter is the only option for people located on the west side of Slocan Lake. Marinas, public boat launch locations, and helipads are mapped on Appendix 1, Map 2 (Values at Risk). Other helicopter pads and airstrips nearby include two helicopter bases near Nakusp where Highland Helicopters maintains a year-round base and Canadian Mountain Holidays has a heli-pad with fuel. The Village of Nakusp maintains a registered aerodrome which includes a 914m paved landing strip. The Village of Kaslo also owns an uncertified, registered aerodrome with no terminal or gas availability. The Kaslo Airport includes a single paved runway (1,171 m).

Other access constraints and potential bottlenecks in the AOI include limited access and dead end roads throughout Hills, New Denver, Silverton and suburbs (e.g. Harris Road, Victoria St, Kokanee Falls Road, Bonanza Road) and numerous steep and narrow private driveways). There are also key bridges located in Rosebery, New Denver, and Silverton. The bridges are not flammable, but any traffic incident that blocked a bridge would stop all evacuation traffic. An evacuation of Sandon would prove to be challenging due to the narrow valley and lack of alternate motorized escape routes should Sandon Road be cut-off. Opportunities to address emergency access and evacuation constraints throughout the AOI should be explored, including connecting dead-end roads and ensuring new developments consider emergency access and evacuation routes.

An interface fire is a stressful, chaotic, and dynamic situation in which decisions made under pressure with limited information can have positive or dire consequences. Having a predetermined - yet adaptable - evacuation plan can help ensure that evacuations are effective and efficient.

The RDCK is currently exploring opportunities to develop detailed evacuation plans for a number of electoral areas. A detailed evacuation plan should include maps of evacuation routes, safety zones, marshalling points, and Emergency Support Services.

Local fire departments which regularly carry out flood related evacuations stress that the evacuation process proceeds more smoothly when residents are well informed in advance regarding who makes the decision to issue the evacuation order and what the legal ramifications of the order are. An education program to communicate this to residents is recommended.

A local emergency communications plan can dramatically improve evacuation efficiency. Fire departments should maintain contact information for residents – particularly those who cannot self-evacuate.

Community members should be encouraged to register with the RDCK’s Emergency Notification System – which sends emergency notifications through text or voice call to registered individuals. Residents should also be encouraged to develop personal evacuation plans which may include: notifying friends and family of evacuations, pre-identifying evacuation routes and accommodations, ensuring vehicles are regularly fuelled, developing a readily available evacuation kit with cash, medication, food, water and other necessities. FireSmart initiatives should aim to educate the public on emergency preparedness and evacuation procedures. For additional educational resources, refer to Section 5.3 – Community Communication and Education.

7.1.4 Training

The New Denver and Area Fire Department conducts weekly practice sessions and participates in wildland fire training including the S-100³⁰ (Basic Fire Suppression and Safety), and Incident Command System (ICS). A few members have Fire Operations in the Wildland/Urban Interface (S-215) training and experience. The Hills Fire Brigade conducts monthly training sessions. A few members of the brigade have previously received S-100 training.

The RDCK Emergency Response and Recovery Plan outlines a policy for coordination between the BC Wildfire Service, the local fire department and the RDCK Emergency Operations Centre (EOC) in the event of an interface fire. During an interface fire, a unified command structure (under the ICS) is adopted in which representatives from multiple agencies share the lead role as the “Incident Commander” – typically this includes the local fire department and the BC Wildfire Service.

When working under a unified command structure, clear lines of communication are essential to facilitate efficient coordination of resources and ensure first responder safety. During the 2016 Horse River Fire in Fort McMurray, provincial wildfire crews and municipal fire departments were operating on different radio frequencies. “At critical times when municipal and wildland firefighters were not physically working together on the ground, they could not directly communicate by radio to identify priorities or support each other” (MNP, 2017). Although both the structural and wildland fire crews

³⁰ SPP-WFF1 Wildland Firefighter Level 1 replaces the S-100 Basic Fire Suppression and Safety and S-185 Fire Entrapment Avoidance courses for structure firefighters.

were trained to use the ICS, a unified command structure was not established in a quick or efficient manner (MNP, 2017).

Similar communications shortcomings during past wildfire events were identified in discussion with volunteer fire personnel in the AOI. The past communications issues did not have material impacts; however they do highlight opportunities for improvement.

In order to prevent a similar situation, firefighting agencies (including the New Denver and Area Fire Department, the BCWS, and RDCK Fire Departments in nearby communities) should participate in regular cross-training. Annual cross-training should include a review of the ICS system and communication protocols - including the establishment and maintenance of shared radio frequencies between the various agencies. Incorporating the Hills volunteer fire brigade into these training sessions – when possible - would also help increase the local capacity of the Area H communities to respond to an interface fire. Currently, the BCWS conducts cross-training with local fire departments every 3 years, while fire response agencies participate in Zone 4 (Kootenays) Fire Chief and Central Kootenay Fire Chief Association meetings.

Past wildfires, including local interface fires and recent catastrophic wildfires throughout the province, provide learning opportunities for both municipal and wildland crews. The 2016 Review of the Horse River Fire and the BC provincial review of the 2017 wildfire season are valuable resources that evaluate fire response efforts and identify areas for improvement. These documents should be reviewed and discussed in order identify training opportunities and prevent similar outcomes. Several online resources – such as the Wildfire Lessons Learned Center³¹ – provide additional, free-of charge; educational material for informal wildfire safety training that can be conducted in-house.

7.2 Structure Protection

Structure Protection Units (SPUs) are a critical resource during an interface fire. SPUs contain equipment (sprinklers and pumps) to increase humidity, wet roofs and areas surrounding structures in order to reduce potential damage from sparks, embers and approaching wildfires. There are several SPUs available in the event of an interface fire. The New Denver and Area Volunteer Fire Department has one Type 3 SPU capable of defending roughly 12 structures.

Currently the RDCK maintains four regional SPUs which can be staffed by RDCK firefighters trained as Structure Protection Specialists. The RDCK has three Type 2 units (capable of defending 20-30 structures) and one Type 3 unit.

The UBCM along with the BCWS and the Office of the Fire Commissioner (OFC) operate a Structural Protection Program (SPP) and can dispatch SPUs throughout the province within 12 hours.

The RDCK should continue to acquire additional SPUs and train firefighters to utilise these resources. Homeowners and community groups may be interested in purchasing or assembling their own personal sprinkler kits if provided with guidance or incentives. This initiative could be incorporated into a FireSmart program and may help increase local capacity to defend against an interface fire.

7.3 Recommendations for Wildfire Response and Resources

³¹ <https://www.wildfirelessons.net/home>

The recommendations in Table 24 intend to improve the efficiency of emergency evacuation, preparedness, and response. Table 25 provides recommendations with the objective of increasing local capacity to respond to wildfires.

Table 24: Wildfire Response and Resources Recommendations (Evacuation, Preparedness, and Response)

Number	Recommendation
Objective: To improve the efficiency of emergency evacuation, preparedness, and response	
22	Conduct a water availability assessment that considers: <ul style="list-style-type: none"> • An assessment of water sources, access points, and hydrants/standpipes for fire suppression needs. • A vulnerability assessment of water sources particularly to summer drought conditions and reliance on electrical power. • The identification of settlement areas that may have insufficient or unreliable water supplies.
23	Continue to identify and map alternate water sources for fire suppression. Create designated access points to natural water sources and ensure access points are clear and usable in the event of an emergency. If necessary, seek emergency access permission from landowners. Develop additional alternate and backup water sources as necessary.
24	Develop a detailed evacuation plan for New Denver, Silverton and communities of Area H – including the west-shore of Slocan Lake. A detailed evacuation plan for the Area H should consider: <ul style="list-style-type: none"> • Maps of evacuation routes, safety zones, marshaling points, and Emergency Support Services Reception Centers. • Designating and communicating pre-determined primary and secondary evacuation routes. • A feasibility review of FSRs as alternate evacuation routes. • Agreements and contact information with local transportation (busses, rotary-wing, and boats). • A communications and traffic control plan to be implemented in the event of an evacuation. • Information on residents who cannot self-evacuate, and current phone lists. • Collaboration with other agencies. This should include working with BC Parks to develop an evacuation plan for the west-side of Slocan Lake and other high-use recreational areas. • Communicating a summary of the plan and the administration framework of the evacuation process to residents to reduce confusion and delay when an evacuation is implemented.
25	Explore opportunities to address emergency access and evacuation constraints throughout the AOI. This should include: <ul style="list-style-type: none"> • Connecting dead-end roads and ensuring new developments consider emergency access and evacuation routes. • Communicating access constraints to homeowners and the implications on emergency response. • Exploring opportunities to coordinate with BC Hydro and Ministry of Transportation and Infrastructure to create/maintain fuel breaks adjacent to roads, highways, and bridges.
26	Continue to collect data on firefighting resources. Develop and maintain a wildfire suppression data set for use by BCWS and Fire Departments, including <ul style="list-style-type: none"> • Firefighting resources • Current access roads and trails

	<ul style="list-style-type: none"> • Old overgrown roads • Access blockages (washouts, bridge failures) • LiDAR terrain data • Water access points • Critical infrastructure
27	Consider installing satellite internet service equipment with generator at fire halls to provide redundant backup communications abilities if conventional communications systems are impacted by wildfire activity.
28	As part of a FireSmart program, encourage members of the public to develop personal evacuation plans. This may include: <ul style="list-style-type: none"> • Registering with the RDCK's Emergency Notification System • Notifying friends and family of evacuations • Pre-identifying evacuation routes and accommodations outside of the valley • Ensuring vehicles are regularly fueled • Developing a readily available evacuation kit with cash, medication, food, water and other necessities

Table 25: Wildfire Response and Resources Recommendations (Increasing Local Capacity)

Number	Recommendation
Objective: To increase local capacity to respond to wildfires	
29	Incorporate volunteer firefighter recruitment into FireSmart education and outreach initiatives.
30	Explore funding opportunities to acquire community fire caddies (small trailer with water tank and pump) and water trucks where there are gaps in fire response coverage. Consider purchasing additional wildland specific firefighting equipment including two-stroke pumps (Wajax Mark 3 or similar) pump kits, and quick connect 1.5" wildland fire hose.
31	Encourage cross-training between the RDCK Fire Departments and the BCWS. Explore opportunities for: annual mock fire exercises, Fire Operations in the Wildland/Urban Interface (S-215) training, Structure and Site Preparation (S-115) training, ICS, communications, and after action reviews of past interface fires.
32	Offer Basic Fire Suppression and Safety S-100 training for interested community members throughout Area H at a reduced rate or free of charge.
33	Maintain RDCK SPUs and continue to acquire additional units. Continue SPU deployment training for firefighters and monitor SPU needs.
34	Explore opportunities to assist homeowners and community groups to develop their own sprinkler kits. Consider coordinating initiatives with other municipalities and electoral areas to increase cost effectiveness.

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