Regional District of Central Kootenay Area E Community Wildfire Protection Plan Update - 2015

Submitted to:

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I certify that I have reviewed this document and I have determined that this work has been done to standards acceptable of a Registered Professional Forester.		I certify that I have reviewed this document and I have determined that this work has been done to standards acceptable of a Registered Professional Forester.	

ACKNOWLEDGEMENTS

The authors would like to thank the staff of the Regional District of Central Kootenay (RDCK), particularly: Nora Hannon, Emergency Program Coordinator, for her assistance in the development of the plan. Thanks also to Ramona Faust, Electoral Area E Director; Andrew Bellerby, Regional Fire Chief and General Manager of Emergency Services; Blewett Fire Chief Denis Lavoie; and Balfour Harrop Fire Chief George Mathieson; and other Regional District staff for their input and support.

In addition, the authors would like to thank, for their cooperation, input and insight, Ministry of Forests, Lands and Natural Resource Operations staff including George Edney, District Manager Selkirk Resource District; Garth Wiggill, Director/Strategic Initiatives Kootenay Boundary Region; and Curt Nixon, Tenures Forester as well as BC Wildfire Service Southeast Fire Centre Fuels Management Specialist Mike Morrow. This report would not be possible without the Strategic Wildfire Prevention Initiative (SPWI) Program and funding from the Union of British Columbia Municipalities (UBCM).

EXECUTIVE SUMMARY

The Community Wildfire Protection Plan (CWPP) Program was created in British Columbia (BC) as a response to the devastating 2003 wildfire in Kelowna. As an integral part of the Strategic Wildfire Prevention Initiative, managed and funded through the Union of British Columbia Municipalities, CWPPs aim to develop strategic recommendations to assist in improving safety and to reduce the risk of damage to property from wildfires. In 2008, Community Wildfire Protection Plans were completed for Regional District of Central Kootenay (RDCK) Fire Protection Areas within Electoral Area E to help guide the Regional District in wildfire risk reduction and mitigation activities. This document intends to update the applicable 2008 CWPPs (collectively referred to as the 2008 CWPP) and the threat of wildfire within and around the municipality. This 2016 CWPP Update reflects changes in Area E communities and current conditions using the current provincially accepted standard methodology and baseline data for hazard and threat analysis. This CWPP Update also examines the effectiveness of completed work, identifies opportunities for improvement within existing programs, and describes future initiatives. Significantly, the RDCK is engaging in collaborative planning and implementation of wildfire risk reduction activities within the Wildland Urban Interface (WUI) with local licensees, First Nations, and adjacent jurisdictions (City of Nelson and BC Parks). This landscape level approach is reflected in the Plan.

Wildfire management requires a multi-faceted approach for greatest efficacy and risk reduction. Five key areas where changes can be made to address community wildfire risk are identified in this CWPP Update and include: Communication and Education; Structure Protection; Planning and Development; Emergency Preparedness; and Vegetation/Fuel Management. A total of 36 prioritized wildfire mitigation recommendations are made in this Plan and summarized below. While it is recognized that the RDCK will not likely have the resources required to act upon all recommendations, it is recommended that the Regional District review and identify resource requirements and develop a timeframe for implementation of recommendations as available funding and resources allow.

Item	Priority	Recommendation	Estimated Cost ($)
Communication and Education			
Objective: To improve public understanding of fire risk and personal responsibility by increasing resident awareness of the wildfire threat in their community and to establish a sense of homeowner responsibility.			
1.	High	• Establish a school education program to engage youth in wildfire management. Consult ABCFP and BCWS (the zone) to facilitate and recruit volunteer teachers and experts to help with curriculum development to be delivered in elementary and/or secondary schools. Educational programming can be done in conjunction with any currently running fire prevention education programs.	$5,000
2.	High	• Make summaries of this report and associated maps publicly available through webpage, social media, and public FireSmart meetings. Add fire threat spatial data to the interactive web-mapping tool to allow residents to find their property and the associated threat of wildfire.	Within current operating costs
3.	Moderate	• Add a Wildfire-specific Fire Prevention Week (or day) in the spring, immediately prior to the fire season.	$2,500

Item	Priority	Recommendation	Estimated Cost ($)
4.	Moderate	• Consider door to door FireSmart assessment and/or home owner self-assessment within the Area E interface in order to educate residents and to quantify the level the level of risk in the interface.	$10,000
Objective: To enhance the awareness of elected officials and stakeholders regarding the resources required to reduce fire risk.			
5.	High	• Maintain and strengthen the regional Interface Working Group that includes Nelson, Area F and BC Parks to coordinate wildfire risk reduction efforts.	Within current operating costs
6.	High	• Consider local planning departments to develop regional development permit standards, provide a group voice to the Building and Safety Standards Branch and other provincial entities, and align municipal bylaws.	$30,000
7.	High	• Consider the development of a coordinated approach to fuel management and hazard reduction within and adjacent to the Area E Study Area by coordinating with stakeholders including forest licensees, Ministry of Transportation and Infrastructure and utility companies, to aid in the establishment of large, landscape-level fuel breaks or compliment current or proposed fuel treatment areas.	$25,000
8.	High	• Maintain regular communication with the Technical Review Committee (see Section 2.4) to ensure that proposed activities maintain or enhance biodiversity values	Within current operating costs
Structure Protection and Planning			
Objective: Enhance protection of critical infrastructure from wildfire.			
9.	High	• Complete a fire flow / water vulnerability assessment for each water system and identify and map all alternative water sources (reservoirs, streams, lakes, etc.). Identify which areas may have insufficient or unreliable water supplies and provide recommendations to reduce Area E's vulnerability.	$20,000
10.	High	• Complete a vulnerability assessment of all critical infrastructure including water infrastructure in interface areas with FireSmart recommendations.	Within current operating costs
11.	High	• Develop alternative, backup water sources for fire protection, including the establishment of standpipes as required.	Based on assessments
12.	High	• Complete a detailed review of back-up power source options for all critical infrastructure and upgrade as required.	Within current operating costs
13.	High	• Consider completing more detailed hazard assessments and developing response plans for stabilization and rehabilitation of burn areas in watersheds that are vulnerable to post-wildfire debris flows and floods. Opportunities may exist to coordinate study and planning with adjacent jurisdictions (City of Nelson and BC Parks)	$25,000
Objective: Encourage private homeowners to voluntarily adopt FireSmart principles on their properties.			

Item	Priority	Recommendation	Estimated Cost ($)
14.	High	• Complete, or support homeowners to complete, WUI Site and Structure Hazard Assessments for interface homes, make hazard mapping for assessed homes publicly available, and provide informational material to homeowners on specific steps that they can take to reduce fire hazard on their property.	$10 per house
Municipal Policy			
Objective: To reduce wildfire hazard on private land and increase FireSmart compliance.			
15.	High	• Complete OCP review to strengthen and expand reach of the existing policy.	Within current operating costs
16.	High	• Consider developing Wildfire Hazard Development Permit (DP) Areas for major retrofits / renovations or new builds (building permits), collecting bonds to be returned upon evidence of completing development and landscaping according to wildfire hazard assessment. Review District of North Vancouver DP process as a model.	$25,000
17.	High	• Obtain legal advice regarding the Building Act, specifically regarding the temporarily unrestricted matters and local government authority to set exterior building materials requirements. Use local government authority to mandate FireSmart construction materials beyond BC Building Code in wildfire hazard development permit area, as allowed.	Within current operating costs
18.	High	• Develop a landscaping standard to be applied in interface / DP areas. The standard should list flammable non-compliant vegetation, non-flammable drought and pest resistant alternatives, and tips on landscape design to reduce maintenance, watering requirements, and reduce wildfire hazard. Include meeting landscaping standard as a requirement of Development Permit.	Within current operating costs
19.	High	• Proactively enforce wildfire covenants requiring owners to maintain their properties hazard free on all properties in Development Permit areas. Enforcement will serve to minimize fuel risks on problematic private properties which have allowed hazardous accumulation of fuels and provide improved protection to adjacent lands.	Within current operating costs
20.	High	• Alter the zoning bylaws to require that developers leave building set backs on private land so that there is a minimum of 10 m distance between buildings and forest interface.	Within current operating costs
21.	High	• Consider developing an outdoor burning bylaw specifying requirements for and limitations to outdoor burning and, in conjunction with the Fire Chief, implement the bylaw at times of high fire danger when provincial bans are not in place. The bylaw should consider effective and efficient enforcement measures and powers.	??
22.	Moderate	• Work with the Building and Safety Standards Branch to provide input into the Building Code revisions that would apply within the development permit areas to prevent the spread of wildfire.	Within current operating costs
Emergency Response and Planning			
Objective: To improve structural and wildfire equipment and training available to RDCK Fire and Rescue.			

Item	Priority	Recommendation	Estimated Cost ($)
23.	High	• Conduct annual structural and interface training with MFLNRO BCWS. As part of the training, it is recommended to conduct annual reviews to ensure PPE and wildland equipment resources are complete, in working order, and the crews are well-versed in their set-up and use. Interface training should include completion of a mock wildfire simulation in coordination with BCWS and safety training specific to wildland fire and risks inherent with natural areas.	Within current operating costs
24.	High	• Integrate Emergency Preparedness Committee and West Arm Interface Steering Committee. Coordination and information sharing are crucial to the development of a community well prepared for wildfire. As an outcome of this integration, consider updating the Emergency Program Structure (see Figure 6).	Within current operating budget.
25.	Moderate	• Provide S215 training to all/some members of Fire Halls in Area E to enhance wildfire suppression training. Consider investigating Office of the Fire Commissioner funding.	$5,000 (Annually)
26.	Moderate	• Review UBCM-owned SPU request procedure. Complete training with SPU as required and assess needs based on training outcomes.	$2,000
27.	Moderate	• Develop Regional Service to fund additional SPUs and maintain existing SPUs	$50,000 (Annually)
28.	Moderate	• Explore opportunities to collaborate with BCWS to coordinate discount volumes of hose for interface fires, reducing costs and logistics to local fire departments	Within current operating costs
29.	Moderate	• Explore opportunities to ensure a duty officer is in place in each Fire Protection Area to provide coverage for periods of high or extreme hazard.	To be determined based on current rates.
30.	Moderate	• Conduct fire preplan assessment for key interface areas in Area E. Other jurisdictions have completed assessments that prioritize fire department-specific variables, such as distance to hydrants, response time from nearest fire station, etc. to produce local risk ratings. [1]	$5,000
Emergency Response (Evacuation and Access)			
Objective: To improve access and egress to neighbourhoods at risk and natural areas within RDCK.			
31.	High	• Develop a Total Access Plan to create, map and inventory trail and road network in natural areas for suppression planning, identification of areas with insufficient access and to aid in strategic planning. Fire threat mapping from this CWPP should be included. The plan should be updated every five years, or more regularly, as needed to incorporate additions or changes.	$8,000 + updating
32.	High	• Require that all new interface developments have access for evacuation and sufficient capacity for emergency vehicles.	Within current operating costs
33.	Moderate	• Facilitate completion of emergency evacuation plans for interface neighbourhoods with limited access	Within current operating costs
Fuel Management			
Objective: Reduce wildfire threat on private and public lands through fuel management.			

[1] FireSmart ratings for Regional District of Nanaimo: http://www.rdn.bc.ca/cms.asp?wpID=761

Item	Priority	Recommendation	Estimated Cost ($)
34.	High	• Proceed with detailed assessment, prescription development and treatment of hazardous fuel units identified in this CWPP. Collaboration with BCTS, and other licensees, BC Parks and City of Nelson may facilitate larger projects.	UBCM SWPI Funding/Municipal Funding as available
35.	High	• Prioritize Areas of Interest across Electoral Areas with updated CWPPs to ensure effective and objective treatment	Within current operating costs
Objective: Maintain treated areas under an acceptable level of wildfire fire threat (moderate).			
36.	Moderate	• As treatments are implemented, complete monitoring within 10 years of treatment (subject to site conditions) and maintenance every 15-20 years (subject to prescription and site conditions) on previously treated areas. Treated areas should be assessed by a Registered Professional Forester, specific to actions required in order to maintain treated areas in a moderate or lower hazard.	UBCM SWPI Funding/ Municipal Funding

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1.0 INTRODUCTION

The Community Wildfire Protection Plan (CWPP) Program was created in British Columbia (BC) to aid communities in developing plans to assist in improving safety and to reduce the risk of damage to property. The Program was developed in response to recommendations from the "Firestorm 2003 Provincial Review" (Filmon, 2003).

The Regional District of Central Kootenay, Electoral Area E (RDCK or Area E) retained Cathro Consulting Ltd and B.A. Blackwell and Associates Ltd to complete an update to the 2008 Community Wildfire Protection Plan, completed by B.A. Blackwell and Associates Ltd.

Since 2008, considerable new development in the Wildland Urban Interface (WUI) has occurred. These areas either were not previously assessed for hazard, or the hazard and associated threat has increased due to the location and siting of the new development in relation to the assessment polygons. This CWPP update provides a reassessment of the level of risk with respect to changes in Area E communities and reflects the current conditions. In addition, methods for assessing wildfire threat have evolved since 2008. This update uses the provincially accepted standard methodology and baseline data for hazard and threat analysis.

Specifically, the objectives of this update are to:

- Summarize implemented recommendations from the 2008 CWPP;
- Summarize wildfire risk mitigative actions implemented by the RDCK that may be outside the recommendations of the 2008 CWPP;
- Provide the RDCK with an updated threat assessment;
- Prioritize mitigative action recommendations to address communication and education, structure protection, emergency response, and fuel management;
- Provide a prioritized maintenance schedule for the areas that have been treated; and,
- Provide a current document that highlights best practices for smoke management and safe prescribed burning practices, as well as explores alternative avenues for reducing woody debris on fuel treatment areas.

This CWPP update will provide the RDCK with a framework that can be used to identify methods and guide future actions to mitigate fire risk in the community. The scope of this project included three distinct phases:

I. Assessment of fire threat to spatially identify those areas of electoral Area E most vulnerable or at highest risk of fire;

II. Consultation with representatives from RDCK's staff, Fire Departments, Ministry of Forests, Lands and Natural Resource Operations (MFLNRO), BC Wildfire Service (BCWS), Union of British Columbia Municipalities (UBCM), residents, stakeholder Groups and First Nations to assist with defining the objectives for wildfire protection, and to develop the mitigation strategy alternatives that would best meet the needs of Area E.

III. Development of the Plan which outlines measures to mitigate the identified risk through communication and education programs, structure protection, emergency response and management of forestlands adjacent to the community.

This CWPP is being developed in conjunction with adjacent RDCK Electoral Area F and the City of Nelson. In addition, West Arm Provincial Park is updating its Fire Management Plan (initiated in 2010). Combined, these jurisdictions constitute a significant landscape. A working group with senior staff from these agencies coordinates wildfire planning and activities. Each jurisdiction will have complimentary stand-alone CWPP documents.

1.1 GOALS AND OBJECTIVES OF THE PLAN

This is an update to the 2008 RDCK Community Wildfire Protection Plans (Fire Protection Areas applicable to Area E) and accounts for changes to forest fuel types due to forest growth, forest health, windthrow, forest harvesting, forest fires and new developments. This project has been undertaken with funds from the Strategic Wildfire Prevention Initiative (SWPI), administered through the Union of BC Municipalities (UBCM). The broad goals of this project are to restore and maintain landscapes, create fire adapted communities, and promote safe, effective and efficient wildfire response.

These objectives are achieved by creating an action plan that focuses on these fundamental components of a CWPP:

1) Communication and Education, as well as training;

2) Structure Protection;

3) Planning and Development;

4) Emergency Response; and,

5) Vegetation (Fuels) Management.

The CWPP update was developed in seven general phases:

1) Background research - general community characteristics, such as demographic and economic profiles, critical infrastructure, environmental and cultural values, fire weather, fire history, relevant legislation and land jurisdiction.
2) Initial GIS analyses – updating fuel typing, creating threat polygons for Area E, assigning initial threat based upon fuel type, aspect, slope, and proximity to structure.
3) Field work - site visits to the area allow for 1) meetings with RDCK staff; 2) fuel type verification; 3) completing hazard assessment forms, 4) ground-truthing initial threat ratings, and 5) identification of site specific issues.
4) Consultation – meetings and consultation with MFLNRO District staff and RDCK Fire Department representatives, residents, stakeholders and First Nations.
5) Secondary GIS analyses – final fuel type updating and threat rating based upon field ground-truthing and results of hazard assessment forms.

6) Report and map development - identification of RDCK challenges and successes, identification of measures to mitigate risks, and recommendations for action.
7) Report review - by RDCK staff and representatives from the Selkirk Resource District, and BCWS. (The Ktunaxa First Nation did not express an interest in reviewing the draft. Note, that all identified First Nations must be consulted during detailed assessment and prescription development for any fuel treatments and prior to any fuel treatments proceeding.)

Detailed methodology on the threat analysis can be found in Appendix 2. Reducing the level of wildfire risk to the RDCK's Area E is the main focus of the CWPP. This document makes specific recommendations (planning tools) on how risk can be reduced by making changes to these five elements.

In order to protect the significant ecological, cultural and economic values of the surrounding forests the RDCK has made significant progress at implementing recommendations from the 2008 CWPP. The RDCK has shown provincial leadership in many aspects of wildfire mitigation activities, acknowledging the deep connection that residents in this electoral area have to forest industry jobs, various recreational uses (mountain biking trails, rock climbing, etc.), aesthetic values and important ecosystem values such as water. This document intends to acknowledge work completed, assess progress to implementation of recommendations in the 2008 CWPP, offer improvements to currently existing programs, and recognize opportunities for improvements and new initiatives. A summary of the most pertinent recommendations implemented can be found throughout the document in the relevant sections, with highlights summarized in Section 2.3. A comprehensive table of recommendations and implementation status can be found in Appendix 4.

A Fire Management Plan has not been completed for the South East Fire Zone; consequently, linkages with a landscape level fire management plan were not possible at the time of writing.

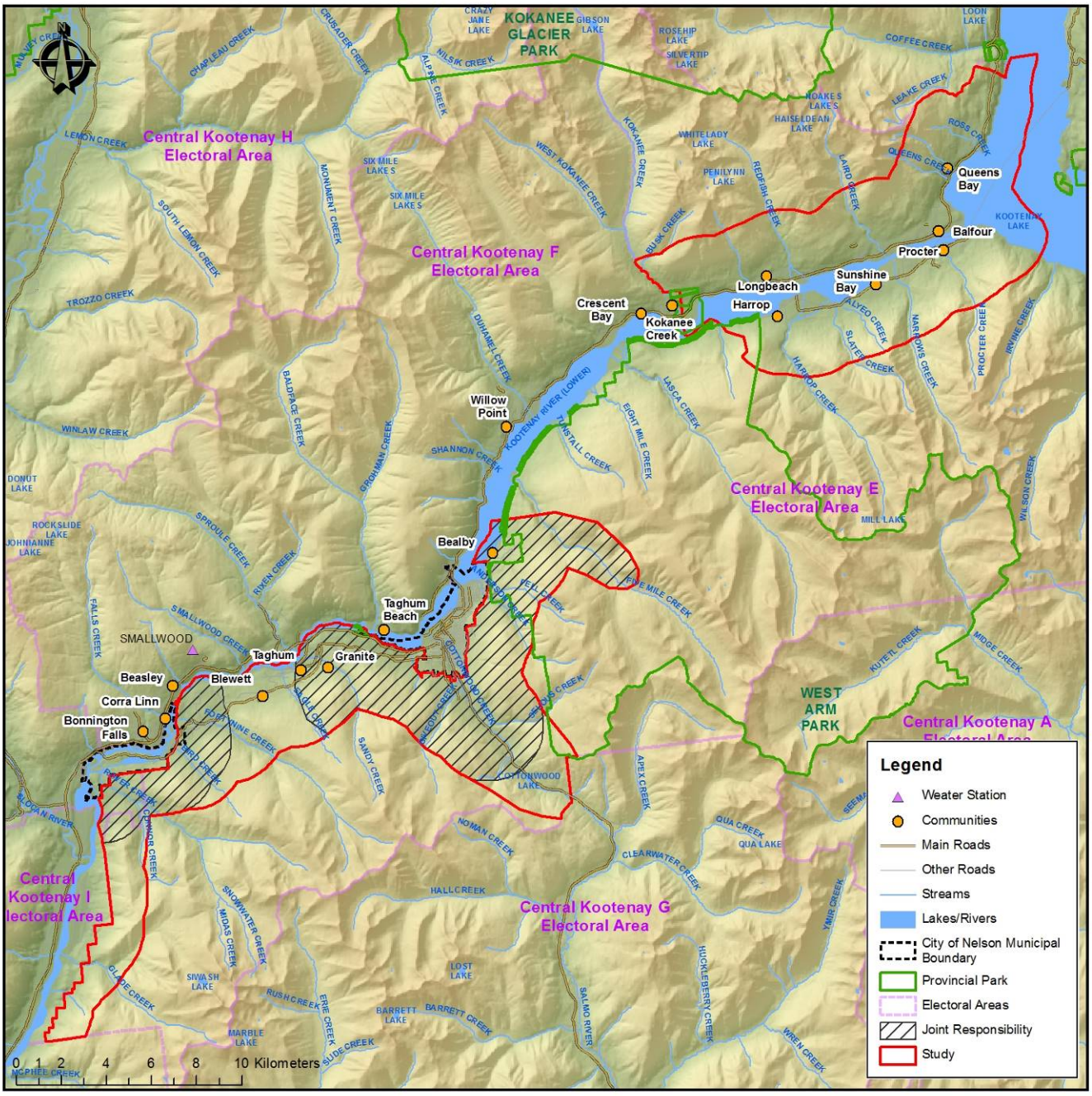
2.0 COMMUNITY DESCRIPTION

Electoral Area E in the Regional District of Central Kootenay is located at an elevation range of approximately 520 m to 1800 m on the north shore of the West Arm of Kootenay Lake east of Kokanee Creek Provincial Park and west of Coffee Creek and on the southern shore of the West Arm of Kootenay Lake from Harrop Procter in the west to Blewett in the west. The majority of the area is south of the West Arm of Kootenay Lake. West Arm Provincial Park and the City of Nelson are surrounded by Area E. Mountains dominate the local topography with the main Columbia River / West Arm valley running approximately northeast. Most communities are along the valley bottom and include Blewett, Balfour, Queens Bay, Longbeach, Harrop/Procter, Sunshine Bay, Bealby/Horlicks, Taghum Beach and Nelson to Cottonwood Lake. Many residences are in unincorporated communities and rural developments. The area also has some agriculture and recreational developments.

The Study Area that makes up the Area E CWPP is situated in the Selkirk Resource District (Ministry of Forests, Lands and Natural Resource Operations) and the South East Fire Region and is shown in Map 1. This Study Area is the WUI and includes a 2 km buffer around all residences and critical infrastructure based on density criteria described below. The Study Area also includes the Joint Responsibility Area developed to ensure that fire hazard mitigation works are undertaken in cooperation between the RDCK, the City of Nelson and BC Parks.

The Study Area and this Joint Responsibility Area use the Provincial Strategic Threat Analysis (PSTA) data package and the British Columbia Wildfire Service (BCWS)-defined Wildland Urban Interface (WUI) Area. The PSTA WUI Area is based on structure density, with a buffer established to meet the SWPI program density criteria of more than 6 structures per hectare. There is an extension of the Joint Responsibility Area into West Arm Provincial Park where the City of Nelson has water infrastructure. This area does not meet the density criteria but is established to protect critical infrastructure. Another small area at the south end of this Joint Responsibility Area has been added to include important access roads to Areas of Interest of Interest in the Joint Responsibility Area.

This CWPP Update relates to four separate CWPPs completed in 2008 for individual Fire Protection Areas with study area boundaries that fall within or overlap the current Area E Study Area (collectively referred to as the 2008 CWPP). The 2008 CWPP assessed the 2 km buffer surrounding four Fire Protection Areas of Balfour/Harrop, Beasley, Blewett and North Shore. This CWPP Update reduces the scope of responsibility for the RDCK. The total Study Area for this 2015 CWPP Update is 25,551 hectares.



Map 1. RDCK Electoral Area E Study Area.

The forest within and surrounding the Study Area is largely mixed coniferous second growth, resulting from early fires and forest management. Typical of the interior temperate rainforest, this forest is characterized on wet sites by dense western red cedar and western hemlock and on dry sites by Douglas fir, western larch and lodgepole pine. Several decades of fire suppression have resulted in patches of overstocked, high hazard forest.

Area E has a tourism and resource-based economy. Traditionally, the economy of Area E and the surrounding area has primarily been based upon fruit growing, forestry and mining. While these industries still provide vital areas of employment, other sectors such as outdoor recreation, retail trade, health and social services, and educational

services now also contribute to the economy. Due to the scenery and opportunities for recreational activity in the area, tourism has become a new and important sector within the economy of this area. Area E also surrounds the City of Nelson which is the provincial administrative centre for the Kootenay region and traditionally has supported many regional and district offices of the provincial government as well as some federal offices.[2]

Area E is accessed primarily by three routes. Highway 6 connects Area E and Nelson to Castlegar to the west, and Salmo to the south. Highway 3A continues east from Area E and Nelson to Balfour where it joins Highway 31 north to Kaslo and also crosses Kootenay Lake (via ferry crossing) to go south down the East Shore to Creston. There is a small airport along Nelson's waterfront, but commercial flights operate from the Castlegar Regional Airport, approximately a half hour drive to the west from Nelson.

The RDCK has two water systems in Area E: Grandview and Balfour. The source for both is surface water from Kootenay Lake. The Balfour system does not have the reservoir capacity to meet fire suppression demands. The Grandview system, with seven hydrants, does have capacity to meet the requirement for rural fire-fighting.

There are also numerous community water systems in Procter, Kootenay Lake Village, Longbeach, Queens Bay, and elsewhere. Hydrants are generally sparsely scattered along the north and south shore of the West Arm of Kootenay Lake in the northeastern part of the Study Area and are non-existent in the southwestern portion of the Study Area except for one hydrant located in the vicinity of Granite Road.

In addition, the Study Area includes Five Mile Creek, the City of Nelson's primary source of water, located in West Arm Provincial Park and connected to Nelson by a pipeline that traverses RDCK Area E. Additional secondary water sources include Anderson Creek Intake and Mountain Station Reservoir within West Arm Provincial Park and Area E, and Selous Creek Intake, which originates in Area E. These City of Nelson water systems are addressed in the City of Nelson CWPP Update, and are central to the establishment of the Joint Responsibility Area.

2.1 LOCAL GOVERNMENT DESCRIPTION

Incorporated in 1965, the RDCK is a local government that serves an estimated population of 60,000 residents. The RDCK consists of 11 electoral areas and nine member municipalities: Castlegar, Creston, Kaslo, Nakusp, Nelson, New Denver, Salmo, Silverton and Slocan. The population of Electoral Area E in 2011 was 3,781 and experienced a very small 1.7% population growth between 2006 and 2011 (Statistics Canada, 2016). There are approximately 1985 dwellings. As a largely rural area, the population density is approximately 5 people per square kilometer.

The RDCK, like all local governments, is granted its powers by the provincial government and is governed primarily by two provincial pieces of legislation – the Local Government Act and the Community Charter – as well as numerous other supplementary enactments.

The RDCK is governed by a board consisting of two types of directors: Electoral Area Directors are elected directly by rural area voters, and serve four-year terms. The RDCK Board consists of eleven electoral area directors; Municipal Directors are first elected to a municipal council, and are then appointed by their council to the regional

[2] http://www.discovernelson.com/htdocs/statistics.html

district board for a one-year term. The RDCK Board consists of nine municipal directors. The Board selects its own chair and vice-chair[3]

The RDCK provides approximately 160 services to taxpayers. The choice of services is determined by the regional board but only with the approval of the electors. The scope of services therefore varies with each regional district.

There are five first nation groups within the Kootenay Lake Timber Supply Area (TSA) – the Lower Kootenay Indian Band, Shuswap Indian Band, Ktunaxa Nation Council, Okanagan Nation Alliance, and Shuswap Nation Tribal Council. The Lower Kootenay Indian Band and the Shuswap Indian Band have Forest and Range Agreements with the Province (Snetsinger, 2010).

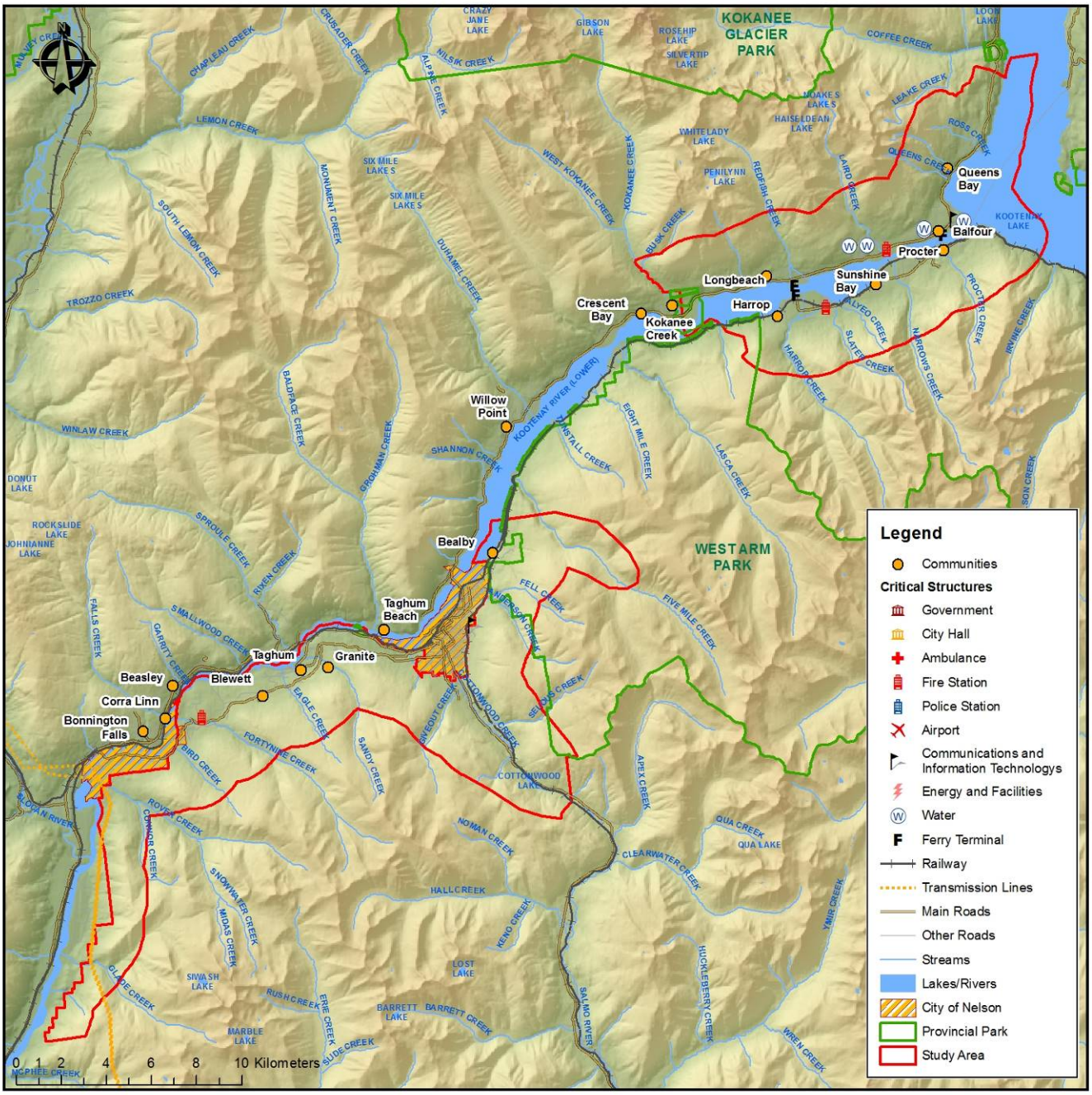
2.2 CRITICAL INFRASTRUCTURE

Protection of infrastructure during a wildfire event is important to ensure that emergency response is as effective as possible, to ensure coordinated evacuation can occur if necessary, and essential services in Area E can be maintained and/or restored quickly. Critical infrastructure includes emergency and medical services, water, electrical service, transportation, major water infrastructure, and communications infrastructure. The RDCK maintains a database of the critical infrastructure within Area E; the locations are shown on Map 2 below. Many other physical structures, systems, and facilities are extremely valuable to the RDCK and are required for the healthy, efficient functioning of the economy and the RDCK.

Emergency services available to Area E include: an RCMP facility (detachment, district headquarters, telecommunications and radio workshop), Nelson Police Department, 911 dispatch service (police, ambulance or fire), Kootenay Lake Hospital, RDCK fire halls (Harrop, Balfour and Blewett), the Nelson Fire & Rescue Services (NFRS) municipal fire hall within the contract area, a BC ambulance service station (Nelson), a primary Emergency Operations Centre (EOC) and the Nelson Regional Airport and associated services. The EOC is operated by the RDCK and is used in times of significant emergency or disaster, when an Incident Commander requires more resource or an emergency is more widespread. There are two communications and information technology infrastructure features within Area E.

Electrical service for most of Area E is received through a network of wood pole transmission and underground distribution infrastructure supplied by Nelson Hydro and Fortis BC. Those neighbourhoods with small, street-side wooden poles to connect homes and subdivisions are particularly vulnerable to fire.

[3] http://www.rdck.ca/EN/main/government/welcome.html



Map 2. Critical structures within the Study Area.

2.2.1 EMERGENCY PREPAREDNESS

The RDCK Fire Service Area E Fire Departments, Nelson Fire and Rescue Service, Kootenay Lake Hospital, area RCMP, Nelson City Police, B.C. Ambulance and groups such as Nelson Search and Rescue are critical to emergency response service in Area E. However, in the event of a localized emergency in Area E. However, in the event of a localized emergency within RDCK Area E, other adjacent municipalities with health care and emergency response facilities may also be able to provide emergency response. The Fire Departments, BC Wildfire Service, and Nelson City Police / RCMP provide the foundation for incident response during a large fire event and therefore must be

prepared to deal with large and complex situations. The Emergency Operation Centre is another key piece of infrastructure that will be integral in coordinating response efforts.

Emergency response for a wildland fire in the event of a large-scale emergency is dependent to a large degree on electrical and water service within the Study Area. It should be noted; however, that a fuel free zone may be a greater benefit to firefighting resources than water in the event of a wildfire. The RDCK manages two water systems within Area E (Kootenay Lake is the source for both). Water for firefighting is sourced from hydrants in Balfour, Grandview, PRT Nursery in Harrop, McKinnon Road, Kootenay Lake Village, Nelson Hydro Power Plant gate at Bonnington Dam on Blewett Road, Pacific Insite, cisterns at the top of Bedford Road and Blewett Fire Hall, 49 Creek, Kootenay River at Fisherman Road, Harrop ferry, Crescent Beach, Sunshine Bay, Queens Bay and the City of Nelson hydrant on Government Road.

Water supply in much of the rural area of Area E is limited. Nearby rivers and lakes could provide a source of water for firefighting but the infrastructure for this is not currently in place. Electrical service is less critical where water supply is gravity fed and in particular for the City of Nelson which provides emergency services within a defined contract area within Area E RDCK limits. Nelson's entire water system is gravity fed and the Nelson fire hall has a 17 KW power plant for backup power.

A large fire has the potential to impact electrical service by causing a disruption in network distribution through direct or indirect means. For example, heat from the flames or fallen trees associated with a fire event may cause power outages. Consideration must be given to protecting this critical service and providing power back up at key facilities to ensure that the emergency response functions are reliable. Additionally, the loss of this utility would greatly hinder recovery efforts.

2.3 PAST WILFIRE RELATED PROJECTS

The RDCK has been active with respect to community wildfire planning and has implemented, or is in the process of implementing, many of the 2008 CWPP's recommendations. A complete list of the status of the recommendations from 2008 can be found in Appendix 4. Much of this 2008 work is still ongoing and has been cross-referenced to the current recommendations in this CWPP Update.

Fuel treatments have been completed on approximately 160 ha of high priority land in the current Study Area (Map 9). These have been on RDCK property (approximately 78 ha), on RDCK property adjacent to Nelson municipal boundaries and/or to protect Nelson infrastructure (approximately 19 ha), and within West Arm Provincial Park to protect Nelson's drinking water infrastructure (approximately 63 ha). The UBCM/SWPI and the Job Opportunities Program (JOP) have funded much of this work. These treatments have reduced the risk profile of Area E but will require additional treatments to maintain effectiveness (see Map 9 and Section 7.5.3 for more details). As an outcome of this CWPP update, the RDCK is working with BC Parks, the City of Nelson and other stakeholders to plan and implement a fuel treatment program at the landscape level.

In the area of emergency preparedness and emergency response, numerous initiatives have either been completed, planned or are in progress. Emergency response coordination between the RDCK and BCWS has been formalized through the implementation of the provincial mutual aid agreement. The RDCK also plays a role through the Emergency Operations Centre (EOC). The structure for establishing and operating an EOC is outlined in the RDCK's recently developed Emergency Response and Recovery Plan. In terms of evacuation planning for

areas with identified access issues, an evacuation plan has been developed for the community of Harrop Procter. Additionally, RDCK Fire Departments are provided maps of water supply, subdivision layout and evacuation routes to facilitate effective emergency response.

In the area of communications and education, the RDCK is working with BC Parks, the City of Nelson, forest licensees, MFLNRO and other stakeholders to develop an effective set of tools to educate and communicate the principles of FireSmart to the public. Consequently, some specific outreach tools recommended in the 2008 CWPPs are no longer considered to be effective by the RDCK. The RDCK website provides links to BCWS resources, including open burning guidelines and restrictions, and fire prevention resources including FireSmart resources and the FireSmart homeowner's manual. Similarly, the Balfour Harrop Fire Department has expanded its public information to include FireSmart resources and other public firefighting education. The RDCK has improved its ability to provide emergency notification to the public through a Web Blocker on the its website that directs users to critical emergency information prior to allowing access to other website information. Additionally, the RDCK EOC circulates Emergency Alerts to residents on a routine basis. Following the 2008 CWPP recommendations, signage regarding current fire danger have been posted in most communities in Area E. Additionally, an effective line of communication exists between BCWS and RDCK Fire Departments through the Zone 4 BC Fire Chiefs Association, Central Kootenay Fire Chiefs Association and individual meetings between Fire Halls and Regional Staff. Communications include daily fire weather updates from the BCWS.

The RDCK has also made progress in the area of structure protection. Notably, the community of Queens Bay in Area E has achieved Community FireSmart Recognition in 2015. The Heddle Road area in Electoral Area F is working towards achieving FireSmart Recognition. The RDCK has also acquired multiple SPUs to assist in the protection of rural/ interface homes.

3.0 FOREST, FUEL AND PAST WILDFIRE INFORMATION

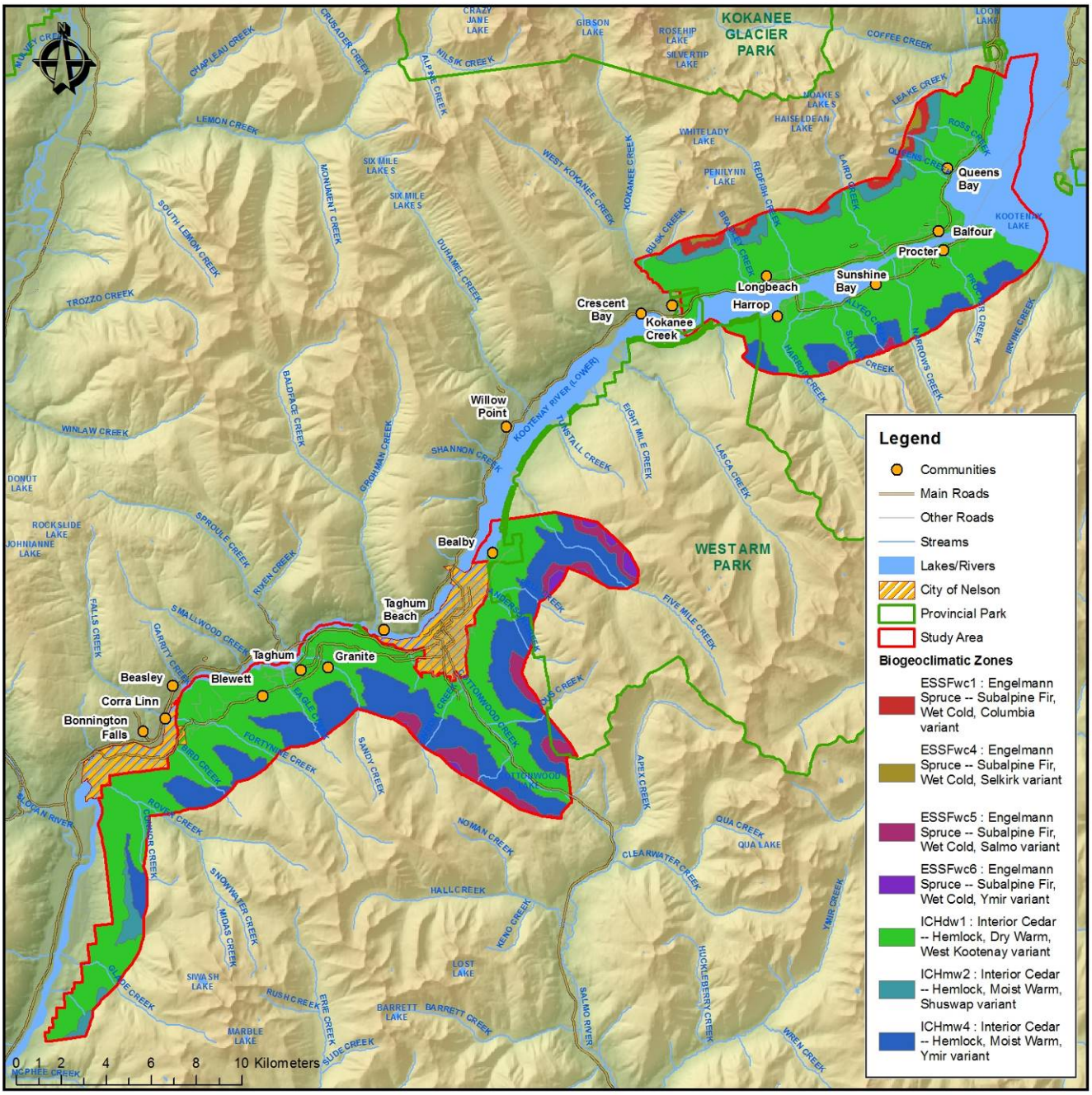
The forests of the region are some of the most ecologically diverse in the province. Fires are common, and are attributable to humans and lightning. The following section discusses the ecosystem classification, the timber harvesting land base, forest health, the wildfire history and fire weather of Area E.

3.1 BIOGEOCLIMATIC INFORMATION

The biogeoclimatic Ecosystem classification (BEC) system describes zones by vegetation, soils, and climate. Regional subzones are derived from relative precipitation and temperature. Area E is in the ecologically diverse West Kootenay Region. The natural forest succession in this region provides for a mosaic of successional stages and species composition. See Table 1 for a breakdown of Area E by BEC zone, as well as Map 3 for the spatial distribution of these Zones in Area E.

Table 1. Biogeoclimatic zones and Natural Disturbance Types in the Study Area

Biogeoclimatic Zone	Natural Disturbance Type	Area (ha)	Percent (%)
ESSFwc1: Engelmann Spruce -- Subalpine Fir, Wet Cold, Columbia variant	NDT1	310	1%
ESSFwc4: Engelmann Spruce -- Subalpine Fir, Wet Cold, Selkirk variant	NDT1	99	0%
ESSFwc5: Engelmann Spruce -- Subalpine Fir, Wet Cold, Salmo variant	NDT2	878	3%
ESSFwc6: Engelmann Spruce -- Subalpine Fir, Wet Cold, Ymir variant	NDT2	177	1%
ICHdw1: Interior Cedar -- Hemlock, Dry Warm, West Kootenay variant	NDT3	18,212	71%
ICHmw2: Interior Cedar -- Hemlock, Moist Warm, Shuswap variant	NDT2	981	4%
ICHmw4: Interior Cedar -- Hemlock, Moist Warm, Ymir variant	NDT2	4,895	19%
TOTAL		**25,551**	**100%**



Map 3. Biogeoclimatic Zones for the Study Area

By far, the largest amount of area lies within the ICH dw 1. This is the valley bottom ecosystem; the mountainous topography quickly gives way to wetter ecosystems (ICH mw 4). The ICH dw is an ecosystem typified by hot, moist summers and very mild winters. Major growth limiting factors include moisture on dry sites and frost on some low elevation sites. Climax forest stands are composed of western red cedar and western hemlock. Seral stands are mixed with Douglas-fir, paper birch, western larch and white pine, and provide important habitat for ungulate winter range. This is the most diverse subzone in the province in terms of tree species, containing 14 commercial

species. In this area, fire-origin stands composed of Douglas fir and larch are common, many of these stands originating from burning during mining activity at the turn of the century (Braumandl & Curran, 1992).

BEC zones have been used to classify the Province into five Natural Disturbance Types (NDTs). NDTs have influenced the vegetation dynamics and ecological functions and pathways that determine many of the characteristics of our natural systems. The physical and temporal patterns, structural complexity, vegetation communities, and other resultant attributes should be used to help design fuel treatments, and where possible, to help ensure that treatments are ecologically and socially acceptable (Province of British Columbia, 1995).

The majority of Area E falls into the NDT3 – ecosystems with frequent stand-initiating events. These are forest ecosystems that experience frequent wildfires of various sizes, with the largest fires in the province often occuring in this NDT. The mean return interval for this NDT is approximately 150 years in the ESSF and ICH units (Province of British Columbia, 1995). Douglas fir occurs through this NDT in the ICH, and in combination with western larch, is an important component of structural diversity during and after forest harvesting operations.

3.2 TIMBER HARVESTING LAND BASE

There are many resources associated with the timber harvesting land base of Area E. There are multiple values associated with the land base, including recreation and tourism, wildlife habitat, drinking water supplies, and many others.

Area E is in the Kootenay Lake Timber Supply Area, administered by the Selkirk Natural Resource District. The current Allowable Annual Cut (AAC) is 640,000 cubic meters per year. The last Timber Supply Review (TSR) was completed in 2010. The TSR determined that the land base contributing to harvesting is 199,282 hectares, removing parks and protected areas, old growth management areas, inoperable areas, uneconomic areas, low timber productivity areas, problem forest types, caribou no-harvest habitat, sensitive terrain areas, riparian areas, roads and trails, railways and transmission lines from 'forested areas' (Snetsinger, 2010).

There are several forest licensees operating within Area E: Harrop Procter Community Forest, BC Timber Sales, Kalesnikoff Lumber Company, and Atco Lumber.

Fuel reduction treatments are not anticipated to have a measurable effect on the timber harvesting land base. Typically, forest stands identified for fuels treatment are highly constrained for conventional logging, and are often in undesirable or uneconomic stand types. The opportunity exists to work with local licensees on commercial thinning projects that meet fuels management objectives. This has been explored with local licensees. See Section 7.0 (Recommendations) for opportunities to build relationships with forest industry licensees.

3.3 IMPORTANT FOREST HEALTH ISSUES

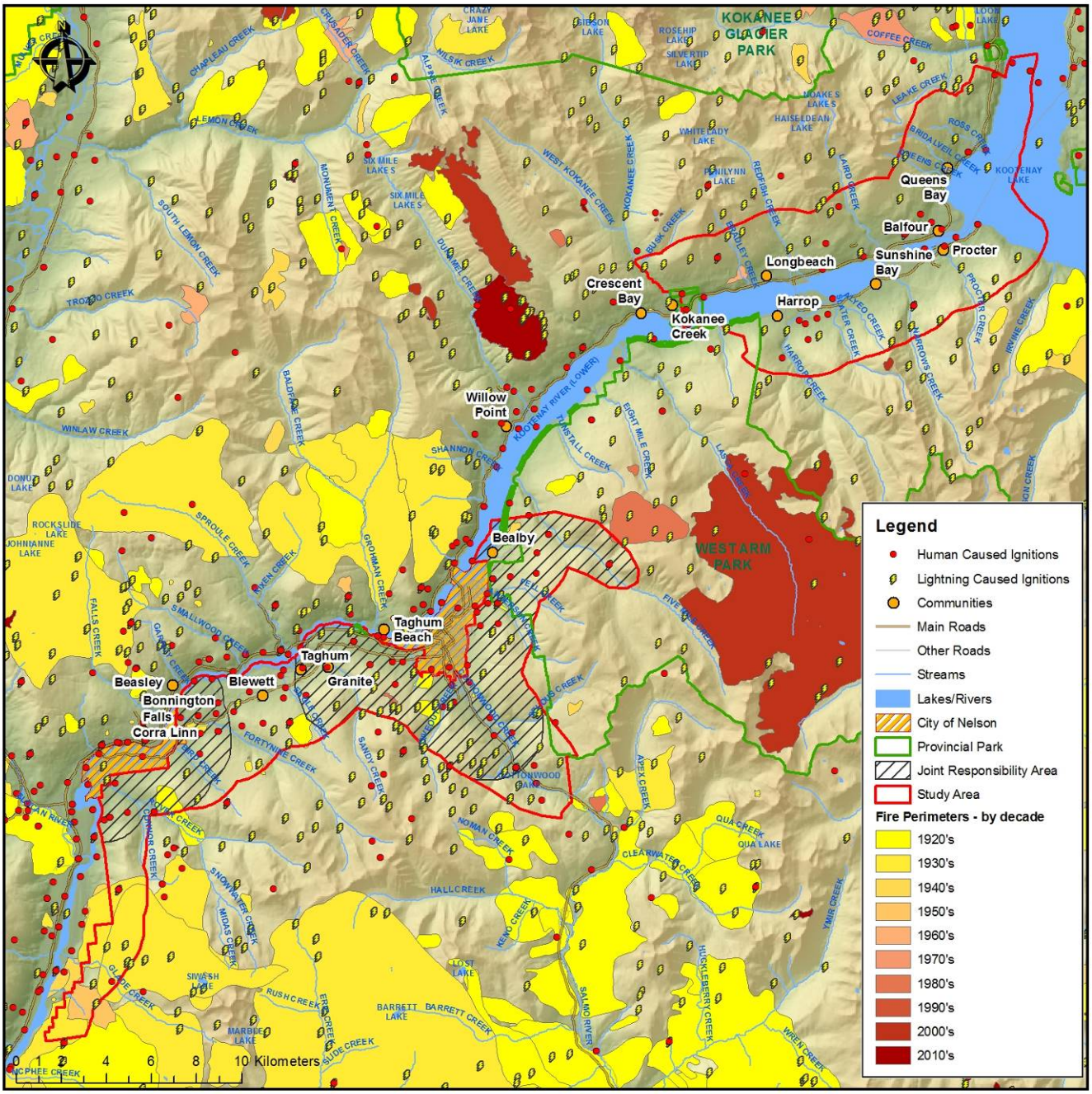
One of the most prevalent forest health issues in the Kootenay Lake Timber Supply Area are bark beetles; primarily mountain pine beetle and western balsam bark beetle, and to a lesser degree, Douglas-fir beetle, and spruce beetle. The 2015 Aerial Overview Survey (Maclauchlan & Buxton, 2015) found that the mountain pine beetle infestations are decreasing, as are Douglas-fir beetle populations, while western balsam bark beetle has increased slightly. Spruce beetle activity was very limited. Aspen serpentine leaf miner is significant and is the most widespread damaging agent of deciduous trees in the TSA with widespread defoliation reported around

Nelson. The birch leaf miner continues to affect paper birch trees. Other damaging agents noted are larch needle blight (in scattered small pockets), wildfire, drought mortality (mixed Douglas-fir-lodgepole pine plantations), flooding, and windthrow.

Climate change is anticipated to have largely negative impacts to forest health, especially within the interface areas. Tree stress caused by drought and greater windthrow are expected to allow insect populations to increase in weakened mature stands. This is particularly the case with Douglas-fir beetle, western balsam beetle, spruce beetle and western hemlock looper. Immature stands may see increases of spruce leader weevil, white pine blister rust, stem rusts of lodgepole pine, foliar diseases of lodgepole pine and larch, and Armillaria root disease. Lodgepole pine stands in particular are at elevated risk of insect and disease impacts with climate change (Holt, Utzig, Pinnell and Pearce, 2012).

3.4 LOCAL WILDFIRE HISTORY/STARTS AND FIRE WEATHER

Area E lies in a fire-dominated ecosystem. This is evidenced by the number and size of historical fires in the area. Fire perimeters and fire igintion points provided in the PSTA data package were reviewed for this Plan. This data show that many large fires burned in the earlier part of the century. Most (71% on average, 60% in Balfour) fire ignition points are attributed to human causes, with the remainder due to lightning.



Map 4. Fire history for the Study Area.

The Canadian Forestry Service developed the Canadian Forest Fire Danger Rating System (CFFDRS) to assess fire danger and potential fire behaviour. A network of fire weather stations during the fire season are maintained by the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO) and are used to determine fire danger, represented by Fire Danger Classes, on forestlands within a community. The information can be obtained from the MFLNRO British Columbia Wildfire Service (BCWS) and is most commonly utilized by municipalities and regional districts to monitor fire weather, and to determine hazard ratings, associated with bans and closures.

Fire Danger Classes provide a relative index of how easy it is to ignite a fire and how difficult control is likely to be. The BC *Wildfire Act* [BC 2004] and *Wildfire Regulation* [BC Reg. 38/2005], which specify responsibilities and obligations with respect to fire use, prevention, control and rehabilitation, and restrict high risk activities based on these classes. Fire Danger Classes are defined as follows:

- **Class 1 (Very Low)**: Fires are likely to be self-extinguishing and new ignitions are unlikely. Any existing fires are limited to smoldering in deep, drier layers.
- **Class 2 (Low)**: Creeping or gentle surface fires. Ground crews easily contain fires with pumps and hand tools.
- **Class 3 (Moderate)**: Moderate to vigorous surface fires with intermittent crown involvement. They are challenging for ground crews to handle; heavy equipment (bulldozers, tanker trucks, and aircraft) are often required to contain these fires.
- **Class 4 (High)**: High-intensity fires with partial to full crown involvement. Head fire conditions are beyond the ability of ground crews; air attack with retardant is required to effectively attack the fire's head.
- **Class 5 (Extreme)**: Fires with fast spreading, high-intensity crown fire. These fires are very difficult to control. Suppression actions are limited to flanks, with only indirect actions possible against the fire's head.

It is important for the development of appropriate prevention programs that the average exposure to periods of high fire danger is determined. 'High fire danger' is considered as Danger Class ratings of 4 (High) and 5 (Extreme). Danger class days were summarized to provide an indication of the fire weather in Area E. The fire danger in Area E can vary from season to season. Considering fire danger varies from year to year, historical weather data provides information on the number and distribution of days when Area E is typically subject to high fire danger conditions. This is useful information in assessing fire risk.

The fire weather data for the Smallwood weather station show that on average (from 1991 to 2015), moderate, high and extreme fire danger days are prevalent in July and August. Average danger class days for each month of the fire season (May – September) are shown in Figure 1.[4] The location of the Smallwood weather station is illustrated in Map 1.

The wind rose data is compiled hourly by the MFLNRO This data provides an estimate of prevailing wind directions and wind speed in the area of the weather station. For the Smallwood weather station, the prevailing wind direction is from the south and southwest (Figure 2). The wind rose indicates that the majority of winds are less than 14km/hr, with a small percentage of the prevailing winds that are between 15 and 19.9km/hr.

[4] Smallwood weather station, data from 1991-2015, courtesy of the Ministry of Forests, Lands and Natural Resources Operations.

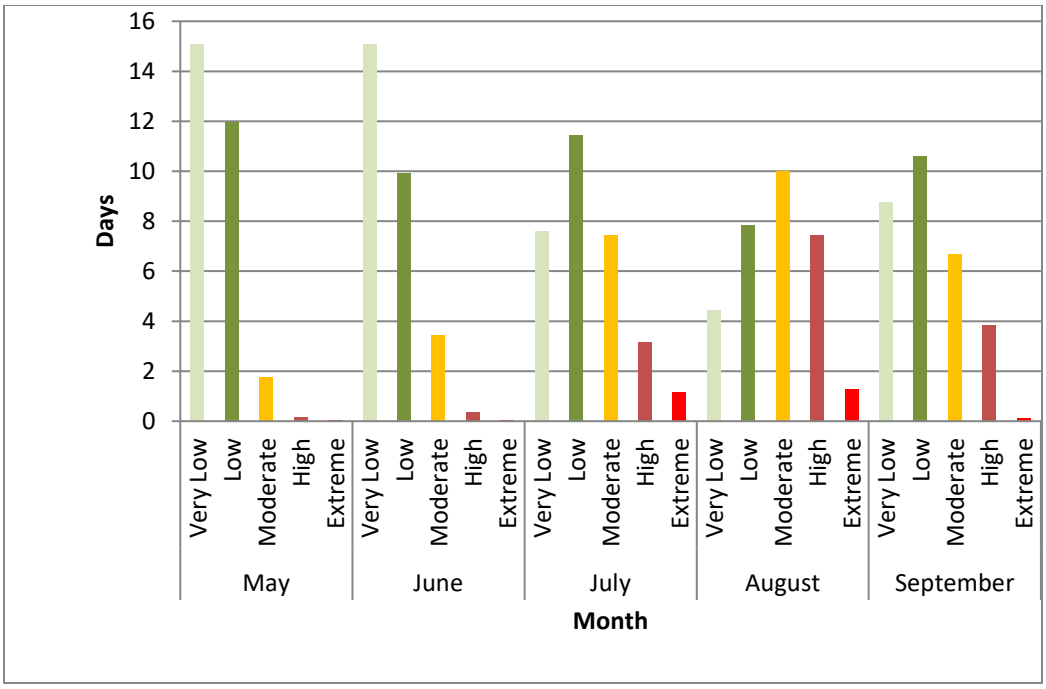


Figure 1.Average Fire Danger Class days per month (May to September) over 25 years in RDCK Area E recorded at the Smallwood weather station.

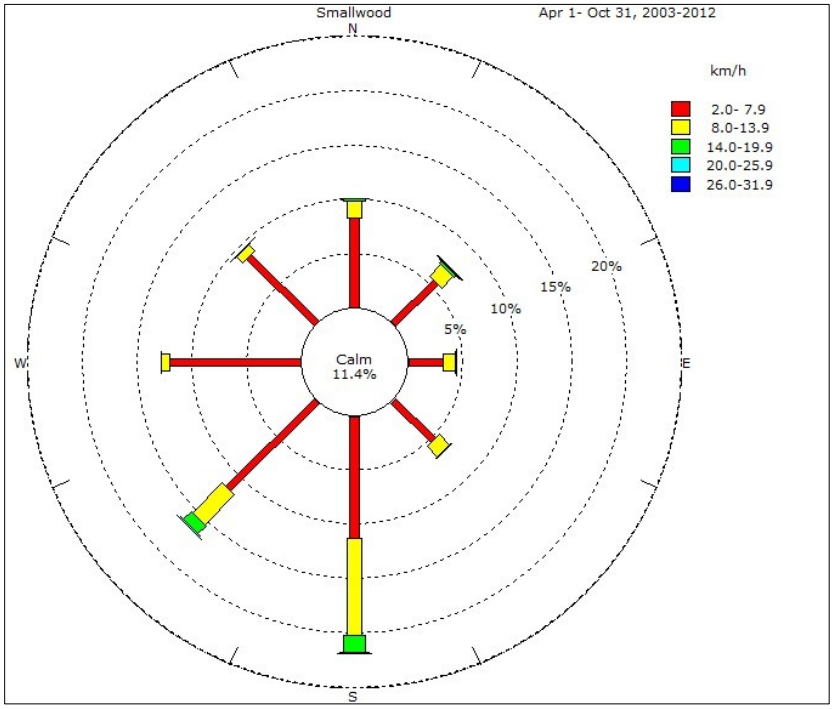


Figure 2. Wind rose data for Smallwood weather station, hourly data from 2003-2012. Courtesy of MFLNRO.

4.0 LOCAL ISSUES, VALUES AND SUPPORT

As with many places in BC, there are numerous overlapping values and resources on the landscape. Residents of Area E demand to be involved in ensuring these values are maintained. To meet this requirement, this plan has been developed with considerable engagement across the community. This includes consultation with resource professionals, local government staff, resident associations, water user groups, forest licensees and MFLNRO staff. This approach to engagement is consistent with community expectations and, when matched at the prescription development and treatment implementation phases, has resulted in broad public support for wildfire hazard reduction work.

Within the scope of this CWPP and associated Study Area, land jurisdictions include the West Arm Provincial Park. These are guided by higher-level plans such as the Kootenay Boundary Higher Level Plan (see Section 5.2).

4.1 RESOURCE ISSUES AND OPERATIONAL CONSTRAINTS

There are many resource values in the Study Area that are outlined in the Kootenay Boundary Higher Level Plan. This plan is the guiding document for other plans for the area, including the RDCK Official Community Plans and licensee Forest Stewardship Plans. Within the Study Area potential fuel management activities are constrained mainly by steep and difficult terrain, the need to accommodate a wide range of recreational users and the requirement for multi-agency coordination of fuel treatments occurring within the Joint Responsibility Area. An Interface Working Group comprised of senior staff from the RDCK, City of Nelson and BC Parks is committed to the coordinated planning and implementation of wildfire management activities at the landscape level.

4.2 ENVIRONMENTAL AND CULTURAL VALUES

Area E and surrounding areas provide a range of outdoor activities for tourists and residents. Cultural values within Area E are in the traditional lands of local First Nations, comprising fish bearing habitat, hunting grounds, archaeological sites, and sites of cultural significance.

4.2.1 ENVIRONMENTAL VALUES OVERVIEW

The Conservation Data Centre (CDC), which is part of the Environmental Stewardship Division in the Ministry of Environment, is the repository for information related to plants, animals and ecosystems at risk in BC. The CDC database was used to identify species and ecosystems at risk within Area E. The CDC keeps two classes of data: non-sensitive occurrences for which species and ecosystems at risk and their locations are available, and masked sensitive occurrences where only generalized location information is available.

Within Area E there are no sensitive masked occurrences, and nine publicly available species at risk including seven terrestrial plant and animal species, one aquatic species and one palustrine species. A list of these species is provided in Appendix 3. The White Sturgeon is a notable species at risk, but is strictly aquatic and not impacted by fuels treatment or other fire hazard mitigation activities. The Painted Turtle is a notable palustrine species at risk occupying herbaceous wetland habitats and is not likely to be impacted by fire hazard mitigation activities. Site level, operational plans must determine through consultation with the CDC and a biologist or qualified professional if fuel management or other wildfire mitigation activities will impact these occurrences. All future fuel treatment activities and those associated with recommendations made in this plan should consider the presence of, and impact upon, potentially affected species. Additionally, all site level operational plans should

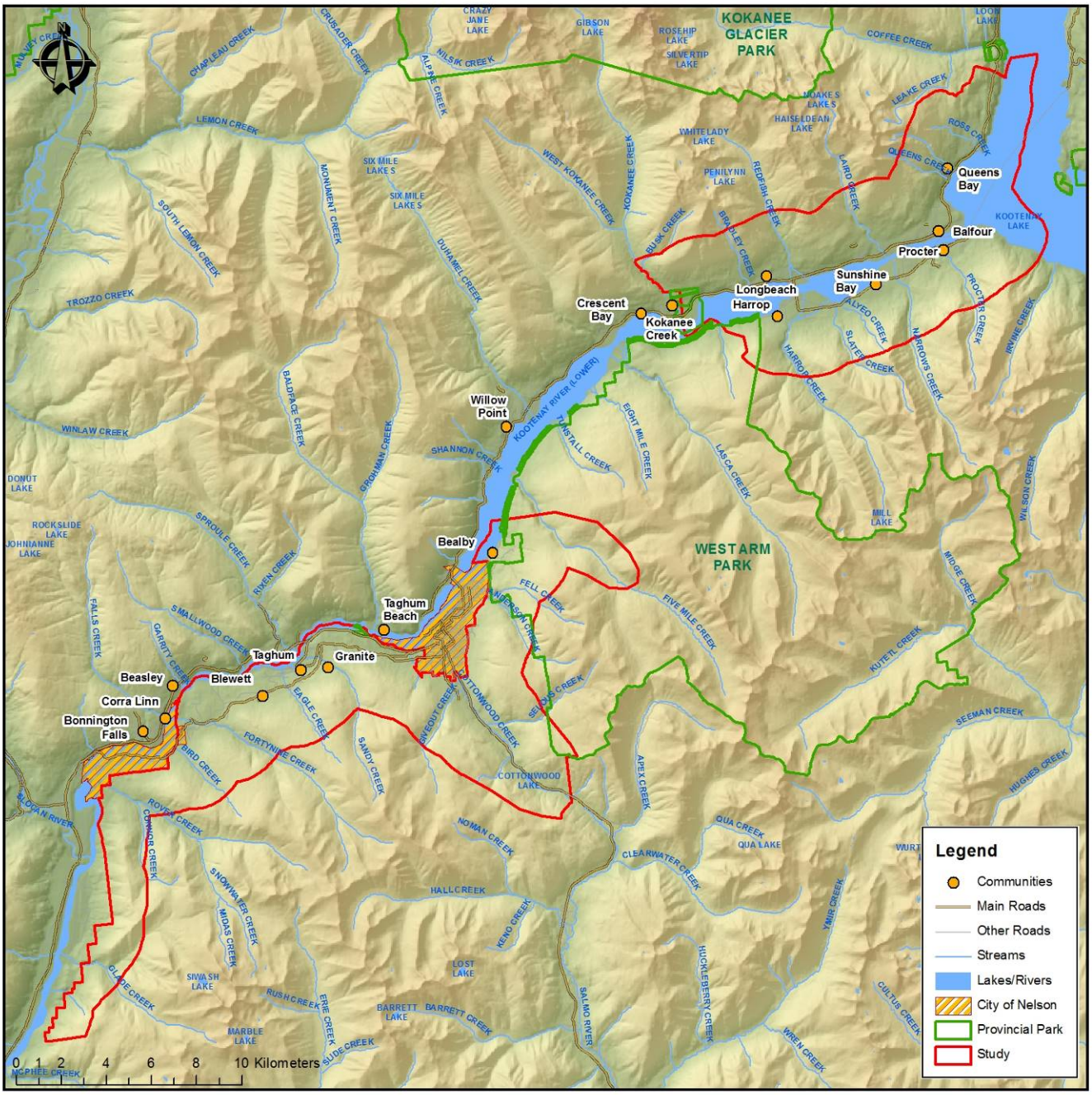
consult the most recent data available to ensure that any new occurrences or relevant masked occurrences are known and considered in the operational plan to mitigate any potential impacts on species at risk.

In the event of a wildfire burning a large area of the watersheds within the Study Area, potential for vulnerability to post-wildfire debris flows and floods exists where creeks drain steep slopes and in particular, in rural areas in the Study Area and in the adjacent municipality of Nelson that are built on the alluvial fans of these creeks (Jordan, 2016). Extensive research by MFLNRO has found that the likelihood of debris flows and other landslides in susceptible terrain is significantly increased following severe wildfire in the snow-dominated environment of the southern interior of BC (Jordan, 2015). Specifically, numerous debris flow incidents have occurred in the West Kootenays following 2003 and 2007 wildfires including Sitkum Creek northeast of the Study Area (Jordan, 2015). Locally, creeks that may be subject to high risks from post-wildfire debris flows include Smelter Creek, a small creek above Uphill, the small creeks above Bealby Point, the two small creeks draining Elephant Mountain above Johnstone Road and 1-Mile, and Garrity Creek above Beasley (Jordan, 2016). There could also be significantly increased flood hazards on Anderson Creek, Giveout Creek, Sandy Creek, Eagle Creek, and Bird Creek (Jordan, 2016). MFLNRO routinely conducts post-wildfire risk analyses where large wildfires have occurred above inhabited areas or in community watersheds (Hope et al., 2015). Post wildfire risk analysis reports are posted on the RDCK's website under Post-Emergency Hazard Reports[5].

Water quality is not likely to be significantly impacted by a wildfire in the Five Mile Creek watershed (Jordan, 2016). Based on a watershed-scale study of three post-wildfire study sites in southeastern BC near Nelson, Slocan and Trail, effects on water quality were found to be minimal (Jordan, 2012).

The RDCK should consider completing more detailed hazard assessments and developing response plans for these sub-drainages. It was noted in the 2008 CWPPs that the water supply in all RDCK Area E Fire Protection Areas is vulnerable to watershed disturbance and recommendations for stabilization and rehabilitation of burn areas were provided. While floodplains and non-standard flood and erosion areas as well as potential slide hazard areas are identified on the RDCK's Central Kootenay Web Map and have been identified in the Flood Management Bylaw (Bylaw No. 2080, 2009[6]) this does not specifically address watershed vulnerability to wildfire disturbance.

[5] http://www.rdck.ca/EN/main/services/emergency-management/geotechnical-hazards.html
[6] http://www.rdck.ca/assets/Government/Bylaws/Land~Use-Planning/2080_Floodplain-2.pdf



Map 5. Creek drainages within and above the Study Area, including some creeks potentially at risk of debris flow post-wildfire.

4.2.2 CULTURAL HERITAGE VALUES OVERVIEW

There are five first nation groups within the Kootenay Lake TSA – the Lower Kootenay Indian Band, Shuswap Indian Band, Ktunaxa Nation Council, Okanagan Nation Alliance, and Shuswap Nation Tribal Council. The Lower Kootenay Indian Band and the Shuswap Indian Band have Forest and Range Agreements with the Province. The Ktunaxa Nation is currently involved in the BC Commission Treaty process.

Archaeological sites in BC are protected by the *Heritage Conservation Act* (HCA), which applies on both private and public lands. Archaeological remains in the Province of British Columbia are protected from disturbance, intentional and inadvertent, by the Heritage Conservation Act (HCA). Archaeological sites that pre-date 1846 are automatic[7]ally protected under the Heritage Conservation Act whether on public or private land. Sites that are of an unknown age that have a likely probability of dating prior to 1846 (e.g., lithic scatters) as well as Aboriginal pictographs, petroglyphs, and burials (which are likely not as old but are still considered to have historical or archaeological value) are also automatically protected. Under the HCA, protected sites may not be damaged, altered or moved in any way without a permit. It is a Best Practice that cultural heritage resources such as culturally modified tree (CMT) sites be inventoried and considered in both operational and strategic planning.

Prior to stand modification for fire hazard reduction, and depending on treatment location, preliminary reconnaissance surveys may be undertaken to ensure that cultural heritage features are not inadvertently damaged or destroyed. Pile burning and the use of machinery have the potential to damage artifacts that may be buried in the upper soil horizons. Above ground archeological resources may include features such as Culturally Modified Trees, which could be damaged or accidentally harvested during fire hazard reduction activities. Prior and during fuel management prescription development the professional forester will request archaeological site records for the specific area and if either cultural or archaeological values are identified then prior to operational fuel treatment activities commence, the project supervisor must commission a reconnaissance survey (or if required) an Archaeological Impact Assessments. Due to site sensitivity, the locations of archaeological sites may not be made publicly available. The RDCK should apply for direct access to Remote Access to Archaeological Data (RAAD), which will allow the RDCK to look up or track any archeological sites in the area.[8]

First Nations consultation for treatments on Crown Land would be required with all identified First Nations at the detailed assessment and prescription stage before any future fuel management treatments proceed and as directed by the Selkirk Resource District.

4.3 COMMUNITY SUPPORT

RDCK staff and community members have widespread awareness of the threats posed by wildfire and the importance of hazard mitigation activities. Broad community engagement played a key role in developing this CWPP. The following consultation was undertaken to ensure community support:

Table 2. Consultations undertaken during the development of the CWPP update.

Group	Activity	Outcome
Interface Working Group	Quarterly meetings between City of Nelson, RDCK and BC Parks senior staff to provide project oversight	Clear progress updates, issues identified get resolved, external communication is consistent.
Harrop Procter Community Forest	Several field tours to conduct WUI threat analyses and discuss options for collaboration	Alignment on CWPP and operational considerations

[7] Snetsinger, 2010.

[8] https://www.for.gov.bc.ca/archaeology/accessing_archaeological_data/obtaining_access.htm

Group	Activity	Outcome
West Kootenay EcoSociety, Conservation Committee	Tuesday May 24 Meeting to review project scope and discuss areas of common interest especially the process going forward to protect biodiversity at the strategic planning, prescription and operational phases.	Shared understanding of project scope and agreement to strike a technical review committee
West Arm Interface Steering Team (WIST)	Wednesday May 25 meeting. The WIST was established to facilitate communication between groups and agencies responsible for wildfire preparation and response and is comprised of City of Nelson, RDCK, local fire departments, forest companies, MFLNRO, BCWS, Ministry of Environment, BC Parks and other local organizations. Meeting at RDCK office to review progress and seek feedback from local licensees, MFLNRO staff, City staff, RDCK staff and local conservation representatives	Shared understanding of project scope and time lines, invitation extended to attend field tours, public meetings or technical sessions when the draft plan is ready to be reviewed.
Licensee Field Tour #1	Thursday May 26 field tour with local licensee to review interface fuel reduction objectives, project timelines and opportunities for collaboration	Agreement to work together on a priority west of Nelson in Area F
Ktunaxa First Nation	Information sharing with Ktunaxa Lands and Resources Agency Lands Stewardship Manager	Shared understanding of project scope and time lines, invitation extended to review the draft plan. The Ktunaxa representatives expressed no concern with the CWPP but requested consultation at the prescription phase of any fuel management project work.
Technical Review Committee	The Technical Review Committee is comprised of local biologists and ecologists associated with the Nelson EcoSociety. Meeting on Monday July 4 to review preliminary priority areas, discuss treatment options and agree to progress	Agreement to collaborate and review the draft CWPP
Svoboda Road Resident Association meeting	Project met with the Svoboda Road Resident Association to summarize the project and discuss appropriate actions of private land owners	Commitment from Svoboda Road Resident Association to engage with Nelson and RDCK staff on implementation of the CWPP, including exploring fuel reduction treatments on private land
Field Tour #1	July 5 field tour to the east shore north of Creston with City of Nelson, City of Creston, BC Parks and RDCK staff and elected officials to discuss the draft plan, review previous fuel reduction projects and discuss overall plan implementation.	Shared understanding of project scope and time lines, invitation extended to attend field tours, public meetings or technical sessions when the draft plan is ready to be reviewed.
Licensee Field Tour #2	Thursday July 7 field tour with local licensee to review interface fuel reduction objectives, project timelines and opportunities for	Agreement to work together on a priority area adjacent to the Municipal boundary, once the

Group	Activity	Outcome
	collaboration	Plan is complete
Field Tour #2	August 9 field tour to various locations in Nelson with City of Nelson, BC Parks and RDCK staff and elected officials to discuss the draft plan, review previous fuel reduction projects and discuss overall plan implement	Shared understanding of project scope and time lines, invitation extended to attend field tours, public meetings or technical sessions when the draft plan is ready to be reviewed.
Public Meeting #1	August 17 open house in Nelson to provide the public, land managers, local elected officials and government staff an opportunity to review the draft plan and provide feedback	Comments received and incorporated into the CWPP
Public Meeting #2	August 18 open house on the North Shore to provide the public, land managers, local elected officials and government staff an opportunity to review the draft plan and provide feedback	Comments received and incorporated into the CWPP
Technical Review Committee	September 9 review and comment on Draft proposed Areas of Interest.	Comments received on how to ensure protection of biodiversity at the prescription stage.
Queens Bay Resident Association	Several site visits and community meeting to summarize the project and discuss appropriate actions of private land owners, in particular collaboration with licensee to reduce the risk of wildfire through appropriate harvesting	Commitment from the Queens Bay Resident Association to collaborate with RDCK and the licensee on prescription writing and implementation in the spring 2017
Critical Infrastructure and Fire fighting status Review	October 7 review with RDCK staff to ensure that critical infrastructure data, emergency response and water systems are described appropriately in the CWPP	Comments received and incorporated into the final CWPP

Combined, these various engagement opportunities have generated a shared understanding of the CWPP objectives, project timelines and expected outcomes among local government, stakeholders, residents and land managers.

4.4 KEY CONTACT, PARTNERSHIP AND FUNDING OPPORTUNITIES

There are key funding opportunities, partnership opportunities and key contacts that are specific to the RDCK Area E. These are summarized in Table 3.

Table 3. Funding sources, partnership opportunities and key contacts for the RDCK

Partnership Organization	Key Contact	Partnership Opportunity
Union of BC Municipalities, Strategic Wildfire Protection Initiative	Peter Ronald, Programs Officer pronald@ubcm.ca http://www.ubcm.ca/EN/main/funding/lgps/strategic-wildfire-prevention.html	SWPI provides direct funding to local governments for development of CWPPs, Fuel Modification Prescriptions, Operational Treatments and Demonstration Projects
Forest Enhancement Society of BC (FESBC)	Greg Anderson, Executive Director anderson.greg.c@gmail.com	FESBC provides funding through the Forest Enhancement Program (FEP) to local governments and licensees to prevent and mitigate wildfire impacts and/or improve wildlife habitat and damaged forests.
Columbia Basin Trust	Tim Hicks, Manager, Water and Environment	CBT has provided 50% of local government funding for RDCK and City of Nelson SWPI projects

Additionally, there are other sources of funding or support that may become available.

- **Provincial Government**
    - BC Parks – West Arm Provincial park adjacent to Area E poses significant wildfire threat to Area E. In addition, this park is at risk from fires starting within Area E. The RDCK may wish to explore partnerships with BC Parks.
    - Other Crown land areas that are not currently high threat may increase with time, as these areas revegetate and recover from previous large-scale forest fires and the mountain pine beetle outbreak (SWPI and FEP funding are applicable).
- **Utility companies** – Right of way clearing and fuel hazard should be discussed with Nelson Hydro, Fortis BC. These companies should be encouraged to maintain rights of way in a low hazard state (frequent brushing, with brushed material removed prior to curing).
- **Forestry Licensees** – Harrop Procter Community Forest, Kalesnikoff Lumber Company, Atco Lumber and BC Timber Sales (BCTS). Partnership opportunities may exist for commercial harvest of hazardous areas that may not qualify under the SWPI program (i.e., too far from infrastructure, but which may still pose a spotting risk to the community or could be leveraged into a landscape level fuel break).

5.0 EXISTING PLANS AND BYLAWS

To ensure consistency among plan documents, a review was conducted of existing plans that may impact or be impacted by this CWPP. These include: the Selkirk Resource District Fire Management Plan; higher level plans such as the Kootenay Boundary Higher Level Plan; and RDCK Area E Official Community Plan as well as bylaws therein that pertain to or affect wildfire hazard mitigation.

5.1 FIRE MANAGEMENT PLANS

The Selkirk Resource District Kootenay Lake Fire Management Plan (FMP) (MFLNRO, 2016) identifies values at risk on the landscape and prioritizes broad categories of values as 'themes' for categorizing response through the Resource Strategic Wildfire Allocation Protocol (RSWAP). The four themes are 1) Human Life and Safety, 2) Property and Critical Infrastructure, 3) High Environmental and Cultural Values, and 4) Other resource values (timber, rangelands, etc.). The organization of values is intended to provide the information needed to make appropriate fire response decisions in complex emergency situations. The Selkirk Resource District FMP was reviewed and this CWPP Update is consistent with the FMP prioritization framework.

The development of FMPs is the responsibility of each MFNLRO Resource District. The FMPs recognize the importance of CWPP-defined risk areas and fuel management recommendations within communities which can augment other treatments on a landscape scale. The Selkirk Resource District FMP has some linkages to the RDCK's 2008 CWPP. Additionally, the strategic direction presented in the District-wide FMP planning processes must be considered for future fuel treatments, as these FMPs and, specifically, landscape level fuel breaks and fuel treatments, are further developed and made available publicly and through consultations with the Resource

5.2 HIGHER LEVEL PLANS

KOOTENAY BOUNDARY HIGHER LEVEL PLAN

Area E falls within the Kootenay Boundary Higher Level Plan (KBHLP). Area E is within the Kootenay Lake Resource Management Zone within which are defined Biodiversity Emphasis areas, Old and Mature forests, green up requirements, Grizzly bear habitat and connectivity corridors, consumptive use streams, enhanced resource development zones for timber, fire-maintained ecosystems, visuals, and social and economic stability. It must be noted that many of the KBHLP objectives have been replaced with other legislation such as Government Actions Regulation (GAR) for special management of certain forest values including Cariboo habitat. The remaining objectives not provided special management under other legislation are carried forward in the KBHLP. The fire-maintained ecosystem provision in the KBHLP allows the possibility to restore and maintain the ecological integrity of fire-maintained ecosystems, providing for treatments that will restore shrubland, open range, open forest, and managed forest ecosystem components in NDT4. However, there are no NDT4 ecosystems in Area E, most ecosystems are classified as NDT3.

AREA E OFFICIAL COMMUNITY PLAN

The Area E Official Community Plan (OCP) (Regional District Central Kootenay, 2013) recognizes wildfire as a significant threat to residences in the wildland-urban interface, and recognizes the need to balance natural beauty and the reduction of wildfire hazard. Section 13, Hazards Lands and Fire Management, sets out Fire Management Policies aimed at fire hazard assessment and risk reduction. The implementation of a community wildfire interface plan is specifically mentioned as community specific policy in Queens Bay. Bealby Point and Svoboda Road recognize the importance of wildfire interface management for the community and City of Nelson.

OTHER

All forest licensees in Area E have Forest Stewardship Plans (FSPs), that detail how each licensee will achieve Forest and Range Practices Act objectives, as well as those in the KBHLP.

5.3 RELEVANT LEGISLATION, PLANS, BYLAWS AND POLICIES

LOCAL GOVERNMENT

The RDCK does not have burning bylaws. Within specified areas of the RDCK development permits are required to ensure that new development is consistent with the applicable OCP. However, the RDCK does not have development permit areas for wildfire hazard.

Local policies and guidelines and relevant bylaws include:

- The RDCK Emergency Management Regulatory Bylaw No. 2210, 2011[9] which was enacted to establish and maintain an emergency management framework for the Regional District and the RDCK Emergency Program Management Plan (described below).
- Bylaw No. 2170, 2010[10] which provides for the operation and regulation of Volunteer Fire Departments for fire protection services, including, but not limited to limits of service and scope of the respective RDCK fire departments.
- The Water Bylaw No. 2470, 2015[11] which applies to all water service areas of the RDCK including setting out ownership, responsibility and access to water systems including fire hydrants and standpipes.

The RDCK Emergency Program Management Plan (Black Shield Preparedness Solutions 2016) describes the organization, roles, procedure and other higher level factors in managing emergencies. The potential emergencies and disasters are characterized in Annex B. 'Fire - Urban and Rural' is ranked the most likely hazard, and 'Wildfire' is rated third. In terms of severity, wildfire is ranked highest.

The RDCK also has an Emergency Response and Recovery Plan (Regional District Central Kootenay, 2016) that coordinates the response to, and recovery from, an emergency or disaster. Recommended actions are suggested for the different types of emergencies. An interface fire should be managed using unified command between the BC Wildfire Service and the local fire departments. If no fire department covers the area involved in a wildfire within the interface, the RDCK Emergency Operations Centre will handle the response in coordination with the BC Wildfire Service.

RELEVANT PROVINCIAL LEGISLATION:

- **Wildfire Act and Wildfire Regulation** – dedicated to wildfire management in BC. Key objective of the legislation is to specify responsibilities and obligations with respect to fire use, prevention, control and rehabilitation.

- **Forest and Range Practices Act and Forest Planning and Practices Regulation** – operational planning, forest practices and resource protection. This legislation provides the power to authorize the destruction or damage of Crown timber for wildfire hazard reduction purposes. The Regulation stipulates minimum forest practices to protect resources.

[9] http://www.rdck.ca/assets/Government/Bylaws/Emergency~Services/Bylaw%202210-Emergency_Bylaw.pdf
[10] http://www.rdck.ca/assets/Government/Bylaws/Fire/Bylaw%202170%20Fire%20Dept%20CONS.pdf
[11] http://www.rdck.ca/assets/Government/Bylaws/Water/2470-Water.pdf

- **Park Act** – gives power to prohibit or control the use of fire within Parks.
- **Environmental Management Act** – governs waste emissions, including particulate matter (smoke). The Open Burning Smoke Control Regulation regulates open burning including favorable conditions for smoke dispersion.
- **Emergency Program Management Regulation** – provides the guiding principles to the Provincial Emergency Program by identifying roles and responsibilities, and has the responsibility to identify potential emergencies and disasters, and the requirement to provide advice and assistance in the event of emergency.
- Other (Hydro and Power Authority Act, Special Accounts Appropriation and Control Act, Annual Rent Regulation)

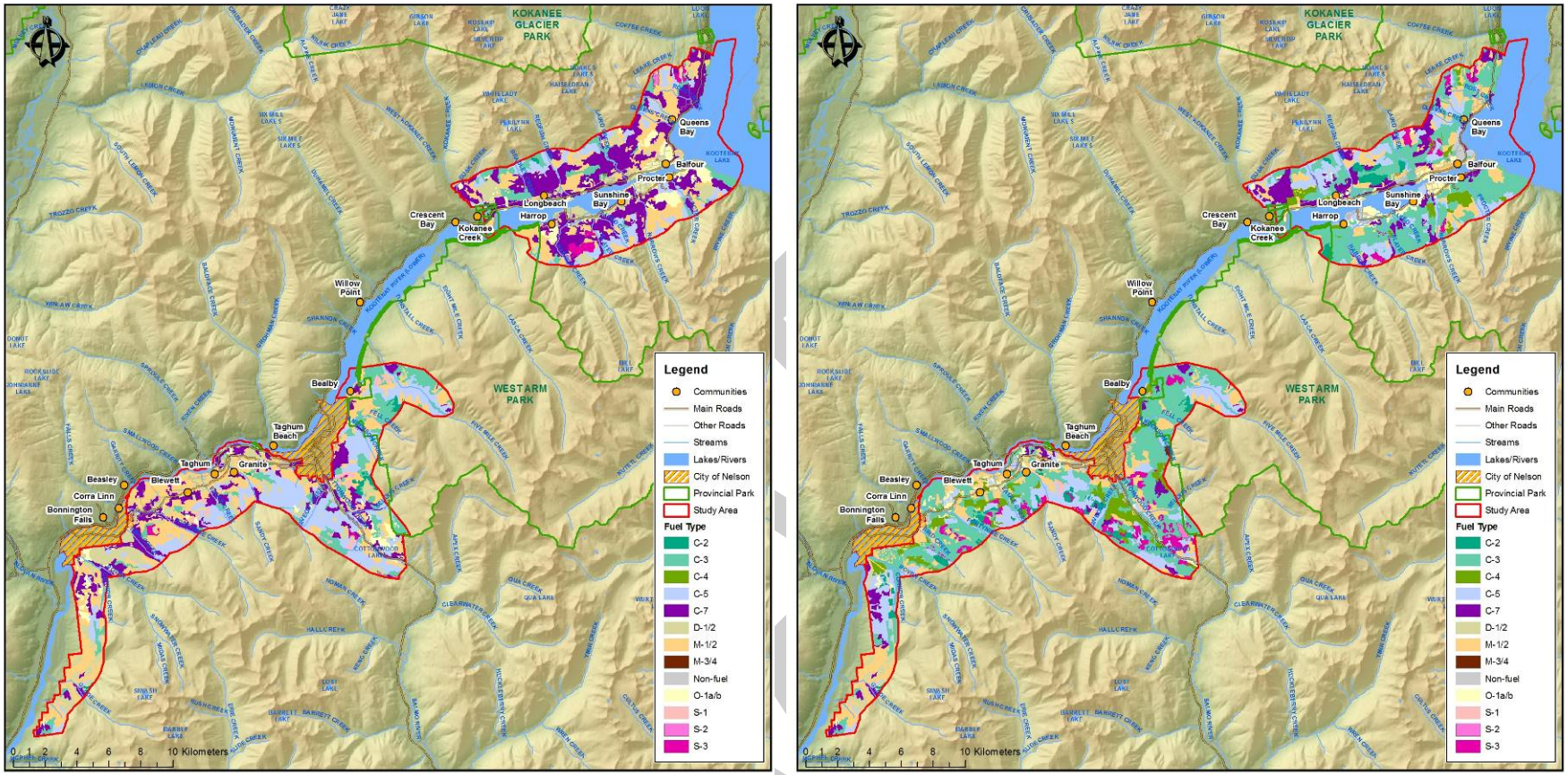
6.0 WILDFIRE BEHAVIOUR AND WUI THREAT ASSESSMENT

As part of the field assessment completed for this CWPP, the wildfire threat was determined surrounding or within the community area by establishing fuel types based on the Canadian Forest Fire Danger Rating System, CFFDRS classification system, and by completing Wildland Urban Interface Threat Assessments.

6.1 LOCAL FUEL TYPE SUMMARY

The Canadian Forest Fire Behaviour Prediction (FBP) System outlines five major fuel groups and 16 fuel types based on characteristic fire behaviour under defined conditions (Forestry Canada Fire Danger Group, 1992).

The initial starting point for Study Area fuel typing is the 2015 Provincial Strategic Threat Analysis (PSTA), which is based on the FBP fuel typing system. PSTA data is limited by the accuracy and availability of information within the Vegetation Resource Inventory (VRI) provincial data; confidence in fuel type provincial fuel type data is low on private land. For the above reasons, fuel types from the PSTA data have been updated using orthophotographs of Area E and with field fuel type verification as illustrated in Map 6 A and B.



Map 6 A and B. Unverified fuel types (PSTA Fuel Types) and the field verified fuel types (CWPP Fuel Types).

Overall, fuel types designated in the PSTA dataset were notably different from the Blackwell corrected fuel typing, and extensive field and photo interpretation validation was required prior to spatial analysis. Table 4 summarizes the fuel types by general fire behaviour and total area for the Study Area.

Table 4. The fuel types occurring within the Study Area.

Fuel Type	Description	Wildfire Behaviour Under High Wildfire Danger Level	Area (ha) in Study Area	Percent of Study Area
C-2	Plantations older than 20 years. High density with high canopy and low crowns.	Almost always crown fire, high to very high fire intensity and rate of spread.	626	2%
C-3	Fully stocked, mature forest, crowns separated from ground	Surface and crown fire, low to very high fire intensity and rate of spread	8,550	33%
C-4	Dense pole-sapling forest, heavy dead and down, dead woody fuel, vertical crown fuel continuity	Almost always crown fire, high to very high fire intensity and rate of spread.	1,326	5%
C-5	Well-stocked mature forest, crowns separated from ground	Low to moderately fast spreading, low to moderate intensity surface fire.	3,697	14%
C-7	Open, mature forest.	Surface fire spread, torching of individual trees, rarely crowning (usually limited to slopes > 30%), moderate to high intensity and rate of spread	1,727	7%
D-1/2	Moderately well-stocked deciduous stands (D1 leafless or D2 green)	Always a surface fire, low to moderate rate of spread and fire intensity	553	2%
M-1/2	Moderately well-stocked mixed stand of conifer and deciduous species, low to moderate dead, down woody fuels, crowns nearly to ground (M1 – leafless, M2 – in leaf)	Surface, torching and crowning, moderate to very high intensity and spread rate (depending on slope and percent conifer and season (in leaf vs leafless)	3,753	15%
M-3/4	Moderately well-stocked mixed stands of conifer and deciduous species, where the conifer species may be dead, in varying percentage. Not typically used In BC except as red-phase MPB-attacked pine stand. M4 (leafless) not used in BC (Perrakis and Eade, 2015)	Rapid spreading, high to very high fire intensity and rate of spread (M3)	54	<1%
O1a/b	Shrub type with volatile species, matted or standing grass	Rapid spreading, intense surface fire	835	3%
S1/S2/S3	Continuous and uncompacted slash type with large fuel loads and deep slash depth. Varies depending on species composition of slash.	Ranges from surface fire, low to moderate intensity to moderate to high rate of spread and high to very high intensity surface fire.	901	4%
W	Water	N/A	3,167	12%
NF	Non-fuel	N/A	362	1%
		Total	**25,551**	**100%**

The most abundant fuel type in Area E is C-3. There are also large tracts of mixed forest (M-1/2), in this case being partly attributed to stands with a western larch component. Western larch is a deciduous conifer, and for the purposes of fire behaviour, is considered less flammable than evergreen conifers due to higher moisture content of leaves that are produced each spring. The next most abundant fuel type is C-5. The minimal presence of some M-3/4 indicates mountain pine beetle-killed stands with deciduous regeneration. Much of the deciduous species component in this region is paper birch, a more flammable species than other deciduous species of the area such as trembling aspen.

Developed areas have been accurately identified as non-fuel areas, as they do not fit into the classification system that is only appropriate to classify forested lands. The assignation of non-fuel should not be interpreted as areas representing low, or no hazard, as planted landscaping and other vegetation, planted and naturally regenerating, on private lands and within a developed matrix may present extreme hazard. This is particularly relevant, as planted landscaping on private lands can present a considerable hazard in interface areas.

6.2 THE WILDLAND URBAN INTERFACE

The Wildland Urban Interface (WUI) is generally defined as the place where the forest meets the community. There are different WUI conditions, which are variations on 'perimeter interface' and 'intermix'. A perimeter interface condition is generally where there is a clean transition from urban development to forest lands. Smaller, more isolated developments that are embedded within the forest are referred to as intermixed areas. An example of interface and intermixed areas is illustrated in Figure 3.

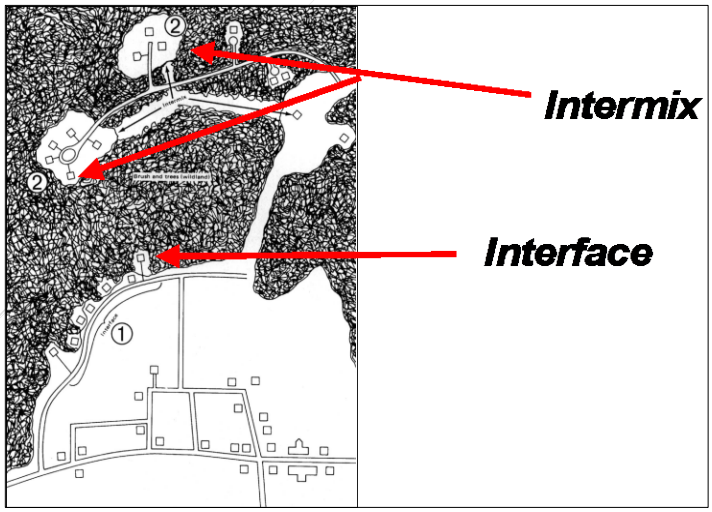


Figure 3. Illustration of intermix and interface areas.

In interface and intermixed communities, fire has the ability to spread from the forest into the community or from the community out into the forest. Although these two scenarios are quite different, they are of equal importance when considering interface fire risk. Regardless of which scenario occurs, there will be consequences for the community and this will have an impact on the way in which the community plans and prepares for interface fires.

6.2.1 VULNERABILITY OF THE WILDLAND URBAN INTERFACE TO FIRE

Fires spreading into the WUI from the forest can impact homes in two distinct ways:

1. From sparks or burning embers carried by the wind, or convection that starts new fires beyond the zone of direct ignition (main advancing fire front), and alight on vulnerable construction materials or adjacent flammable landscaping (*i.e.* roofing, siding, decks, juniper, etc.) (Figure 4).

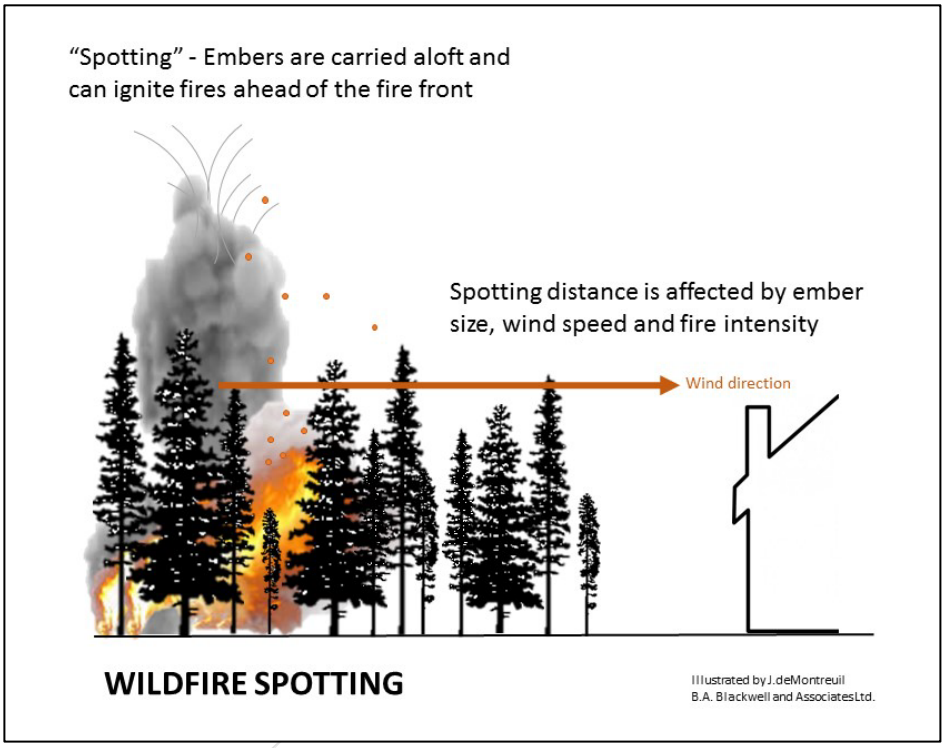


Figure 4. How homes in the interface are impacted by wildfire through 'spotting'.

2. From direct flame contact, convective heating, conductive heating or radiant heating along the edge of a burning fire front (burning forest), or through structure-to-structure contact. Fire can ignite a vulnerable structure when the structure is in close proximity (within 10 meters of the flame) to either the forest edge or a burning house.

6.3 WUI THREAT ASSESSMENTS

WUI threat assessments were completed during the early part of the field season of 2016, from March to July, in conjunction with verification of fuel types. WUI Threat Assessments were completed in the interface areas of Area E, in order to support development of priority treatment areas, and in order to confidently ascribe threat to polygons which may not have been visited or plotted, but which have similar fuel, topographic, and proximity to structure characteristics to those that were. To assess risk on treated and untreated polygons, the *Provincial WUI Wildfire Threat Rating Worksheets* (worksheet) were used, as required by UBCM[12] in addition to professional judgment. The worksheet provides point ratings for four components that contribute to wildfire risk. These components include fuels, weather, topography and structural values at risk. The original WUI threat plot forms have been submitted as a separate document.

[12] http://www.ubcm.ca/assets/Funding~Programs/LGPS/Current~LGPS~Programs/SWPI/Resources/swpi-WUI-WTA-Guide-(2012-Update).pdf

A total of 31 WUI threat plots were completed in Area E, in conjunction with fieldwork for CWPP updates for the Area F and the City of Nelson. The data collected and field observations recorded from the plots and field stops inform much of this document. Area E overall has 'high' fire behaviour threat class ratings, and a range of WUI threat ratings, as shown in Table 5 below.

Table 5. Wildland Urban Interface Threat Assessments completed in the Study Area.

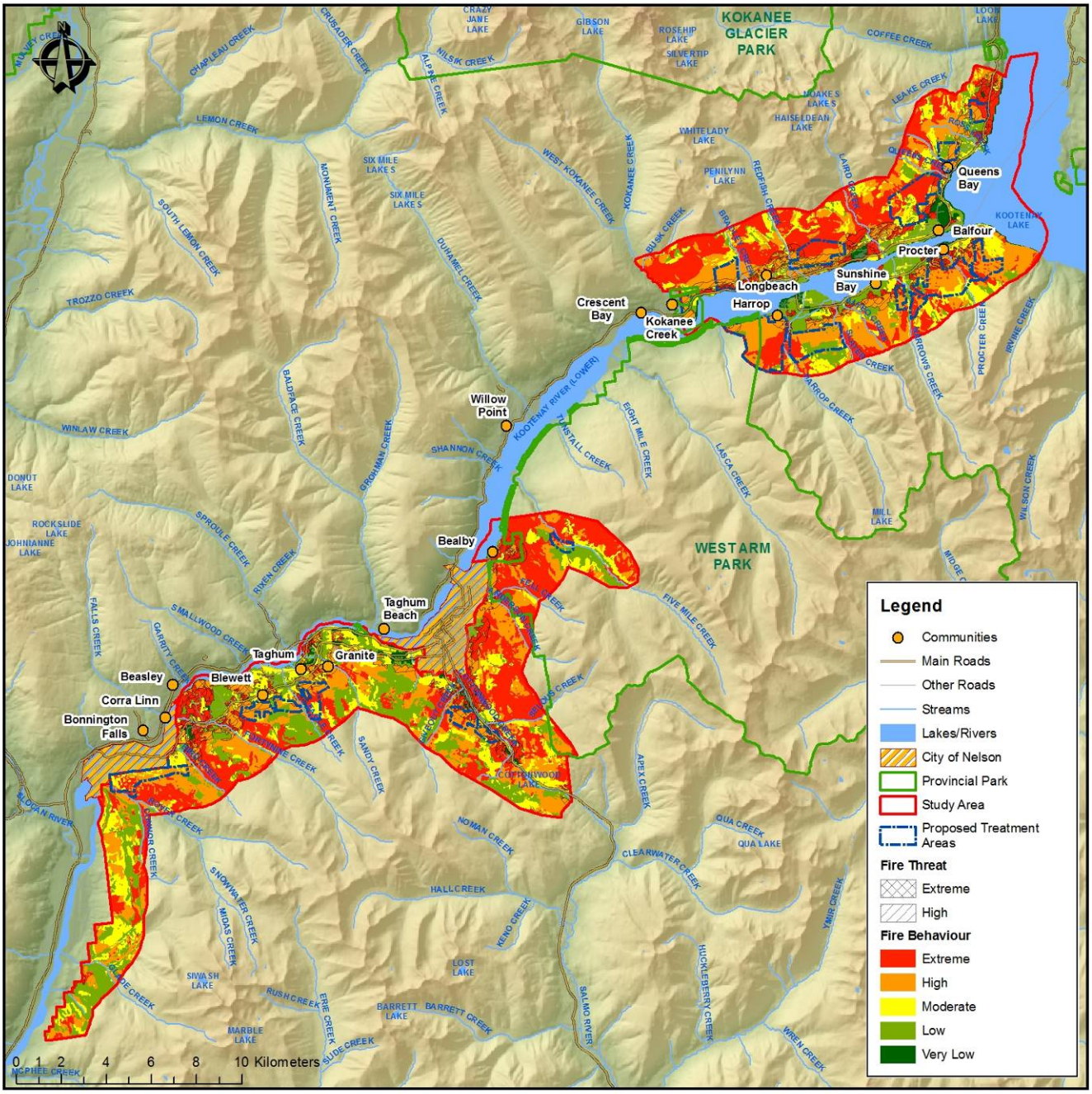
Plot Number	General Location	Fire Behaviour Score	Fire Behaviour Class	WUI Threat Score	WUI Threat Class
AC1	Anderson Creek	115	High	33	High
AC2	Anderson Creek	138	High	33	High
BA1	Balfour Holt Road	87	Moderate	43	N/A
BF2	Balfour Face Road	145	High	14	Moderate
BL1	Blewett	124	High	33	High
BL2	Blewett	131	High	14	Moderate
GO1	Giveout Creek	119	High	14	Moderate
GO2	Giveout Creek	127	High	23	Moderate
GO3	Giveout Creek	127	High	23	Moderate
GO4	Giveout Creek	145	High	28	High
GO5	Giveout Creek	134	High	32	High
GO6	Giveout Creek	122	High	14	Moderate
GO7	Giveout Creek	134	High	14	Moderate
HP1	Harrop Proctor - Kosma Road	116	High	14	Moderate
HP2	Harrop Proctor - Lasca Creek Road	119	High	38	High
HP3	Harrop Proctor - Carson Creek Road	123	High	25	Moderate
HP4	Harrop Proctor - Narrows Creek Road	119	High	20	Moderate
HP5	Harrop Proctor - East Harrop Mainline	120	High	20	Moderate
KP3	Kootenay Park East	136	High	14	Moderate
LB1	Longbeach	133	High	43	Extreme
MS1	Mountain Station	141	High	28	High
MS2	Mountain Station	121	High	25	Moderate
QB1	Queens Bay	121	High	27	High
QB2	Queens Bay	127	High	27	High
RF1	Redfish FSR	129	High	27	High
RF2	Redfish FSR	142	High	18	Moderate
SEL1	Selous Creek	139	High	16	Moderate
SEL2	Selous Creek	157	Extreme	16	Moderate

Plot Number	General Location	Fire Behaviour Score	Fire Behaviour Class	WUI Threat Score	WUI Threat Class
SVO1	Svoboda Road	121	High	40	Extreme
WA1	Waldorf School	119	High	32	High
WAPP1	West Arm Provincial Park	120	High	18	Moderate

6.3.1 STUDY AREA THREAT RATING

There are two main components of the threat rating system: the wildfire behaviour threat class (fuels, weather and topography sub-components) and the WUI threat class (structural sub-component). The map below shows the Fire Behaviour and Fire Threat (WUI Threat class), determined as a result of a spatial data analysis (for methodology, see Appendix 2).

The result of the analysis shows large tracts of landscape that have high or extreme fire behavior potential. Areas of high or extreme WUI threat are limited to those areas that have a high or extreme fire behavior rating, *and* are in close proximity to homes. Some areas proposed for fuels modification extend beyond the WUI threat areas, in order to establish landscape-level breaks.



Map 7. Fire Threat and Fire Behaviour for the Study Area.

7.0 RECOMMENDATIONS AND ACTION PLAN

The following recommendations and action plans provide recommendations on how to implement the CWPP. The recommendations discussed in this section include: Communication and Education; Structure Protection; Emergency Preparedness; Planning and Development; and Vegetation/Fuel Management.

7.1 COMMUNICATION AND EDUCATION

Awareness and understanding support the adoption of tools to reduce fire risk. In communities where the dangers of wildfire are understood there is increased support and interest in reducing fire risk. The establishment of tools to reduce fire risk is one of the keystones to building a FireSmart community. A more detailed discussion of nationally accepted FireSmart principles is provided in Appendix 1. Without the support of the community, the efforts of public officials, fire departments, and others to reduce wildfire will be hindered. In many communities there is generally a lack of understanding about interface fire and the simple steps that can be taken to minimize risk. Additionally, public perception of fire is often underdeveloped due to public confidence and reliance on local and provincial fire rescue services.

Based on the consultation completed during development of this Plan, it is evident that the RDCK has a good level of awareness of fire risk in the interface in Area E; however, field observations highlighted the need to further educate the community on what private land owners can do to contribute to a FireSmart community. The Communication and Education objectives for Area E are:

- To improve public understanding of fire risk and personal responsibility by increasing resident awareness of the wildfire threat in their community and to establish a sense of homeowner/landowner responsibility; and
- To enhance the awareness of elected officials, protection staff and stakeholders about the resources required to mitigate fire risk.

The two principal goals for RDCK area E to enhance wildfire related Communication and Education should be to:

- Reduce human caused fire ignitions; and
- Reduce fire risk on private property and critical infrastructure.

Communicating effectively is the key aspect of education. Communication materials must be audience specific, and delivered in a format and through mediums that reach the target audience. Audiences should include home and landowners, school students, local businesses, elected officials, District staff, local utilities, and forest tenure holders. Education and communication messages should be simple yet comprehensive. A basic level of background information is required to enable a solid understanding of fire risk issues and the level of complexity and detail of the message should be specific to the target audience.

The RDCK has undertaken some public education and FireSmart and fire prevention initiatives in the community. In 2015 Queens Bay became the first community in the RDCK to receive Community FireSmart Recognition through FireSmart Canada. FireSmart resources are also provided on the Regional District's website. These initiatives can be expanded upon and/or adapted to further enhance wildfire preparedness and education. The RDCK Fire Service should consider providing or expanding fire education programs in schools to include wildfire prevention and preparedness education to be presented annually. Programming could include volunteer/advocacy work from professional foresters, wildland firefighters or prevention officers, and District staff. RDCK should consider holding a wildland specific Fire Prevention Week or Day, or similarly formatted event,

in the spring prior to the wildfire season. Timely educational materials to increase preparedness would be most effective immediately prior to the fire season.

Provincial funding for fuel management is only provided for public lands. It is important for homeowners to understand what they can do to reduce the risk of wildfire damage to their property or adjacent residences. In particular, property owners need to be aware of their responsibility to implement FireSmart mitigation measures on their properties and also understand how their contributions benefit community wildfire safety.

FireSmart information material is readily available and simple for municipalities to disseminate. It provides concise and easy-to-use guidance that allows homeowners to evaluate their homes and take measures to reduce fire risk. However, the information needs to be supported by locally relevant information that illustrates the vulnerability of individual houses to wildfire. As per the 2008 CWPP, it is recommended that educational material be made available to all private landowners.

Bringing organizations together to address wildfire issues that overlap physical, jurisdictional or organizational boundaries is a good way to help develop interagency structures and mechanisms to reduce wildfire risk. Engagement of various stakeholders can help with identifying valuable information about the landscape and also help provide unique and local solutions to reducing wildfire risk. The RDCK should consider strengthening the effectiveness of the West Arm Interface Steering Committee to coordinate wildfire risk reduction efforts. Coordination of fuel management activities with forest licensees could significantly aid in the establishment of large, landscape-level fuel breaks or compliment current or proposed fuel treatment areas.

Table 6. Summary of Recommendations for Communication and Education.

Communication and Education			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: To improve public understanding of fire risk and personal responsibility by increasing resident awareness of the wildfire threat in their community and to establish a sense of homeowner responsibility.			
1.	High	• Establish a school education program to engage youth in wildfire management. Consult ABCFP and BCWS (the zone) to facilitate and recruit volunteer teachers and experts to help with curriculum development to be delivered in elementary and/or secondary schools. Educational programming can be done in conjunction with any currently running fire prevention education programs.	$5,000
2.	High	• Make summaries of this report and associated maps publicly available through webpage, social media, and public FireSmart meetings. Add fire threat spatial data to the interactive web-mapping tool to allow residents to find their property and the associated threat of wildfire.	Within current operating costs
3.	Moderate	• Add a Wildfire-specific Fire Prevention Week (or day) in the spring, immediately prior to the fire season.	$2,500

Communication and Education			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
4.	Moderate	• Consider door to door FireSmart assessment and/or home owner self-assessment within the Area E interface in order to educate residents and to quantify the level the level of risk in the interface.	$10,000
Objective: To enhance the awareness of elected officials and stakeholders regarding the resources required to reduce fire risk.			
5.	High	• Maintain and strengthen the regional Interface Working Group that includes Nelson, Area F and BC Parks to coordinate wildfire risk reduction efforts.	Within current operating costs
6.	High	• Consider local planning departments to develop regional development permit standards, provide a group voice to the Building and Safety Standards Branch and other provincial entities, and align municipal bylaws.	$30,000
7.	High	• Consider the development of a coordinated approach to fuel management and hazard reduction within and adjacent to the Area E Study Area by coordinating with stakeholders including forest licensees, Ministry of Transportation and Infrastructure and utility companies, to aid in the establishment of large, landscape-level fuel breaks or compliment current or proposed fuel treatment areas.	$25,000
8.	High	• Maintain regular communication with the Technical Review Committee (see Section 2.4) to ensure that proposed activities maintain or enhance biodiversity values	Within current operating costs

7.2 STRUCTURE PROTECTION AND PLANNING

Establishing a FireSmart community will reduce losses and impacts related to wildfire. For this Plan two classes of structures were considered: critical infrastructure and residential / commercial infrastructure. Critical infrastructure provides important services that may be required during a wildfire event or may require additional considerations or protection. As outlined in Appendix 1, FireSmart principles are important when reducing wildfire risk to both classes of structure and are reflected in the recommendations. The structure protection objectives for RDCK are to:

- Enhance protection of critical infrastructure from wildfire; and
- Encourage private homeowners to voluntarily adopt FireSmart principles on their properties.

The two main avenues for implementing FireSmart include:

- Change the vegetation type, density and setback from the structure; and

- Change the structure (where feasible) to reduce vulnerability to fire and reduce the potential for fire to spread to or from a structure.

Critical infrastructure is important to consider when planning for a wildfire event. The use of construction materials, building design and landscaping must be considered for all structures when completing upgrades or establishing new infrastructure. Additionally, vegetation setbacks around critical infrastructure should be compliant with FireSmart recommendations.

Detailed FireSmart assessments were not completed for critical infrastructure. The RDCK Fire departments in Area E should consult with District staff to systematically assess critical infrastructure in interface areas and to provide FireSmart recommendations based on their findings.

As noted in the 2008 CWPP, water is a critical suppression resource that is dependent on water service. This recommendation is still valid and implementation is ongoing. Other recommendations include: installing reservoir or hydrant systems in areas of poor water availability, identifying and mapping alternative water sources where feasible and ensuring new developments have sufficient water service and hydrant coverage. District staff and Fire Departments in Area E should review hydrant coverage and locations. Improving water availability in identified areas and mapping alternative water sources is ongoing and should continue.

A Full assessment of the water availability and vulnerability of water sources was not possible under the scope of this report. Back-up power sources should be installed for all critical infrastructure to ensure the RDCK can continue to operate at an acceptable level during a wildfire event in Area E. The RDCK should complete a Fire Flow / Water Supply Vulnerability Assessment for each water system in Area E to identify those areas that may have insufficient or unreliable water supplies.

Table 7. Summary of Recommendations for Protection of Critical Infrastructure

Structure Protection and Planning			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: Enhance protection of critical infrastructure from wildfire.			
9.	High	• Complete a fire flow / water vulnerability assessment for each water system and identify and map all alternative water sources (reservoirs, streams, lakes, etc.). Identify which areas may have insufficient or unreliable water supplies and provide recommendations to reduce Area E's vulnerability.	$20,000
10.	High	• Complete a vulnerability assessment of all critical infrastructure including water infrastructure in interface areas with FireSmart recommendations.	Within current operating costs
11.	High	• Develop alternative, backup water sources for fire protection, including the establishment of standpipes as required.	Based on assessments

Structure Protection and Planning			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
12.	High	• Complete a detailed review of back-up power source options for all critical infrastructure and upgrade as required.	Within current operating costs
13.	High	• Consider completing more detailed hazard assessments and developing response plans for stabilization and rehabilitation of burn areas in watersheds that are vulnerable to post-wildfire debris flows and floods. Opportunities may exist to coordinate study and planning with adjacent jurisdictions (City of Nelson and BC Parks)	$25,000

7.2.1 WILDLAND URBAN INTERFACE SITE AND STRUCTURE ASSESSMENTS

Another way to encourage change is through education and increased awareness of fire hazard on private property. The reduction of wildfire hazards on private lands generally depends on the homeowner. This includes choices in exterior building materials, setbacks from forest edges and landscaping. In other jurisdictions, notably Colorado Springs, Colorado[13] and Whistler, BC, programs to increase awareness of fire hazard and spur homeowner action have been implemented successfully. In these jurisdictions, fire hazard assessments were completed for homes in the Wildland Urban Interface. The results of the assessments were shared with the homeowner / property owner at the time of assessment. The results of the hazard assessments were compiled into a geo-spatial database and made available to the public. Each home and property owner could look up to see the hazard of their property, as well as their neighbours' (Figure 5). This database may be useful for the Fire Departments in Area E in targeting educational efforts, triage assessments and as an aid in suppression planning.

[13] http://gis.coloradosprings.gov/Html5Viewer/?viewer=wildfiremitigation.

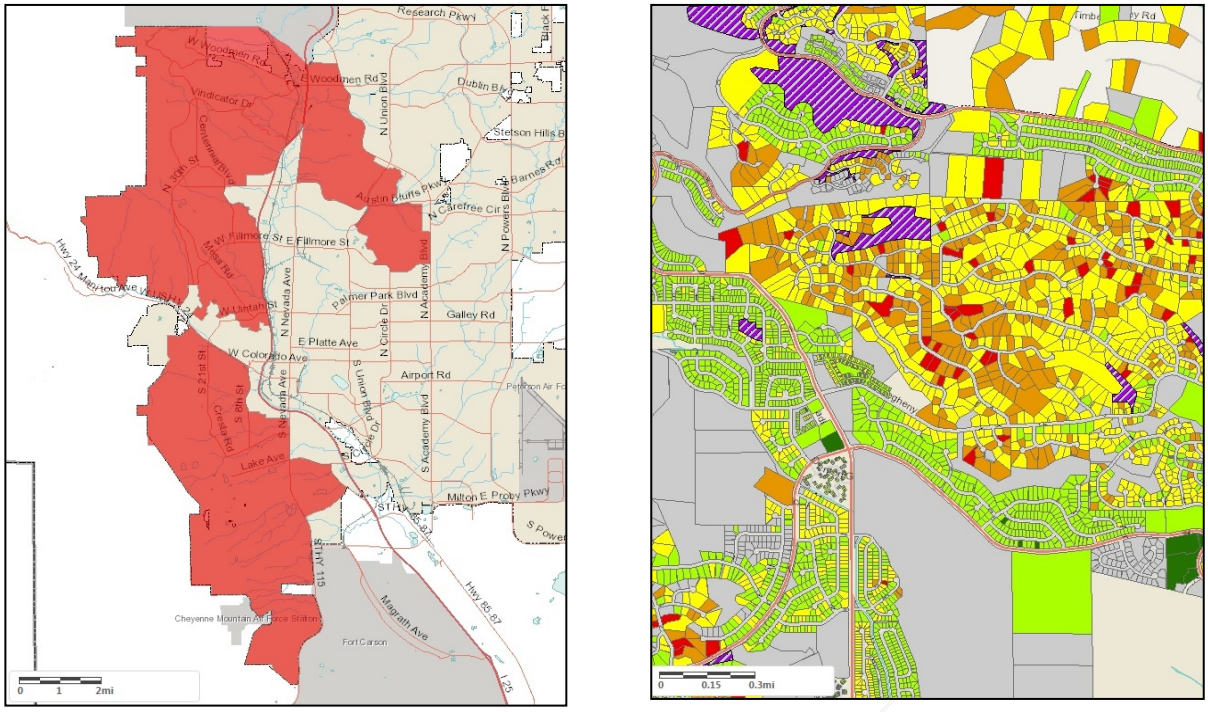


Figure 5. Screen captures of Colorado Springs, Colorado public internet mapping service.

The left figure displays the WUI area in red in which fire hazard assessments were completed. The right figure displays a neighbourhood within the WUI area and the fire hazard for each individual property. In these diagrams red is extreme, orange is very high, yellow is high, bright green is moderate and dark green is low risk.

RDCK should consider developing a similar fire hazard assessment program. Individual properties within an established Wildfire Development Permit (DP) Area should be assessed using a FireSmart site and structure assessment form and to provide the results and opportunities for hazard mitigation to the property owner/resident. The Central Kootenay Web Map could then make available to the public the fire hazard results by property. Property owners could then request a re-assessment upon completion of various mitigative actions and updates posted periodically on the mapping site.

It is recognized that this program could be combined with other initiatives, such as free yard waste drop-off at transfer stations and a scheduled garden debris-burning weekend. This could also include distribution of additional educational materials, such as FireSmart landscaping design and FireSmart plant selection information. The program will be most effective if it evaluates hazard, as well as provides property owners the information they need to effectively reduce the hazard and methods to dispose of materials removed.

This program could come at considerable cost to the RDCK. Opportunities for savings may include options such as using a student or work experience program participant to complete the assessments, retaining a consultant, and/or involve volunteer fire departments to complete the work, or targeting the program to the highest priority (highest threat) neighbourhoods and expanding as resources allow. Another cost saving option may be to hold a training session for individual FireSmart champion volunteers from interface neighbourhoods to complete

assessments for their respective neighbourhoods and to provide the results of their assessments to RDCK to complete the mapping.

The recently launched SWPI FireSmart Grant Program provided funding of up to $10,000 to undertake FireSmart planning activities for private lands. At the time of report development, applications for this program are no longer being accepted. RDCK should stay up to date on all UBCM/SWPI funding initiatives, in order to leverage FireSmart funding for this and other FireSmart programs, if funding again becomes available.

Table 8. Summary of Recommendations for Structure Protection and Planning.

Structure Protection and Planning			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: Encourage private homeowners to voluntarily adopt FireSmart principles on their properties.			
14.	High	• Complete, or support homeowners to complete, WUI Site and Structure Hazard Assessments for interface homes, make hazard mapping for assessed homes publicly available, and provide informational material to homeowners on specific steps that they can take to reduce fire hazard on their property.	$10 per house

7.3 PLANNING AND DEVELOPMENT

Municipal policy and bylaws are tools available to mitigate wildfire risk to the RDCK. All levels of government (municipal, regional district, provincial, and federal) and individual landowners need to work together to successfully reduce their risk. Local and regional governments can educate the public on the associated risks, and show leadership to help reduce that risk to the RDCK and the individual community members, their homes and properties, and other values at risk.

7.3.1 WILDFIRE HAZARD DEVELOPMENT PERMIT AREA

A development permit should be developed to address the risk of interface wildfire. Using the threat mapping from the CWPP, a Wildfire Hazard Development Permit Area could be defined. Within this area, guidelines could be developed for building materials. The scope of guidelines could be expanded to include landscaping and building siting to strengthen this permit process.

The wildfire hazard development permit process can most effectively advance the objective of developing FireSmart communities through the following strategies:

- Increasing the number of homes and properties in the interface that are FireSmart compliant (building materials, design and landscaping) and are thus less vulnerable to ignition through radiant heat or ember spotting. This can be achieved by extending the reach and scope of the Development Permit;
- Ensure that future development is completed with public safety and property protection in mind (road network facilitates suppression and emergency vehicles and public evacuation in the case of wildfire,

water availability is sufficient for suppression activities, sufficient setbacks from forested edge and top of slope).

- Ensure that natural lands turned over to RDCK and adjacent to new development are a moderate threat rating or lower; and,
- Ensure that the natural lands turned over to RDCK are accessible to fire crews, as well as for future maintenance activities to keep the areas at a moderate or lower threat rating.

A review of other jurisdictions' successfully implemented DP processes suggests that DPs can be used effectively to gradually phase in FireSmart practices on private land, both in sub-division and individual lot re-development phase. The District of North Vancouver has a robust Wildfire Hazard Development Permit process, which could serve as a model for opportunities to improve current practices for RDCK. Within the Wildfire Hazard DP area in the District of North Vancouver, DPs are triggered at the building permit phase. Bonds collected by the District are not returned to the homeowner or developer until a Qualified Professional (QP) has provided a post-development inspection sign off and photographs to ensure that recommendations regarding landscaping, setbacks, and building materials were met. Through this process, the new lots and existing housing stock within the District of North Vancouver is rapidly converting to meeting FireSmart standards in both building materials and landscaping.

Section 5 of the Building Act provides local governments the authority to set local building bylaws for unrestricted and temporarily unrestricted matters, such as exterior design and finish of buildings in relation to wildfire hazard and within a development permit area. Until revisions of the Building Code to include requirements specific to prevention of wildfire spread are completed, local governments have the ability to set exterior requirements within the development permit area.[14] It is recommended that the RDCK seek legal advice regarding the Building Act and to mandate and enforce within the Development Permit process that exterior building materials are FireSmart compliant to the extent legally possible. It is also recommended that RDCK work with the Building and Safety Standards Branch to provide input into the Building Code revisions that would apply within the development permit areas to prevent the spread of wildfire.

Many landscaping designs include highly flammable vegetation such as cedar hedging. This increases fire hazard on private properties and immediately adjacent to homes (priority zone 1). The RDCK should consider developing a landscaping standard to be applied within the DP area to all new properties and upon existing properties when building permits are requested for new builds, retrofits or major renovations. If enforcement is not possible with currently available resources, the RDCK should consider requiring a bond and post-development sign-off from a QP, to reduce enforcement costs. As an alternative, education and incentives for homeowners to plan and implement FireSmart landscaping should be considered.

[14] Building and Safety Standards Branch. 2016. Bulletin No. BA 16-01 Building Act Information Bulletin: Update for Local Governments.

Table 9. Summary of Recommendations for Municipal Policy

Municipal Policy			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: To reduce wildfire hazard on private land and increase FireSmart compliance.			
15.	High	• Complete OCP review to strengthen and expand reach of the existing policy.	Within current operating costs
16.	High	• Consider developing Wildfire Hazard Development Permit (DP) Areas for major retrofits / renovations or new builds (building permits), collecting bonds to be returned upon evidence of completing development and landscaping according to wildfire hazard assessment. Review District of North Vancouver DP process as a model.	$25,000
17.	High	• Obtain legal advice regarding the Building Act, specifically regarding the temporarily unrestricted matters and local government authority to set exterior building materials requirements. Use local government authority to mandate FireSmart construction materials beyond BC Building Code in wildfire hazard development permit area, as allowed.	Within current operating costs
18.	High	• Develop a landscaping standard to be applied in interface / DP areas. The standard should list flammable non-compliant vegetation, non-flammable drought and pest resistant alternatives, and tips on landscape design to reduce maintenance, watering requirements, and reduce wildfire hazard. Include meeting landscaping standard as a requirement of Development Permit.	Within current operating costs
19.	High	• Proactively enforce wildfire covenants requiring owners to maintain their properties hazard free on all properties in Development Permit areas. Enforcement will serve to minimize fuel risks on problematic private properties which have allowed hazardous accumulation of fuels and provide improved protection to adjacent lands.	Within current operating costs
20.	High	• Alter the zoning bylaws to require that developers leave building set backs on private land so that there is a minimum of 10 m distance between buildings and forest interface.	Within current operating costs
21.	High	• Consider developing an outdoor burning bylaw specifying requirements for and limitations to outdoor burning and, in conjunction with the Fire Chief, implement the bylaw at times of high fire danger when provincial bans are not in place. The bylaw should consider effective and efficient enforcement measures and powers.	??
22.	Moderate	• Work with the Building and Safety Standards Branch to provide input into the Building Code revisions that would apply within the development permit areas to prevent the spread of wildfire.	Within current operating costs

7.4 EMERGENCY PREPAREDNESS AND RESPONSE

The RDCK Fire Service has two fire departments in Area E. The Blewett Fire Department has a Fire Protection Area from Kootenay Canal to Fisherman Road to Blewett Road before Blewett School. The Balfour Harrop Fire Department has a Fire Protection Area from Crescent Beach to Coffee Creek Harrop to Procter. The NFRS provides fire protection under contract to Bealby Point, Svoboda Road, Blewett East and south of Nelson at the brake check on Highway 6. Additionally, the Beasley Fire Department has a Fire Protection Area within the 2 km buffer of the Study Area (but outside of the Electoral Area E boundary) to the north of the West Arm of Kootenay Lake.

The Fire Departments in Area E are well trained, highly organized and able to provide high quality emergency and public safety services to RDCK and surrounding area. As the departments are well organized, the main objectives for recommendations in regards to Emergency Preparedness are to provide additional resources to increase the level of training and equipment for department fire fighters to utilize in an interface fire situation. There are 400 firefighters within the RDCK Fire Service; 15 in Blewett and 25 in Balfour Harrop. All firefighters within the RDCK fire service are volunteer with the exception of a career Regional Chief and Deputy Chief.

The RDCK Area E Fire Departments respond to approximately 215 calls per year (Blewett 37 incidents and Balfour Harrop 177 incidents) including (but not limited to) structure and wildland fire, first responder, motor vehicle incidents, technical rescue and regional hazardous materials calls[15]. Kootenay Boundary Fire Rescue provides fire dispatch to all RDCK Fire departments in the region, with the exception of the Nelson Fire Department. The 215 call-outs in 2015 is characteristic of an average year in Area E. The total number of wildfire or brush-related call outs in the 2015 fire season was not available at the time of writing. Statistics for call-outs are on an increasing trend, but this is attributed to population growth within the community.

Fire departments within and adjacent to Area E are responsible for first response within their Fire Protection Areas. Within a defined contract portion within Area E, the NFRS provides wildland fire, first responder, motor vehicle incidents and technical rescue response. The RDCK has automatic aid agreements in place with all RDCK Fire Departments and a mutual aid agreement with the City of Nelson. This mutual aid agreement with the City of Nelson is used approximately 2 to 3 times per year, on average. The RDCK responds to wildfires within Fire Protection Areas. The provincial mutual agreement provides for assistance from the BCWS on larger incidents. Under this agreement, the RDCK may be requested to assist the BCWS outside of RDCK Fire Protection Areas.

The majority of training for the RDCK Fire Service focuses on structural firefighting but does include annual wildland interface training as part of the spring training curriculum. Some RDCK Fire Service members participate in EOC training, which involves multiple agencies. There has been some recent cross-training with MFLNRO BCWS (usually conducted annually at the start of each fire season). All RDCK Fire Service members should, at a minimum, have S100 and S215 (or equivalent) training. Structure Protection Program (SPP) Wildland Firefighter (WWF) Level 1 training is a suitable equivalent and will replace the S100 training for structure fire fighters (Emergency Management BC, 2013). The RDCK should coordinate annual cross-training events with the BCWFS, for example a joint wildfire simulation exercise. This could be completed in cooperation with other area Fire Departments (RDCK) to further strengthen regional emergency response training.

[15] 2015 statistics provided by the RDCK Emergency Program

The RDCK Fire Services own numerous emergency response vehicles. The Blewett Fire Department has four emergency response vehicles (one rescue, one engine, one tender, and one command vehicle). Balfour Harrop Fire Department has seven emergency response vehicles (two rescues, two tenders, two engines, and one command).

The RDCK owns three sprinkler protection units (SPUs). The UBCM owns four complete SPUs, each equipped to protect 30 to 35 structures. The UBCM and RDCK SPU kits are deployed by the MFLNRO/ BCWFS incident command structure and are placed strategically across the province during the fire season based on fire weather conditions and fire potential. The RDCK SPUs can also be deployed regionally at the request of a fire department within the RDCK Fire Service. When the RDCK owned kits are not in use, they may be utilized by fire departments for training exercises. SPUs can be useful tools in the protection of rural/ interface homes in the event of a wildfire. The RDCK should stay up to date on the location of, and request process for, a UBCM-owned SPU in the event of a wildfire where SPUs would be an effective structural protection tool.

Emergency preparedness and response is managed regionally through cooperation with the Regional District of Central Kootenay and member communities as set out in Figure 6.[16] The 'Emergency Program Management Plan 2016' details the program structure, jurisdictional boundaries, guiding principles, and the overall planning and response to emergencies including risk assessments, mitigation, response and response levels, and recovery. The designation of Emergency Operations Centers is made in this document. The RDCK is grouped operationally with the RDCK Electoral Areas E, F and Nelson/Kaslo and Area D/Area I and J Fire Services sharing an Emergency Program Coordinator with each service having a dedicated Emergency Preparedness Committee. This report recommends that the RDCK utilize this existing structure, and incorporate the West Arm Interface Steering Committee into the meetings of the Emergency Preparedness Committee.

[16] Excerpt from Emergency Program Management Plan for the Regional District of Central Kootenay, June 2012 (revised April, 2016)

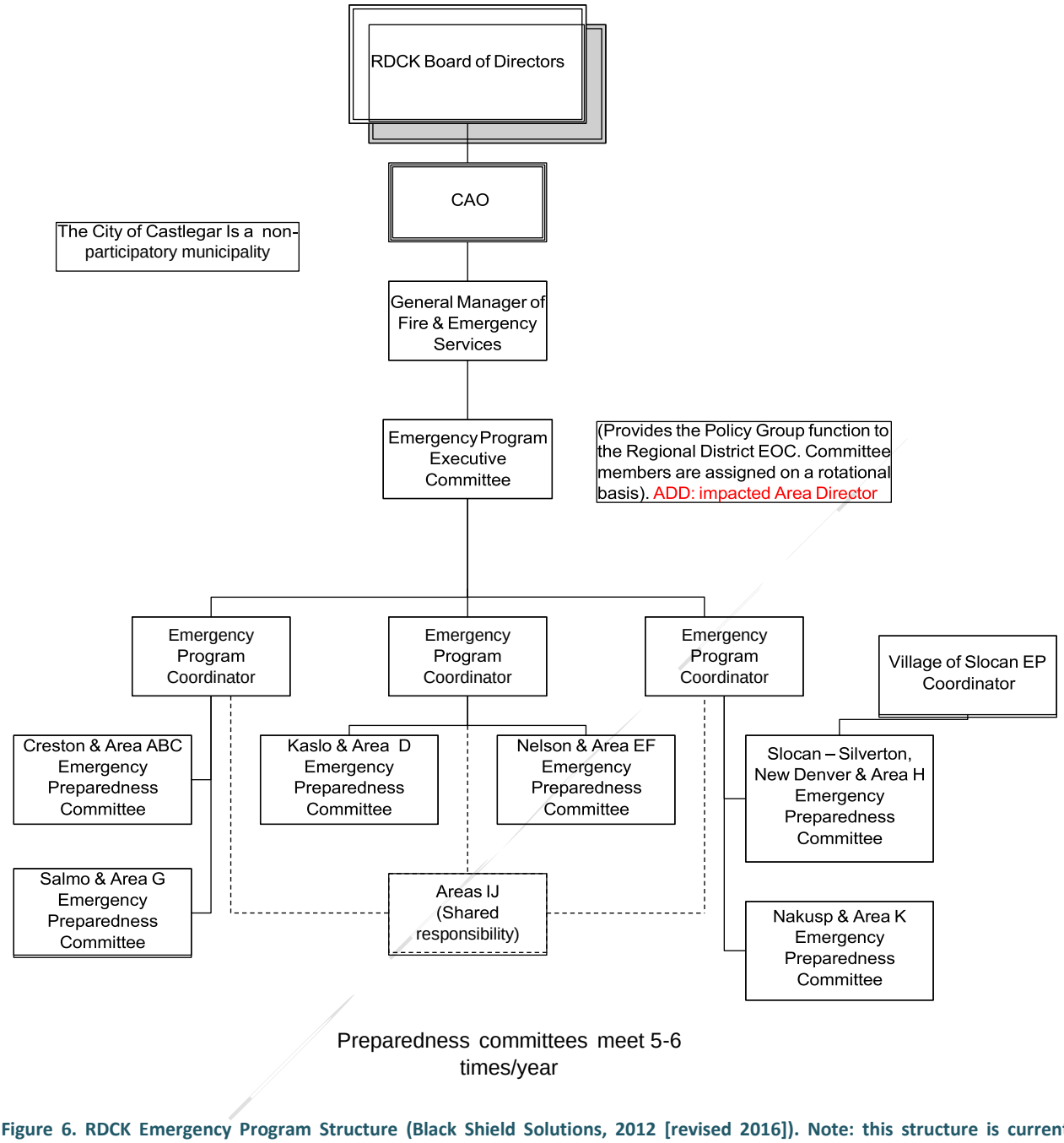


Figure 6. RDCK Emergency Program Structure (Black Shield Solutions, 2012 [revised 2016]). Note: this structure is current with the exception that the emergency coordinator for Nelson & Area E F and Kaslo & Area D is now also responsible for Areas I & J.

Many homes could benefit from preplan assessments to ensure accessibility and safety for firefighters. Fire triage is an important tool used by fire suppression crews to improve the potential for structures to survive a fire event. The process involves determining which houses have the greatest likelihood of surviving a wildfire and therefore should be prioritized for additional protective measures such as setting sprinklers or spraying retardant. Triage assessments are dependent on five main factors that include: firefighter safety, structure design and material, fuels around the structure, fire behavior, and available resources. Conducting assessments of housing in the WUI prior to a fire can assist in suppression efforts. The assessments can also be used to educate homeowners as to

what protection they might receive during a fire event and what changes they can make to improve the probability of their home surviving a fire event. See Section 7.2.1 for details regarding WUI wildfire hazard assessments and associated recommendations.

Table 10. Summary of Recommendations for Emergency Response and Planning

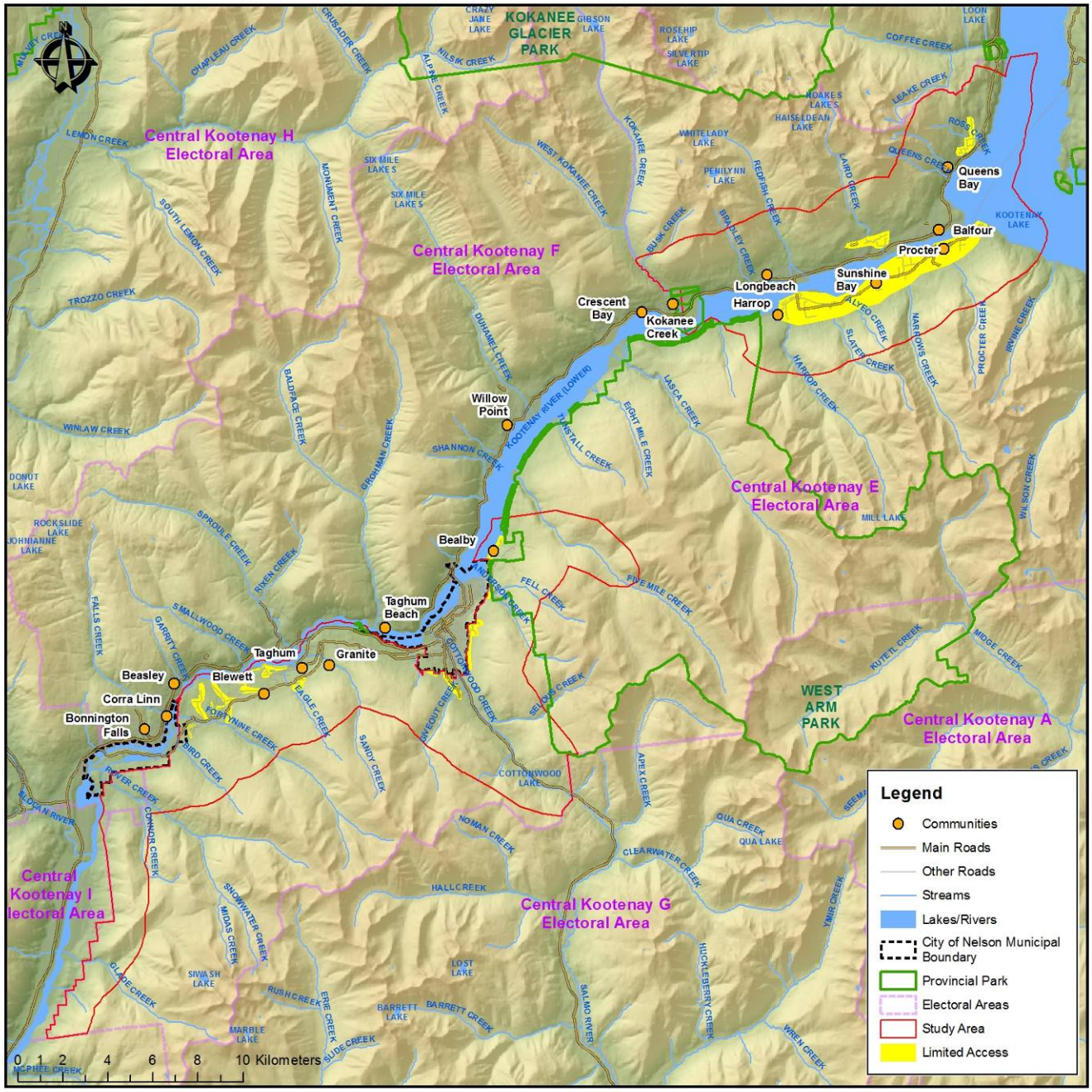
Emergency Response and Planning			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: To improve structural and wildfire equipment and training available to RDCK Fire and Rescue.			
23.	High	• Conduct annual structural and interface training with MFLNRO BCWS. As part of the training, it is recommended to conduct annual reviews to ensure PPE and wildland equipment resources are complete, in working order, and the crews are well-versed in their set-up and use. Interface training should include completion of a mock wildfire simulation in coordination with BCWS and safety training specific to wildland fire and risks inherent with natural areas.	Within current operating costs
24.	High	• Integrate Emergency Preparedness Committee and West Arm Interface Steering Committee. Coordination and information sharing are crucial to the development of a community well prepared for wildfire. As an outcome of this integration, consider updating the Emergency Program Structure (see Figure 6).	Within current operating budget.
25.	Moderate	• Provide S215 training to all/some members of Fire Halls in Area E to enhance wildfire suppression training. Consider investigating Office of the Fire Commissioner funding.	$5,000 (Annually)
26.	Moderate	• Review UBCM-owned SPU request procedure. Complete training with SPU as required and assess needs based on training outcomes.	$2,000
27.	Moderate	• Develop Regional Service to fund additional SPUs and maintain existing SPUs	$50,000 (Annually)
28.	Moderate	• Explore opportunities to collaborate with BCWS to coordinate discount volumes of hose for interface fires, reducing costs and logistics to local fire departments	Within current operating costs
29.	Moderate	• Explore opportunities to ensure a duty officer is in place in each Fire Protection Area to provide coverage for periods of high or extreme hazard.	To be determined based on current rates.
30.	Moderate	• Conduct fire preplan assessment for key interface areas in Area E. Other jurisdictions have completed assessments that prioritize fire department-specific variables, such as distance to hydrants, response time from nearest fire station, etc. to produce local risk ratings. [17]	$5,000

[17] FireSmart ratings for Regional District of Nanaimo: http://www.rdn.bc.ca/cms.asp?wpID=761

7.4.1 EVACUATION AND ACCESS

Road networks in a community serve several purposes including providing access for emergency vehicles, providing evacuation routes for residents, and creating fuel breaks. Access and evacuation during a wildfire emergency often must happen simultaneously and road networks should have the capacity to handle both. Access throughout Area E is variable and many areas have limited access for evacuation and capacity for emergency vehicles.

There are communities within Area E that are accessed by cul-de-sac or dead end roads; these neighbourhoods are of particular concern for fire suppression, emergency response, and evacuation and were identified in the 2008 CWPP. Identified areas of concern have been updated from the 2008 CWPP, and are displayed below in a map adapted from the 2008 CWPP map. These areas should be reviewed for secondary access options where possible.



Map 8. Areas that have limited access or egress in the event of emergency.

Emergency access and evacuation planning is of particular importance in the event of a wildfire event or other large-scale emergency. An evacuation plan should:

- Map and identify safe zones, marshaling points and aerial evacuation locations;
- Plan traffic control and accident management;
- Identify volunteers that can assist during and/or after evacuation;
- Create an education/communication strategy to deliver emergency evacuation procedures to residents.

Recreation trails built to support ATVs can provide access for ground crews and act as fuel breaks for ground fires, particularly in natural areas. Strategic recreational trail development to a standard that supports ATVs can be used by local fire departments to access interface area. Gates can minimize access by unauthorized users.

The creation of a map book or spatial file that displays the trail network available for the District to access during an emergency or for fire suppression planning must accompany any fire access trail building activities. In order to effectively use the trails as crew access or as fuel breaks during suppression efforts, The District should develop a Parks Access Plan, or Total Access Plan. This plan should be made available to Fire Halls in Area E, the Nelson Fire and Rescue Services and the BCWS in the event that they are aiding suppression efforts on an interface fire in Area E. The plan should include maps and spatial data, identify the type of access available for each access route, identify those trails that are gated or have barriers, and provide information as to how to unlock / remove barriers. The plan should also identify those natural areas where access is insufficient. Access assessment should consider land ownership, proximity of values at risk, wildfire threat, opportunities for use as fuel break / control lines, and requirements for future maintenance activities such as operational access for fuel treatments and other hazard reduction activities.

In addition to providing the safest, quickest, and easiest access routes for emergency crews, a Total Access Plan would minimize the need for using machinery or motorized access in an otherwise undisturbed area. This would reduce the risk of soil disturbance and other environmental damage, as well as reduce rehabilitation costs.

Table 11. Summary of Recommendations for Emergency Evacuation and Access.

Emergency Response (Evacuation and Access)			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: To improve access and egress to neighbourhoods at risk and natural areas within RDCK.			
31.	High	• Develop a Total Access Plan to create, map and inventory trail and road network in natural areas for suppression planning, identification of areas with insufficient access and to aid in strategic planning. Fire threat mapping from this CWPP should be included. The plan should be updated every five years, or more regularly, as needed to incorporate additions or changes.	$8,000 + updating
32.	High	• Require that all new interface developments have access for evacuation and sufficient capacity for emergency vehicles.	Within current operating costs
33.	Moderate	• Facilitate completion of emergency evacuation plans for interface neighbourhoods with limited access	Within current operating costs

7.5 FUEL MANAGEMENT

Fuel management, also referred to as vegetation management or fuel treatment, is a key element of a FireSmart approach. The RDCK has completed extensive fuel management activities within and adjacent to Area E (see Map 9.). To complement the work completed to-date and to further reduce the wildfire risk in Area E, the objectives for fuel management are to:

- Reduce wildfire threat on private and public lands through shovel-ready fuel management projects;
- Establish landscape-level fuel breaks to enhance community protection; and,
- Establish a long-term monitoring program and maintenance schedule for those areas that have been treated.

These objectives will enhance protection to homes and critical infrastructure by proactively reducing fire behaviour.

Fuel treatments are designed to reduce the possibility of uncontrollable crown fire through the reduction of surface fuels and ladder fuels and the creation of crown separation. This varies by ecosystem type, forest fuel type, fire weather, slope and other variables. While fuel management can be an effective method of reducing fire behaviour it does not stop wildfire. The effectiveness of fuel modification must be supported by other key CWPP elements.

Fuel management can be undertaken with minimal negative or even a positive impact on the aesthetic, recreational and ecological quality of the surrounding forest and does not necessarily mean removing most or all of the trees. The focus for fuel modification in the interface is not to stop fire but to ensure that fire intensity is low enough that wildfire can be fought on the ground. For example, FireSmart activities around a home may prevent structure ignition due to direct flame contact. The ability of the home to survive the fire would come down to whether construction materials can withstand an ember shower.

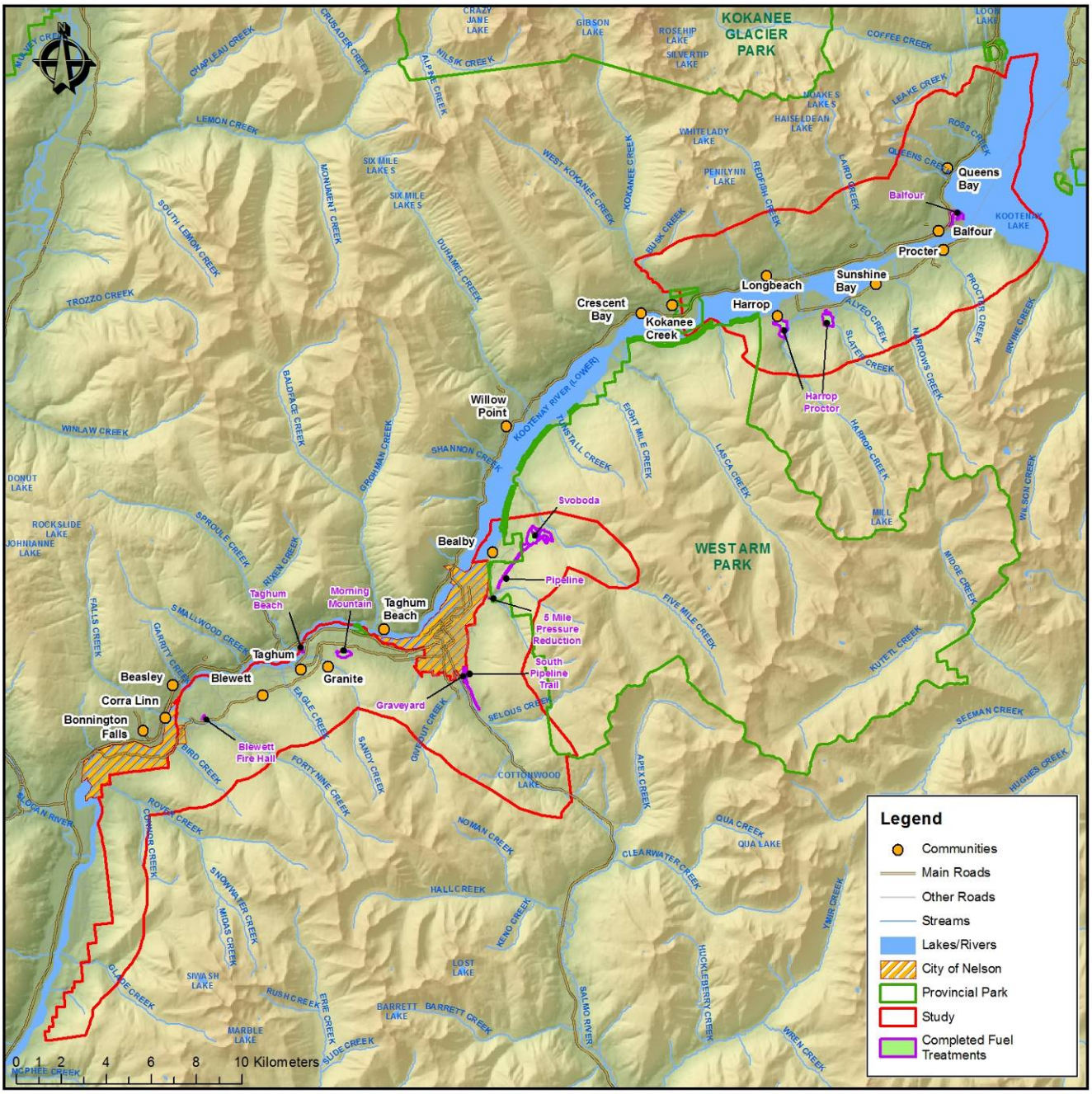
One of the constraints with fuel management is lack of funding. Funds from UBCM are available only for fuel modification on Crown lands. The best approach to mitigate fuels on private lands is to promote FireSmart. A FireSmart approach to fuel management improves defensible space around structures and reduces the likelihood that a house fire could spread to adjacent forests.

When considering fuel management to reduce fire risk, the following steps should be followed:

- A qualified professional forester must develop the prescriptions;
- Collaboration with licensees and MFLNRO to ensure that all harvesting and road building within the WUI reduces wildfire risk;
- Public consultation should be conducted during the process to ensure community support;
- Treatment implementation must weigh the most financially and ecologically beneficial methods of fulfilling the prescriptions goals;
- Pre- and post-treatment plots should be established to monitor treatment effectiveness; and
- A long-term maintenance program should be in place or developed to ensure that the fuel treatment is maintained in a functional state.

Based on recommendations from the 2008 CWPP, fuel treatments activities were completed on some of the high priority and moderate priority polygons within Area E. The total area treated within Area E since 2008 is approximately 139 hectares. Ongoing maintenance of these treated areas is required to ensure they continue to function as effective fuel treatments.

Proposed projects to reduce the wildfire hazard to Area E through fuel modification are summarized in Section 7.5.2. To assess risk, the *Provincial WUI Wildfire Threat Rating Worksheets* (worksheet) were used, as required by UBCM[18], in addition to professional judgment (WUI summaries are provided as a separate document). The worksheet provides point ratings for four components that contribute to wildfire risk. These components include fuels, weather, topography and structural values at risk.



Map 9. Previous fuels treatment projects undertaken within the Study Area.

[18] http://www.ubcm.ca/assets/Funding~Programs/LGPS/Current~LGPS~Programs/SWPI/Resources/swpi-WUI-WTA-Guide-(2012-Update).pdf

7.5.1 BURNING AND SMOKE MANAGEMENT

Prescribed fire, when used properly and in appropriate circumstances, is an extremely important, and effective, tool for mitigating hazard and reducing fuels. Air curtain burners, piling and burning, and prescribed broadcast burning are methods of fuel reduction/debris management that should be considered during fuel reduction activities and, when implemented properly, can be completed with low emissions and little impact on air quality: much less smoke and particulates than is released in a wildfire.

SMOKE MANAGEMENT

Smoke management is integral to the success of any burning operation. Site, or area specific, smoke management plans should be in place to ensure that emissions are minimized and are operations are compliant with all relevant legislation such as the Operational Burning and Smoke Control Regulation. Strategies to minimize impacts of smoke include:

- burn under acceptable venting, wind and weather conditions only;
- light a test pile before burning to ensure that local conditions match published venting conditions;
- practice concurrent burning, also called hot-fed piles (piling and burning at the same time to achieve a moderate level of fuel compaction and a good mixture of small and large diameter wood);
- utilize tools, such as leaf blowers, to maintain a hotter fire with more complete combustion;
- stop burns immediately should venting, weather, or wind conditions become undesirable;
- utilize trained and knowledgeable personnel;
- time burns when the least amount of people will be impacted (e.g. during school holidays); and
- notify the public and offer alternatives for those with serious health concerns.

Burning completed by knowledgeable and competent personnel, guided by a smoke management plan, and directed by an experienced professional can often be completed with minimal impacts to public health or air quality.

AIR CURTAIN BURNERS

Air curtain burners are wood incinerators. By providing high-velocity air to wood waste in either an earthen or metal fire box, wood waste is able to be burned with more complete combustion and less smoke emissions. Air curtain burners require a flat and wide location; forest fuels must be yarded to a road and/or transported to the burner location.

PILE BURNING

Pile burning is an effective use of fire in locations where access is limited, making chipping or fuel removal impossible or too costly. Smoke management and control during pile burning has improved in recent years and there are a number of strategies that can be employed to reduce smoke emissions to an acceptable level. They

include: checking local venting indices prior to burning; lighting a small test pile to check venting prior to starting larger operations; burning concurrently (lighting small piles and continually adding to the pile throughout the day, rather than accumulating large piles to burn); adding oxygen through the use of leaf blowers, or similar hand-held devices to encourage more complete combustion.

Prescribed burning is just one method of woody debris management and fuel reduction and can be used in combination with other methods, such as chipping, mulching, or scattering fuels, in the same treatment unit to further reduce emissions. The utilization of woody fuels commercially should be considered in all projects. For example, chips can be used as biofuel. Local market demand for these products will dictate the availability of commercial utilization for fuels treatment projects.

7.5.2 LIST OF PRIORITY TREATMENT AREAS

Wildfire threat must be reduced throughout the Wildland Urban Interface by ensuring that road building and harvesting does not increase the level of risk. Additionally, proactive fuel management treatments are recommended to mitigate wildfire threat in the WUI. To prioritize this threat reduction, 17 priority treatment areas are recommended for initial fuel management activities (11 high priority and 6 moderate priority) totaling 2,701 ha. These are detailed in Table 12 below. These new treatment polygons represent areas of predominantly high, to extreme fire behaviour threat which are close to values at risk. These proposed treatment areas are priority areas of interest for focused mitigation activities; however, the implementation of fuel management activities is subject to detailed prior assessment.

Funding opportunities are currently limited to Crown Provincial, Regional District, or Municipal land. As such, priority treatment areas were limited to Crown land which is eligible for current funding opportunities. The Five-Mile Creek polygon is recommended for critical water infrastructure protection. Recommended treatment types are thinning such as conifer understory and overstory, surface fuel reduction, pruning, removal of dead trees, and removal of surface fuels. Some of the polygons identified for treatment are eligible for UBCM funding.

A number of these proposed treatment areas fall within an area of shared responsibility between RDCK Area E and the City of Nelson as indicated with an asterisk in Table 12 below and are included in both CWPP Updates.

Two treatment polygons occur immediately adjacent to separate treatment polygons included in either the Nelson or Area F CWPP Study Area as indicated in Table 12. This is because the proposed treatment areas are very close to the boundary between these adjacent CWPPs. In these instances, a single WUI threat plot is applicable to both areas as they represent a single treatment unit that has essentially been split into separate polygons along Study Area boundaries.

Site-specific operational challenges exist in almost all treatment areas. Debris disposal and management are constrained by access limitations that pose challenges to implementation and increase operational costs. Many polygons are located on steep slopes that may not easily be accessible by machinery and pose limits to manual labour. Private land often surrounds or isolates proposed treatment areas. Additionally, proximity to structures will impact the possibility of using pile burning as a cost-effective method of debris disposal; pile burning must comply with the Open Burning Smoke Control Regulations which sets out minimum distances from institutions and residences.

Table 12. List of Priority Treatment Areas (these are areas of interest for focused mitigation activities subject to detailed assessment prior to implementation).

Treatment Polygon	WUI Threat Plot (Wildfire Behaviour Threat Score)	Priority	Fuel Type	Area (ha)	Recommended Treatment Type
Giveout Creek 1*	GO 7 (134, High)	High	Mosaic of C-3, C-4, C-5 and M-1/2	83.1	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Consider collaboration with Atco Lumber Company to remove small diameter merchantable logs
Giveout Creek 2*	GO1 (119, High) GO2 (127, High) GO3 (127, High) GO5 (134, High) WA1 (119, High)	High	C-4	128.6	• Thin dense patches to 40% crown closure • Prune trees to 3 m; • Reduce woody surface fuels; • Consider formalizing trail / road network to provide suppression capability south west of Nelson • Collaborate with licensee to develop prescriptions to remove merchantable timber
Harrop Proctor 2	HP1 (116, High) HP2 (119, High)	High	C-3 with C-2 component	424	• Thin dense patches to 40% crown closure • Prune trees to 3 m; • Reduce woody surface fuels; • Collaborate with BC Parks to increase effectiveness of treatment / road location • Collaborate with licensee to develop prescriptions to remove merchantable timber
Harrop Proctor 3	HP3 (123, High) HP4 (119, High)	High	Mosaic of predominantly C-3 with C-4 and M-1/2	304.7	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with licensee to develop prescriptions to remove merchantable timber
Harrop Proctor 5	HP5 (120, High)	High	C-3 and C-5	252.9	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with licensee to develop prescriptions to remove merchantable timber

Treatment Polygon	WUI Threat Plot (Wildfire Behaviour Threat Score)	Priority	Fuel Type	Area (ha)	Recommended Treatment Type
Kokanee Park 1a	KP1** (126, High)	High	C-3	30.8	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with BC Parks to increase effectiveness of treatment / road location • Collaborate with licensee to develop prescriptions to remove merchantable timber
Queens Bay 1	QB1 (121, High)	High	C-3	66.5	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with licensee to develop prescriptions to remove merchantable timber
Queens Bay 2	QB2 (127, High)	High	C-5/C-3	64.2	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with licensee to develop prescriptions to remove merchantable timber
Redfish	RF1 (129, High) LB1 (133, High)	High	Mosaic of C-2, M-1/2 and C-3	198.2	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with licensee to develop prescriptions to remove merchantable timber
Selous*	SEL2 (157, Extreme) MS1 (141, High)	High	Predominantly C-3 with M-1/2	99.7	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Consider collaboration with Kalesnikoff Lumber Company to remove small diameter merchantable logs

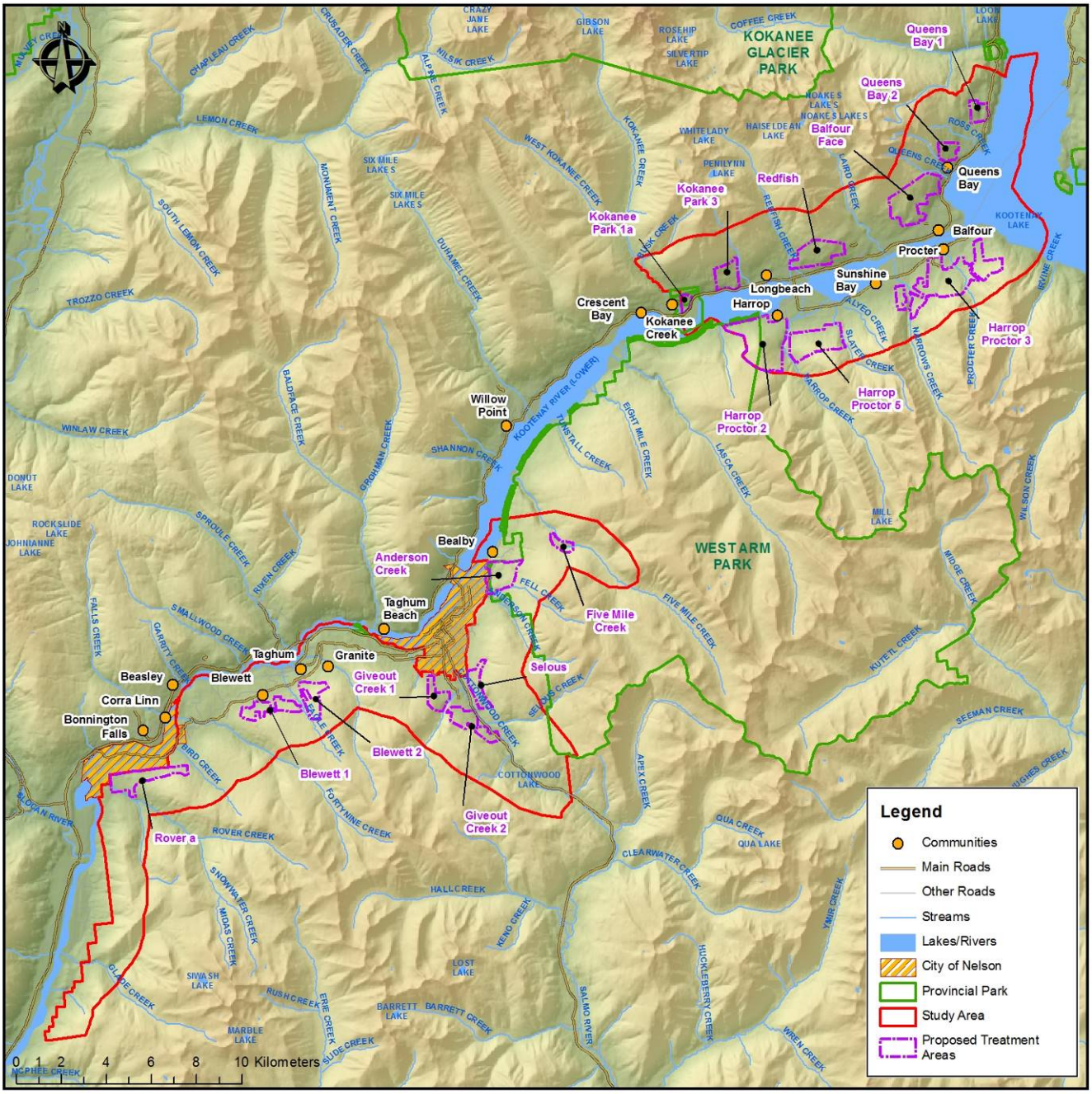
Treatment Polygon	WUI Threat Plot (Wildfire Behaviour Threat Score)	Priority	Fuel Type	Area (ha)	Recommended Treatment Type
Five Mile Creek*	-	High	Predominantly C-3 with C-5 and M-1/2	43.3	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Consider collaboration with BC Parks to remove small diameter merchantable logs • Complete WUI Threat Plots at time of prescription development
Anderson Creek*	AC1 (115, High) WAPP1 (120, High)	Moderate	Predominantly C-3 with C-2 and C-7	149.3	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure
Balfour Face	BF2 (145, High)	Moderate	Mosaic of C-3, C-7, C-5 and S-4	300.2	• Thin dense patches to 40% crown closure • Prune trees to 3 m; • Reduce woody surface fuels; • Collaborate with licensee to develop prescriptions to remove merchantable timber similar to some of the partial retention cutblocks
Blewett 1	BL1 (124, High)	Moderate	C-4 and C-3 mix	125.2	• Thin dense patches to 40% crown closure • Prune trees to 3 m; • Reduce woody surface fuels • Collaborate with licensee to develop prescriptions to remove merchantable timber
Blewett 2*	BL2 (131, High)	Moderate	Predominantly C-3 with C-2 and C-5	117.3	• Thin dense patches to 40% crown closure; • Prune trees to 3 m; • Reduce woody surface fuels • Collaborate with licensee to develop prescriptions to remove merchantable timber
Kokanee Park 3	KP3 (136, High)	Moderate	C-4/C-3	116.4	• Prune trees to 3 m; • ·Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with BC Parks to increase effectiveness of treatment / road location • Collaborate with licensee to develop prescriptions to remove merchantable timber

Treatment Polygon	WUI Threat Plot (Wildfire Behaviour Threat Score)	Priority	Fuel Type	Area (ha)	Recommended Treatment Type
Rover a	ROV1***(128, High)	Moderate	Mosaic of C-3, C-4 and M-1/2	196.5	• Prune trees to 3 m; • Reduce woody surface fuels; • Thin dense patches to 40% crown closure • Collaborate with licensee to develop prescriptions to remove merchantable timber
			TOTAL AREA	**2,700.9**	

*Polygon falls within an area of shared responsibility between the RDCK Area E and the City of Nelson and is included in both CWPP Updates.

**The WUI threat plot data is included in and submitted with the 2016 RDCK Area F CWPP Update. The adjacent treatment polygon in the Area F Study Area is Kokanee Park 1b.

***The WUI threat plot data is included in and submitted with the 2015 City of Nelson CWPP Update. The adjacent treatment polygons in the City of Nelson Study Area are Rover a and b.



Map 10. Location of proposed treatment areas in the Study Area.

7.5.3 MAINTENANCE OF EXISTING TREATMENT AREAS

The RDCK has shown leadership in completing fuel management projects within Area E to reduce the associated hazard. These activities started with the completion of the CWPP in 2008 and with fuel treatments starting in 2009. Since then, fuel treatments have been completed on approximately 160 ha of land. These polygons are in various states of hazard and some of them will require additional fuel management activities in order to maintain

or to achieve moderate threat ratings. Furthermore, maintenance is recommended for all future treatments based on polygon ecosystem and productivity.

Based on 2016 field visits of representative existing treatments, no maintenance is required until approximately 15-20 years from date of treatment, with the exception of a localized blowdown area as indicated in Table 13 below. This generalized schedule (for previously treated areas and future treatment areas) should be confirmed by reviewing the maintenance schedule in the original treatments prescriptions. Additionally, the maintenance schedule is subject to inspection of all existing treatment units within 10 years of treatment. Areas that have experienced significant blowdown should be maintained as soon as possible provided funding is available. Currently, only minor blowdown has been observed in three treatment units, while recent windstorm blowdown in Balfour is recommended for treatment within 4 years (by 2020) as funding allows. The treatment areas field verified are indicated in Table 13 below. Where the site was not field verified, recommendations are extrapolated from existing field verifications and informed by year of treatment and site productivity.

Maintenance activities may include such tasks as removing blowdown debris and brushing to remove regenerating conifers and woody shrub species.

Table 13. Estimated maintenance schedule for previously treated polygons within the Study Area.

Treatment Unit Name	Year Treated	Area (Ha)	Project	Field Verified (Y/N)	Priority for Main-tenance	Target Timeline	Comment
Balfour	2014	14.4	RDCK UBCM	Y	High	2020 (treatment)	Prescription fully implemented. Consider Maintenance of Blow down areas in 2020
BLEW-1 (Blewett Fire Hall)	2015	1.3	RDCK UBCM	Y	Low	2025 (inspection)	Prescription fully implemented
BLK 150 (Harrop Procter)	2013	24.0	RDCK UBCM	Y	Low	2023 (inspection)	Prescription fully implemented. Partially treated. Funding requested for treatment in 2017.
BLK 151 (Harrop Procter)	2010	23.4	RDCK UBCM	Y	Low	2030 (inspection)	Prescription fully implemented
NC-1 (Taghum Beach)	2014	1.1	RDCK UBCM	Y	Low	2024 (inspection)	Prescription fully implemented
NC-2 (Morning Mountain)	2015	13.7	RDCK UBCM	Y	Low	2025 (inspection)	Prescription fully implemented

Treatment Unit Name	Year Treated	Area (Ha)	Project	Field Verified (Y/N)	Priority for Main-tenance	Target Timeline	Comment
SU-6 (Five Mile Pressure Reduction)	2011	0.2	City of Nelson	Y	Low	2021 (inspection)	Prescription fully implemented
SU 2 (Graveyard)	2011	7.9	City of Nelson	Y	Low	2021 (inspection)	Prescription fully implemented. Minor blowdown observed
SU3 (South Pipeline Trail)	2011	2.6	City of Nelson	Y	Low	2021 (inspection)	Prescription fully implemented. Minor blowdown observed
SU5 (Pipeline)	2011	8.4	City of Nelson	Y	Low	2021 (inspection)	Prescription fully implemented. Minor blowdown
Svoboda (6 treatment units)	2009	62.8	West Arm Provincial Park	Y	High	2019 (inspection)	Thrifty regrowth of lodgepole pine, minimal surface fuels
TOTAL		**159.8**					

Table 14. Summary of Fuel Management Recommendations.

Fuel Management			
Item	**Priority**	**Recommendation**	**Estimated Cost ($)**
Objective: Reduce wildfire threat on private and public lands through fuel management.			
34.	High	• Proceed with detailed assessment, prescription development and treatment of hazardous fuel units identified in this CWPP. Collaboration with BCTS, and other licensees, BC Parks and City of Nelson may facilitate larger projects.	UBCM SWPI Funding/Municipal Funding as available
35.	High	• Prioritize Areas of Interest across Electoral Areas with updated CWPPs to ensure effective and objective treatment	Within current operating costs
Objective: Maintain treated areas under an acceptable level of wildfire fire threat (moderate).			
36.	Moderate	• As treatments are implemented, complete monitoring within 10 years of treatment (subject to site conditions) and maintenance every 15-20 years (subject to prescription and site conditions) on previously treated areas. Treated areas should be assessed by a Registered Professional Forester, specific to actions required in order to maintain treated areas in a moderate or lower hazard.	UBCM SWPI Funding/ Municipal Funding

8.0 CONCLUSIONS

This 2015 update to the 2008 CWPP reflects existing RDCK priorities and the current provincial standard methodology and baseline data for hazard and threat analysis. This CWPP Update takes into account the considerable new development that has occurred in the WUI and provides an assessment or reassessment of the hazard associated with these development changes, as well as other changes in the community. Specifically, it accounts for changes to forest fuel types due to forest growth, forest health (i.e., mountain pine beetle impacts), windthrow, forest harvesting, and forest fires, in addition to new developments.

Another significant change since 2008 is the formation of the Interface Working Group with the RDCK, the City of Nelson and BC Parks to collaboratively plan and implement fire hazard mitigation works in the Joint Responsibility Area while taking a strategic landscape level approach.

The 2008 CWPP Study Area was defined by a 2 km buffer around Fire Protection Areas within the RDCK whereas this 2015 CWPP Update is focused on the PSTA WUI and associated density criteria and municipal and critical infrastructure including extensions into West Arm Provincial Park. As a result, the area under study is reduced and more focused in this Update.

In addition, methods for assessing wildfire threat have evolved since 2008. This update uses the provincially accepted standard methodology and new BC Provincial Strategic Threat Analysis baseline data for hazard and threat analysis. Due to the PSTA updates, altered Study Area and changes in the community, 2,701 ha have now been identified as hazardous fuels.

The RDCK has made significant progress at implementing recommendations from the 2008 CWPP and has shown provincial leadership in many aspects of wildfire mitigation activities.

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APPENDIX 1 – FIRESMART

One of the most important areas with respect to forest fire ignition and the damages associated with a wildfire is the zone adjacent to buildings and homes. *FireSmart, Protecting Your Community from Wildfire*[19] is a guide developed by Partners in Protection that provides practical tools and information on how to reduce the risk of loss from interface fires. The FireSmart website can be visited at: https://www.firesmartcanada.ca/resources-library/protecting-your-community-from-wildfire

Wildfire is often considered an external threat to residences; however, in many cases fire can originate as a house fire and spread into the interface. In both cases, fire coming from the forest to a building or spreading from a building to the forest, home owners and businesses can take steps to reduce the probability of this occurring. There are two main avenues to FireSmart a home: 1) change the vegetation type, density, and setback from the building (fuel treatments and landscaping) and 2) change the structure to reduce vulnerability to fire and the potential for fire to spread to or from a building.

FIRESMART BUILDING MATERIALS AND DESIGN

An important consideration in protecting the WUI zone from fire is ensuring that homes can withstand an interface fire event. Often, it is a burning ember traveling some distance and landing on vulnerable housing materials (spotting), rather than direct flame contact (vegetation to house) or radiative heat that ignites a structure. Alternatively, the convective or radiant heating produced by one structure may ignite an adjacent structure if it is in close proximity. Structure protection is focused on ensuring that building materials and construction standards are appropriate to protect individual homes from interface fire. Materials and construction standards used in roofing, exterior siding, window and door glazing, eaves, vents, openings, balconies, decks, and porches are primary considerations in developing FireSmart neighbourhoods. Housing built using appropriate construction techniques and materials are less likely to be impacted by interface fires.

While many BC communities established to date were built without significant consideration with regard to interface fire, there are still ways to reduce home vulnerability. Changes to roofing materials, siding, and decking can be achieved over the long-term through changes in bylaws and building codes.

The FireSmart approach has been adopted by a wide range of governments and is a recognized template for reducing and managing fire risk in the wildland urban interface. The most important components of the FireSmart approach are the adoption of the hazard assessment systems for wildfire, site and structure hazard assessment, and the proposed solutions outlined for vegetation management, structure protection, and infrastructure. Where fire risk is moderate or greater, at a minimum, the FireSmart principles should be applied to new subdivision and structure developments and, wherever possible, the principles should be integrated into existing subdivisions and built up areas when renovations occur or landscaping is changed.

The following link accesses an excellent four-minute video demonstrating the importance of FireSmart building practices during a simulated ember shower: http://www.youtube.com/watch?v=_Vh4cQdH26g.

[19] For further information regarding the FireSmart program see *www.pep.bc.ca/hazard_preparedness/FireSmart-BC4.pdf*

Roofing Material:

Roofing material is one of the most important characteristics influencing a home's vulnerability to fire. Roofing materials that can be ignited by burning embers increases the probability of fire related damage to a home during an interface fire event.

In many communities, there is no fire vulnerability standard for roofing material. Homes are often constructed with unrated materials that are considered a major hazard during a large fire event. In addition to the vulnerability of roofing materials, adjacent vegetation may be in contact with roofs, or roof surfaces may be covered with litter fall from adjacent trees. This increases the hazard by increasing the ignitable surfaces and potentially enabling direct flame contact between vegetation and structures.

Building Exterior - Siding Material:

Building exteriors constructed of vinyl or wood are considered the second highest contributor to structural hazard after roofing material. These materials are vulnerable to direct flame or may ignite when sufficiently heated by nearby burning fuels. Winds caused by convection will transport burning embers, which may lodge against siding materials. Brick, stucco, or heavy timber materials offer much better resistance to fire. While wood may not be the best choice for use in the WUI, other values from economic and environmental perspectives must also be considered. It is significantly cheaper than many other materials, supplies a great deal of employment in BC, and is a renewable resource. New treatments and paints are now available for wood that increase its resistance to fire and they should be considered for use.

Balconies and Decking:

Open balconies and decks increase fire vulnerability through their ability to trap rising heat, by permitting the entry of sparks and embers, and by enabling fire access to these areas. Closing these structures off limits ember access to these areas and reduces fire vulnerability.

Combustible Materials:

Combustible materials stored within 10 m of residences are also considered a significant issue. Woodpiles, propane tanks and other flammable materials adjacent to the home provide fuel and ignitable surfaces for embers. Locating these fuels away from structures helps to reduce structural fire hazards and makes it easier and safer for suppression crews to protect a house.

FIRESMART TREATMENTS

One effective method of reducing how easily fire can move to and from a home is by altering the vegetation around the home. The following information regarding fuel treatments is based on the FireSmart Manual (Partners in Protection 2002).

Priority Zone 1 is a 10 m fuel free zone around structures. This ensures that direct flame contact with the building cannot occur and reduces the potential for radiative heat to ignite the building. While creating this zone is not always possible, landscaping choices should reflect the use of less flammable vegetation such as deciduous bushes, herbs and other species with low flammability. Coniferous vegetation such as juniper or cedar bushes and

hedges should be avoided, as these are highly flammable. Any vegetation in this zone should be widely spaced and well setback from the house.

Priority Zone 2 extends from 10 to 30 m from the structure. In this zone, trees should be widely spaced 5 to 10 m apart, depending on size and species. Tree crowns should not touch or overlap. Deciduous trees have much lower volatility than coniferous trees, so where possible deciduous trees should be preferred for retention or planting. Trees in this area should be pruned as high as possible (without compromising tree health), especially where long limbs extend towards buildings. This helps to prevent a fire on the ground from moving up into the crown of the tree or spreading to a structure. Any downed wood or other flammable material should also be cleaned up in this zone to reduce the ability of fire to move along the ground.

Priority Zone 3 extends from 30 to 100 m from the home. The main threat posed by trees in this zone is spotting, the transmission of fire through embers carried aloft and deposited on the building or adjacent flammable vegetation. To reduce this threat, cleanup of surface fuels as well as pruning and spacing of trees should be completed in this zone (Partners in Protection).

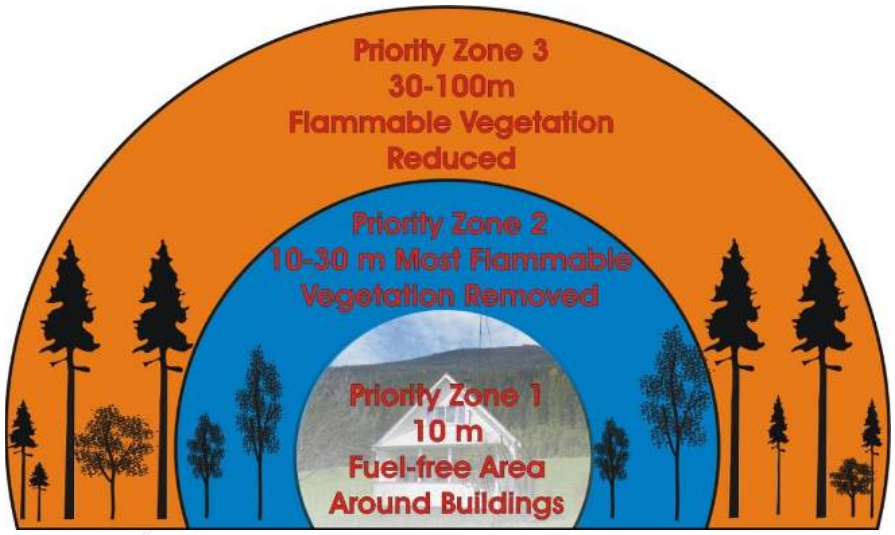

Figure7.Illustration of FireSmart zones.

APPENDIX 2 – FIRE THREAT METHODOLOGY

As part of the CWPP process, spatial data submissions are required to meet the defined standards in the Program and Application Guide. As part of the program, proponents completing a CWPP or CWPP update are provided with the Provincial Strategic Threat Analysis (PSTA) dataset. This dataset includes:

- Current Fire Points
- Current Fire Polygons
- Fuel Type
- Historical Fire Points
- Historical Fire Polygons
- Mountain pine beetle polygons
- PSTA Head Fire Intensity
- PSTA Historical Fire Density
- PSTA Spotting Impact
- PSTA Threat Rating
- Structure Density
- Structures (sometimes not included)
- Wildland Urban Interface Buffer Area

The required components for the spatial data submission are detailed in the Program and Application Guide Spatial Appendix – these include:

- AOI
- Fire Threat
- Fuel Type
- Photo Location
- Proposed Treatment
- Structures
- Threat Plot
- Wildland Urban Interface

The provided PSTA data does not necessarily transfer directly into the geodatabase for submission, and several PSTA feature classes require extensive updating or correction. In addition, the Fire Threat determined in the PSTA is fundamentally different than the Fire Threat feature class that must be submitted in the spatial data package. The Fire Threat in the PSTA is based on provincial scale inputs - fire density; spotting impact; and head fire intensity, while the spatial submission Fire Threat is based on the components of the Wildland Urban Interface Threat Assessment Worksheet. For the scope of this project, completion of WUI Threat Assessment plots on the entire AOI (Study Area) is not possible, and therefore an analytical model has been built to assume Fire Threat based on spatially explicit variables that correspond to the WUI Threat Assessment worksheet.

FIELD DATA COLLECTION

The primary goals of field data collection are to confirm or correct the provincial fuel type, complete WUI Threat Assessment Plots, and assess other features of interest to the development of the CWPP. This is accomplished by traversing as much of Area E as possible (within time, budget and access constraints). Threat Assessment plots are completed on the latest version (2013) form, and as per the Wildland Urban Interface Threat Assessment Guide.

For clarity, the final threat ratings for Area E were determined through the completion of the following methodological steps:

1. Update fuel-typing using 2015 orthophotography provided by the client and field verification.
2. Update structural data using critical infrastructure data provided by the client and orthophotography.
3. Complete field work to ground-truth fuel typing and threat ratings (completed 31 WUI threat plots and, 147 field stops within the Area E Study Area and joint responsibility area).
4. Threat assessment analysis using field data collected and rating results of WUI threat plots – see next section.

SPATIAL ANALYSIS

Not all attributes on the WUI Threat Assessment form can be determined using a GIS analysis on a landscape/polygon level. To emulate as closely as possible the threat categorization that would be determined using the Threat Assessment form, the variables in Table 15 were used as the basis for building the analytical model. The features chosen are those that are spatially explicit, available from existing and reliable spatial data or field data, and able to be confidently extrapolated to large polygons.

Table 15. WUI Threat Sheet attributes used in the spatial analysis.

WUI Threat Sheet Attribute	Used in analysis?	Explanation
Fuel		
1. Duff depth and Moisture Regime	No	Many of these attributes assumed by using 'fuel type' as a component of the Fire Threat analysis. Most of these components are not easily extrapolated to a landscape or polygon scale, or the data available to estimate over large areas (VRI) is unreliable.
2. Surface Fuel continuity	No	
3. Vegetation Fuel Composition	No	
4. Fine Woody Debris Continuity	No	
5. Large Woody Debris Continuity	No	
6. Live and Dead Coniferous Crown Closure	No	
7. Live Deciduous Crown Closure	No	
8. Live and Dead Conifer Crown Base height	No	
9. Live and Dead suppressed and Understory Conifers	No	
10. Forest health	No	
11. Continuous forest/slash cover within 2km	No	
Weather		
12. BEC Zone	Yes	Although included, these are broad classifications, meaning
13. Historical Fire Weather	Yes	

WUI Threat Sheet Attribute	Used in analysis?	Explanation
Occurrence		most polygons in Area E will have the same value
Topography		
14. Aspect	Yes	
15. Slope	Yes	Elevation model was used to determine slope.
16. Terrain	No	
17. Landscape/topographic Limitations to Wildfire Spread	No	
Structural		
18. Position of Structure/Community on slope	No	Too difficult to quantify – this is a relative value.
19. Type of development	No	Too difficult to analyze spatially.
20. Position of assessment area relative to values	Yes	Only distance to structures is used in this analysis. Being above, below or sidehill is too difficult to analyze spatially.

The field data is used to correct the fuel type polygon attributes provided in the PSTA. This corrected fuel type layer is then used as part of the spatial analysis process. The other components are developed using spatial data (BEC zone, fire history zone) or spatial analysis (aspect, slope). A scoring system was developed to categorize resultant polygons as having relatively low, moderate, high or extreme Fire Threat, or Low, Moderate, High or Extreme WUI Threat. Table 16 below summarizes the components and scores to determine the Fire Behaviour Threat.

Table 16. Components of Fire Threat Analysis

Attribute	Indicator	Score
Fuel Type	C-1	35
	C-2	
	C-3	
	C-4	
	M-3/4,>50% dead fir	
	C-7	20
	M-1/2, >50% conifer	
	M-3/4, <50% dead fir	
	C-5	5
	C-6	
	M-1/2, <50% conifer	
	O-1a/b	10
	S-1	

Attribute	Indicator	Score
	S-2	
	S-3	
	D-1/2	0
	W	0
	N	0
Weather - BEC Zone	AT, irrigated	1
	CWH, CDF, MH	3
	ICH, SBS, ESSF	7
	IDF, MS, SBPS, CWHsds1 & ds2, BWBS, SWB	10
	PP, BG	15
Historical Fire Occurrence 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	15
Slope	<16	1
	16-29 (max N slopes)	5
	30-44	10
	45-54	12
	>55	15
Aspect (>15% slope)	North	0
	East	5
	<16% slope, all aspect	10
	West	12
	South	15

These attributes are combined to produce polygons with a final Fire Behaviour Threat Score. To determine the Wildland Urban Interface Score, only the distance to structures is used. Buffer distances are established as per the WUI Threat Assessment worksheet (<200, 200-500 and >500) for polygons that have a 'high' or 'extreme' Fire Behaviour Threat score. Polygons with structures within 200m are rated as 'extreme', within 500m are rated as 'high', within 2km are 'moderate', and distances over that are rated 'low'.

There are obvious limitations in this method, most notably that not all components of the threat assessment worksheet are scalable to a GIS model, generalizing the Fire Behaviour Threat score. The WUI Threat Score is greatly simplified, as determining the position of structures on a slope, the type of development and the relative position are difficult in an automated GIS process. Structures are considered, but there is no consideration for structure type (also not included on threat assessment worksheet). This method uses the best available information to produce accurate and useable threat assessment across Area E in a format that is required by the UBCM SWPI program.

APPENDIX 3 – SPECIES AT RISK INFORMATION

Table 17. Publicly available occurrences of Blue and Red listed species in Area E[20]

Common Name	Scientific Name	Category	BC List	Habitat
Blunt-sepaled Starwort	*Stellaria obtusa*	Vascular Plant	Blue	TERRESTRIAL
Heterocodon	*Heterocodon rariflorum*	Vascular Plant	Blue	TERRESTRIAL: Roadside, Grassland/Herbaceous
Monardella	*Monardella odoratissima ssp. discolor*	Vascular Plant	Red	TERRESTRIAL
Painted Turtle - Intermountain - Rocky Mountain Population	*Chrysemys picta pop. 2*	Vertebrate Animal	Blue	PALUSTRINE: Herbaceous Wetland
Spurless Touch-me-not	*Impatiens ecornuta*	Vascular Plant	Blue	TERRESTRIAL
Western Screech-owl, Macfarlanei Subspecies	*Megascops kennicottii macfarlanei*	Vertebrate Animal	Red	TERRESTRIAL: Forest Broadleaf, Urban; RIVERINE: Riparian
Western Skink	*Plestiodon skiltonianus*	Vertebrate Animal	Blue	TERRESTRIAL: ROCK OUTCROP, COARSE TALUS/BOULDERS, GRASSLAND/HERBACEOUS, FOREST NEEDLELEAF
White Sturgeon (Kootenay River Population)	*Acipenser transmontanus pop. 1*	Vertebrate Animal	Red	RIVERINE: Big River; Moderate Gradient; Low Gradient; Pool; LACUSTRINE: Deep Water
Wild Licorice	*Glycyrrhiza lepidota*	Vascular Plant	Blue	TERRESTRIAL: Roadside

[20] Data current as of October 21, 2016.

APPENDIX 4 – PREVIOUS CWPP RECOMMENDATIONS

This 2015 CWPP Update relates to four separate 2008 CWPPs completed for each of the following RDCK Fire Protection Areas (FPAs) with study areas that overlap the current 2015 Study Area:

- Balfour/Harrop (the FPA is within the boundaries of both electoral Areas E and F);
- Beasley (the FPA is within Area F; however, the buffered 2008 CWPP Study Area overlaps with the current Area E Study Area);
- Blewett (the FPA is within Area E);
- North Shore (the FPA is within Area F; however, a small portion of the buffered 2008 CWPP Study Area extends into the current Area E Study Area).

The Nelson Contract Fire Protection Area also overlaps with the Area E Study Area, but has been addressed separately in the City of Nelson 2015 CWPP Update.

Since 2008, the RDCK has implemented many of these CWPP recommendations. The previous recommendations and progress to date are summarized below. In some cases, the recommendations have been fully achieved. In other cases, these recommendations have been partially met, or met in a limited way. Some of the recommendations that are not fully achieved are cross-referenced to the recommendations and Action Plan in this CWPP update (see Section 7.0).

Some of the previous recommendations are paraphrased and agency names and stakeholders or partners originally referred to may have subsequently changed. These changes have been acknowledged in the reported progress as/if applicable.

For full recommendation text, see the respective Balfour/Harrop Fire Protection Area, Beasley Fire Protection Area, Blewett Fire Protection Area, and North Shore Protection Area Community Wildfire Protection Plans (Part 2 of the RDCK Community Wildfire Protection Plans, Risk Assessment and Hazard Mitigation Options for Four Application Areas in the Region). The 2008 recommendations are common between all CWPPs, with exceptions as indicated in the summary below.

Recommendation		Progress
Communication and Education		
#1	The RDCK should consider developing a communication plan to outline the purpose, methods and desired results of communication and education in Fire Protection Areas. The plan should cover the principles of fire risk to the community, fire behaviour, spotting, structure protection and vegetation management. Educational information and communication tools need to be stakeholder specific. To establish effective communication within target groups, the plan should identify spokespersons who can best establish communication ties with target audiences and provide the educational information required.	The RDCK has not developed a communication plan, but rather sends out sporadic updates and press releases (consider increasing frequency of public safety and fire information messages).
#2	The RDCK should investigate working with local developers to construct a FireSmart show home to be used as a tool to educate and communicate the principles of FireSmart to the public. The demonstration home would be built to FireSmart standards using recommended materials for interface communities. Additionally, vegetation adjacent to the home would be managed to guidelines outlined in the FireSmart program.	The RDCK has not achieved this recommendation and no longer considers this approach to be an effective outreach tool. The RDCK is working with BC Parks, City of Nelson, forest licensees, MFLNRO and other stakeholders to develop an effective set of tools to educate and communicate the principles of FireSmart to the public.
#3	The RDCK should enhance their existing website to outline Fire Protection Area fire risks, current fire danger and proactive steps individual homeowners can take to make their homes safer within the Fire Protection Area. Other information, such as fire danger and FireSmart principles, should be maintained on the regional site	The RDCK has some information on its website to inform residents of fire risks and proactive steps individual homeowners can take to make their homes safer within the Fire Protection Area. Current fire danger ratings are not included. A RDCK Web Blocker is in place in the event of any kind of fire event directing residents to click on and receive emergency information prior to accessing other information. The RDCK and the Balfour Harrop Fire Department have links to FireSmart Canada and the FireSmart homeowners' manual posted on their websites. The RDCK EOC circulates Emergency Alerts to residents on a routine basis.

Recommendation		Progress
#4	The RDCK should access local newspapers or community bulletins to deliver FireSmart educational materials or mail materials to residents as was done in 2004	The RDCK has not achieved this recommendation and no longer considers this approach to be an effective outreach tool. The RDCK is working with BC Parks, City of Nelson, forest licensees, MFLNRO and other stakeholders to develop an effective set of tools to educate and communicate the principles of FireSmart to the public.
#5	The RDCK should investigate creating a central phone number accessible to the public with messages updating fire bans and fire danger rating	The RDCK is working with MFLNRO and BCWS to determine how best to provide the public with messages updating fire bans and fire danger rating.
#6	The RDCK should establish communications with the MOFR for daily updates during the fire season. This information should be relayed to individual Fire Departments and to the homes of the Fire Chiefs and Deputy Chiefs.	RDCK (BC Zone 4) Fire Chiefs receive daily BCWS fire weather updates.
#7	Fire halls should be assessed to ensure that they meet or exceed FireSmart recommendations. Additionally, fire halls should have emergency power backup and be equipped with sufficient resources to act as alternate incident command posts. Alternatively, sub-regional caches could be provided with incident command centre equipment.	The RDCK has not formally completed these assessments, and is carried forward in this revised CWPP. See Recommendation 10, Table 7.
#8	Signage consisting of current fire danger, campfire bans and general warnings regarding fire safety should be posted at all major entrances to the community or surrounding fire protection area and updated with current fire information as required.	This has been completed in most communities in Area E, and is ongoing
#9	The Regional District should consider developing a campfire ban bylaw and, in conjunction with the Fire Chief, implement the ban at times of high fire danger when provincial bans are not in place. The bylaw should consider effective and efficient enforcement measures and powers. (Recommendation in all CWPPs with the exception of Blewett FPA)	The RDCK does not have burning bylaws. The RDCK advises residents in municipalities to check with city halls regarding municipal bylaws, restrictions and permits and has posted links to relevant provincial guidelines (air quality control legislation, BCWS open burning restrictions and fire bans). See recommendation 21, Table 9.

Recommendation		Progress
#10	The Fire Department and the Regional District should work with the Regional Chamber of Commerce to educate the local business community, particularly businesses that depend on forest use (i.e., tourism and recreation) on FireSmart preparation and planning. Public education programs should be enhanced by: 1) integrating a unit of "FireSmart" and wildfire safety into the local elementary school curriculum, promoting the principles of community wildfire protection at a young age in order to improve awareness over time. This unit could be part of a general emergency preparedness teaching program; 2) creating a "FireSmart" sticker program where Fire Department members attend residences and certify them as meeting "FireSmart" guidelines. (Corresponds to recommendation #9 in the Blewett FPA CWPP)	The RDCK has not achieved this recommendation and no longer considers this approach to be an effective outreach tool. The RDCK is working with BC Parks, City of Nelson, forest licensees, MFLNRO and other stakeholders to develop an effective set of tools to educate and communicate the principles of FireSmart to the public, including local businesses.
Structure Protection		
#11	Many homes and businesses are built immediately adjacent to the forest edge. In these neighbourhoods, trees and vegetation are often in direct contact with homes. The Regional District should consider incorporating building setbacks into bylaw with a minimum distance of 10 m when buildings border the forest interface. (Corresponds to recommendation #10 in the Blewett FPA CWPP)	The RDCK does not have a Development Permit Area. Discussions are ongoing on how best to achieve this recommendation. See recommendation 16, Table 9.
#12	It is recommended that the RDCK conduct detailed FireSmart assessments of homes and businesses to further communicate and promote fire risk reduction on private property. The Wildfire Risk Management System developed for individual Fire Protection Areas indicates that many areas of the Regional District are at high risk from wildfire. (Corresponds to recommendation #11 in the Blewett FPA CWPP)	Queens Bay has achieved Community FireSmart Recognition in 2015. The Heddle Road community in Area F is under development. This has not been completed in other communities in Area E, and is ongoing. See recommendation 14, Table 8.

Recommendation		Progress
#13	The RDCK should investigate the policy tools available for reducing wildfire risk within the municipality. These include voluntary fire risk reduction for landowners, bylaws for building materials and subdivision establishment, covenants for vegetation set-backs, delineation of Wildfire Development Permit areas, incentives such as exclusion from a fire protection tax and education. Specifically, the community should investigate a process to create and/or review and revise existing bylaws to be consistent with the development of a FireSmart community. Consideration should be given to the creation of a Wildfire Bylaw that mandates sprinkler protection, providing for good access for emergency response, and specifies fuel management on both public and private property. (Corresponds to recommendation #12 in the Blewett FPA CWPP)	Queens Bay has achieved Community FireSmart Recognition in 2015. The Heddle Road community in Area F is under development. This has not been completed in other communities in Area E, and is ongoing. The recommended policy tools have not all specifically been addressed and are consolidated in the current CWPP recommendations (see recommendation 14, Table 8.and recommendations 16 to 20, and 22, Table 9).
#14	The RDCK should consider requiring roofing materials that are fire retardant with a Class A and Class B rating within new subdivisions. While it is recognized that wholesale changes to existing roofing materials within the community are not practical, a long-term replacement standard that is phased in over the roof rotation period would significantly reduce the vulnerability of the community. The RDCK should consider obtaining legal advice regarding the implementation of building requirements that are more restrictive than the BC Building Code. While restrictions to rated roofing are not supported in the Code at this time, there are several communities who have or are undergoing various processes (e.g., lobbying, legal opinion, declaration of hazard by Fire Chief) to enact roofing bylaws within their Wildfire Development Permit areas. (Corresponds to recommendation #13 in the Blewett FPA CWPP)	The RDCK does not have a Development Permit Area and has not considered requiring roofing materials that are fire retardant with a Class A and Class B rating within new subdivisions. Discussions are ongoing on how best to achieve this recommendation. See recommendation 17, Table 9).
#15	The RDCK should consider working with the Building Policy Branch to create a structure that would enable the municipality to better address wildland urban interface protection considerations for buildings. (Corresponds to recommendation #14 in the Blewett FPA CWPP)	The RDCK does not have a Development Permit Area and has not pursued other mechanisms to enable the municipality to better address wildland urban interface protection considerations for buildings. Discussions are ongoing on how best to achieve this recommendation. See recommendation 21, Table 9).

Recommendation		Progress
#16	The RDCK should consider lobbying the province to identify and document hazardous fuel types on crown lands that are not within 2 km of the boundary of the community but that are within 5 km of residential areas that could be impacted by a wildland urban interface fire. Effort should be directed at encouraging the province to initiate a fuel treatment program for these lands. This may include coordinating lobbying initiatives with other local governments from within the Regional District. (Corresponds to recommendation #15 in the Blewett FPA CWPP)	The RDCK has been successful in achieving funding to revise the 2008 CWPP and identify and document hazardous fuel types on crown lands that are not simply within 2 km of the boundary of the community but that are within a broader landscape that could be impacted by a wildland urban interface fire. As an outcome of this CWPP update the RDCK is working with BC Parks, the City of Nelson and other stakeholders to initiate a fuel treatment program for these lands at the landscape level.
#17	Access constraints to residences should be addressed. Homeowners should be made aware of access constraints that may prevent the Fire Department from attending a wildland fire that could threaten their property. (Corresponds to recommendation #16 in the Blewett FPA CWPP)	The RDCK has identified access issues in this CWPP update. See Section 7.4.1. Work on this is ongoing on. See recommendations 31-33, Table 11.
#18	Subdivision design plans should be reviewed by the Fire Department to ensure suitable access routes exist, hydrant accessibility is adequate where applicable, and that interface fire related issues are addressed. (Corresponds to recommendation #17 in the Blewett FPA CWPP)	The RDCK does not require that subdivision design plans be reviewed by the Fire Department Work on this is ongoing on. See recommendation 32, Table 11.
#19	As Fire Department officials can only request rather than force an illegal fire to be extinguished, the Regional District should consider enacting a mechanism such as a 'fee for service charge' or developing a policy to enforce regional bylaws if Fire Departments are called out to attend illegal burning. The issue of illegal fires is considered significant in the uncontrolled areas of the Regional District and requires action. (Corresponds to recommendation #18 in the Blewett FPA CWPP)	When a burn ban is in place, the RDCK can extinguish the fire and request that Compliance and Enforcement issue a fine to the person responsible. Under the Fire Services Act, the RDCK can extinguish a fire that is threatening life and structures. With other forms of illegal fires such as burning garbage, the RDCK can request that Compliance and Enforcement issue a fine to the person responsible.

Recommendation		Progress
#20	Given the wildfire risk profile of the Fire Protection Area, an emergency sprinkler kit capable of protecting 30 to 50 homes should be purchased and maintained in the RDCK. Fire rescue personnel, or a designate of the department, should be trained to mobilize and set up the equipment efficiently and effectively during a fire event. (Corresponds to recommendation #19 in the Blewett FPA CWPP)	The RDCK has one type 2 structural protection unit and three type 3 structural protection units. Further work required. See recommendation 27, Table 10.
Emergency Response		
#21	Consideration should be given to developing a regional initial attack crew as other regional districts such as Metro Vancouver and the Capital Regional District have done. The location of this crew should be determined in consultation with communities and fire chiefs. The crew could consist of seasonal and permanent staff. Permanent staff could be trained to offer S100 and S215 training to fire departments as well as providing support such as community education and communication during the non-wildfire season. (Corresponds to recommendation #20 in the Blewett FPA CWPP)	The RDCK has trained its members to Wildland Fire Fighter Structure Protection Program standards, delivered by the Office of the Fire Commissioner. This includes SPP-115 structural protection training. The result is a region wide roster of trained fire fighters. Further work required. See recommendation 25, Table 10.
#22	A formal communication structure should be established with the MOFR so that information regarding fires in the region is communicated in a timely manner to the communities and fire departments adjacent to active fires. This might be best achieved through joint cooperation with the RDCK, the communities, Fire Protection Areas and the MOFR.	Fire Weather is currently communicated by BCWS. Some but not all information regarding wildfires is also shared. Additional work required. See recommendation 24, Table 10.
#23	Consideration should be given to developing community evacuation plans in each Fire Protection Area. Appropriate evacuation routes should be mapped, considering Disaster Response Routes (DRR). Major evacuation routes should be signed and communicated to the public. The plan should identify loop roads and ensure access has sufficient width for two-way traffic. In addition, alternative emergency responder access should be considered.	Harrop Procter has a community evacuation plan in place. Additional work required. See recommendations 31 and 33, Table 11.

Recommendation		Progress
#24	Balfour-Harrop, Beasley, Blewett, and North Shore FPAs (CWPP recommendation #24): The RDCK should work towards improving access in identified areas that are considered isolated and that have inadequately developed access for evacuation and fire control Blewett FPA (CWPP recommendation #21): The RDCK should consider reviewing road accessibility for emergency vehicles to ensure homes are accessible and safety of emergency personnel is not compromised.	The RDCK is working towards improving access in identified areas that are considered isolated and that have inadequately developed access for evacuation and fire control Work on this is ongoing on. See recommendation 32 and 33, Table 11.
#25	The Regional District should consider providing an accurate and detailed set of maps to all Fire Protection Area Fire Departments. Maps should provide details related to access and evacuation routes, water supply, subdivision layout and the fire risk mapping developed as part of this project. Periodic updates to the mapping will be required in areas of the Regional District where development is active.	Most of these maps have been provided including water supply, subdivision layout and evacuation routes. Fire risk mapping has not yet been provided (see recommendation .31, Table 11).
#26	During a large wildfire it is possible that critical infrastructure within the community could be severely impacted by smoke. It is recommended that contingency plans be developed in the event that smoke causes evacuation of the community's incident command centres. The RDCK should co-operate with Provincial and municipal governments to identify alternate incident command locations and a mobile facility in the event that the community or Fire Protection Area is evacuated.	These alternate incident command locations have not been identified. The RDCK is working with BC Parks, City of Nelson, forest licensees, MFLNRO and other stakeholders to consider such issues as contingency plans and alternate incident command locations.
#27	New subdivisions should be developed with access points that are suitable for evacuation and the movement of emergency response equipment. The number of access points and their capacity should be determined during subdivision design and be based on threshold densities of houses and vehicles within the subdivisions.	This has not been completed. The RDCK has limited jurisdiction over subdivisions developed with access points suitable for evacuation and the movement of emergency response equipment. Additional work required. See recommendations 30-33, Table 11.
#28	Where forested lands abut new subdivisions, consideration should be given to requiring roadways to be placed adjacent to those lands. If forested lands surround the subdivision, ring roads should be part of the subdivisions design. These roads both improve access to the interface for emergency vehicles and provide a fuel break between the Wildland and the subdivision.	This has not been completed. Additional work required. See recommendations 31-33, Table 11.

Recommendation		Progress
#29	The RDCK should consider conducting a review of critical water infrastructure to determine whether water flow and pressure will be adequate in an interface fire emergency. The review should consider water supply, water delivery volumes/pressure, pumping capacity and vulnerability of reservoirs.	This has not been completed. See recommendation 9 and 10, Table 7.
#30	The RDCK should review the safety of current water fill locations and procedures related to water transportation to ensure that tendering is safe and as efficient as feasible.	This has not been completed. See recommendations 10-11, Table 7.
#31	The RDCK should consider establishing standpipes at safe locations adjacent to bridges and other water access points. Gravity fill tanks or permanent pumps should be established in strategic locations where tendering distances and return times are prohibitive.	This has not been completed. See recommendations 9, Table 7.
#32	Given the values at risk identified in this plan, it is recommended that, during periods of high and extreme fire danger (danger class V), individual Fire Protection Areas work with adjacent municipalities, the RDCK and the MOFR to maintain a local helicopter with a bucket on standby within 30 minutes of each community.	This has not been achieved. The RDCK is working with BC Parks, City of Nelson, forest licensees, MFLNRO and other stakeholders to ensure preparedness for periods of high or extreme hazard.
Training/Equipment		
#33	The following training should be maintained/considered: 1) Continue the S-100 course training on an annual basis; 2) Regional Parks outside staff should be trained in the S-100 course; 3) A review of the S-215 course instruction should be given on a yearly basis; 4) The S-215 course instruction should be given to senior fire officers on an ongoing basis; and, 5) Incident Command System training should be given to all rural Fire Chiefs. Funding for proper training and compensation for members who wish to take S100 or S215 should be provided by the RDCK.	WFF SPP and S-100 are mandatory training. The SPP 115 training is offered through the Office of the Fire Commissioner. ICS 100 training is mandatory for all fire service personnel. ICS 200 through ICS 400 training is offered regionally. Further work required. See recommendation 25, Table 10 (and 2008 recommendation #21 above).

Recommendation		Progress
#34	Fire Departments should meet with the MOFR prior to the fire season to review the Incident Command System structure in the event of a major wildland fire. It may be most effective for this to occur at a regional level, these agencies should work in conjunction with Regional District staff to establish clear command structures and lines of communication with MOFR to ensure efficient operations during wildfire events. This should include designated radio channels and operating procedures.	An effective line of communication exists between BCWS and RDCK Fire Departments through the Zone 4 BC Fire Chiefs Association, Central Kootenay Fire Chiefs Association and individual meetings between Fire Halls and Regional Staff.
#35	The RDCK and Fire Departments should consider reviewing existing inventory of interface fire fighting equipment to ensure that items such as large volume fire hose, portable pumps and firefighter personal protection (PPE) are adequate to resource the interface area. Fire Department personnel should have correct personal protective equipment and wildland fire fighting tools. Hoses, pumps and other equipment should be compatible with MOFR wildland fire fighting equipment.	This is happening on an ongoing basis. See recommendation 28, Table 10 regarding opportunities for obtaining discount volumes of hose for interface fires.
#36	The RDCK should consider working with Fire Protection Areas and adjacent municipalities to coordinate the creation of sub-regional mobile caches of wildland fire fighting equipment. This would reduce the cost of purchasing and maintaining the cache and provide additional resources in the event of a wildfire.	This is in place throughout the RDCK with four Structural Protection Units in Beasley (Type 2), Kaslo, Pass Creek and Canyon / Lister Fire Halls (Type 3). See recommendation 27, Table 10.
#37	The Regional District should consider retaining a contract fire fighting crew of 20 fire fighters to assist MOFR crews in initial attack and fire containment during periods of high and extreme hazard. These resources could be made available as needed throughout the district for both fire fighting and fuel hazard mitigation. (Recommendation included in all CWPPs except Blewett FPA)	Currently the RDCK is responsible for fire fighting in Fire Protection Areas. BCWS retains contract crews. See recommendation 29 for duty officers, Table 10.
Vegetation (Fuel) Management		

Recommendation		Progress
#38	The RDCK should investigate the potential for fuel management programs. A number of high hazard areas immediately adjacent to or embedded in the community have been identified as part of the wildfire risk assessment. These high hazard areas should be the focus of a progressive thinning program that is implemented over the next five to ten years. Thinning should be focused on priority 1 and 2 areas identified in Map 7 of the respective CWPPs A qualified professional (RPF), with a sound understanding of fire behaviour and fire suppression, should develop treatment prescriptions. Any treatments that take place on sloped sites must be prescribed with consideration given to slope stability. Where slope stability may be an issue, a Professional Geotechnical Engineer should review the treatment prescription. The RDCK should also investigate the potential for working with private land owners to address hazardous fuels on private land. (Corresponds to recommendation #37 in the Blewett FPA CWPP)	To date 159.8 ha have been treated on areas identified in the 2008 CWPP as priority 1 and 2 areas (see Table 13). Fuel Management Prescriptions have been developed for additional priority 1 and 2 areas and are pending funding for implementation. This work is ongoing. See Table 12 for a summary of areas identified for treatment at the landscape level in Area E.
#39	The mountain pine beetle has the potential to cause significant changes in fuels and fire risk over the next decade and beyond. Where applicable, fuel treatment strategies should target removal of beetle susceptible lodgepole pine. The RDCK should consider working with the province and private land owners to monitor and quantify changes in fire risk associated with the mountain pine beetle outbreak. (Corresponds to recommendation #38 in the Blewett FPA CWPP)	To date 159.8 ha have been treated on areas identified in the 2008 CWPP as priority 1 and 2 areas including stands with mountain pine beetle (see Table 13). Fuel Management Prescriptions have been developed for additional areas affected by MPB and are pending funding for implementation. This work is ongoing. See Table 12 for a summary of areas identified for treatment at the landscape level in Area E.
#40	The Provincial government and the UBCM have funding programs specifically to address wildfire hazard and the wildfire hazard associated with Mountain Pine Beetle on Crown and Municipal Lands. The RDCK should consider applying for UBCM funding to carry out fuel treatments that will strategically mitigate fuel hazard within the 2 km of the Fire Protection Area. The priority 1 treatment area identified in the respective CWPPs would be the focus for funding. (Corresponds to recommendation #39 in the Blewett FPA CWPP)	To date 159.8 ha have been treated on areas identified in the 2008 CWPP as priority 1 and 2 areas including stands with mountain pine beetle (see Table 13). Fuel Management Prescriptions have been developed for additional areas affected by MPB and are pending funding for implementation. This work is ongoing. See Table 12 for a summary of areas identified for treatment at the landscape level in Area E.

Recommendation		Progress
#41	The RDCK should investigate the potential for additional funding options, such as a cogeneration plant, composting program or a minimal increase in property taxes, which could be used to encourage and aid property owners with fuel mitigation and to facilitate treatments on public lands. Efficiencies may be gained if this is coordinated at a Regional level and shared with RDCK municipalities. (Corresponds to recommendation #40 in the Blewett FPA CWPP)	The RDCK has made some progress on this. A Biomass Feasibility Study for Area E was completed in May 2011, identifying the amount of biomass available, including from interface treatment areas, and summarizing potential markets. Further work is required.
#42	The RDCK should investigate the potential for working with the Ministry of Transportation and Highways to maintain major roadways as fuel breaks through communities. This would be achieved by thinning the understory and raising the height to live crown on either side of the roadway to a depth of 50 m. (Corresponds to recommendation #41 in the Blewett FPA CWPP)	Limited progress has been made. See recommendation 7, Table 6 for a summary of the proposed approach to the collaborative approach identified in this CWPP update.
#43	The RDCK should investigate the potential for partnering with residents to promote treatment of public lands adjacent private property. Private land owners could be encouraged to not only clean their own yards of debris and brush but also to be responsible for the removal of debris and brush from public lands immediately adjacent to them to a depth of 20 meters. Removal of material could be coordinated with a spring yard waste pickup program. (Corresponds to recommendation #42 in the Blewett FPA CWPP)	Limited progress has been made to date. See recommendation 14, Table 8.

Recommendation		Progress
#44	The RDCK should work with FortisBC to ensure that transmission infrastructure within the Fire Protection Area can be maintained and managed during a wildfire event. Maintaining the transmission corridor to a fuelbreak standard will provide the community with a more reliable power supply that is less likely to fail during a fire event and will reduce the probability of fire spreading into the community. The RDCK should work with FortisBC to ensure that the right-of-way vegetation management strategy includes consultation with the community and the fire department so that wood waste accumulations do not contribute to unacceptable fuel loading or diminish the ability of the right-of-way to act as a fuel break. (Corresponds to recommendation #43 in the Blewett FPA CWPP and #44 in the Balfour/Harrop and North Shore FPA CWPPs)	Limited progress has been made to date. See recommendation 7, Table 6 for a summary of the proposed approach to the collaborative approach identified in this CWPP update
#45	The RDCK should prioritize the development of a fuelbreak network that builds on existing breaks such as the FortisBC Transmission Corridors and major roads running through the Fire Protection Areas. (Corresponds to recommendation #44 in the Beasley and Blewett FPA CWPPs and #45 in the Balfour/Harrop and North Shore FPA CWPPs)	To date 159.8 ha have been treated on areas identified in the 2008 CWPP as priority 1 and 2 areas (see Table 13). Fuel Management Prescriptions have been developed for additional priority 1 and 2 areas and are pending funding for implementation. This landscape level approach is the focus of work for the revised CWPP.
Wildfire Rehabilitation Planning		
#46	Individual Fire Protection Areas should develop plans for post fire rehabilitation that considers the procurement of seed, seedlings and materials required to regenerate an extensive burn area (1,000-5,000 ha). The opportunity to conduct meaningful rehabilitation post fire will be limited to a short fall season (September to November). The focus of initial rehabilitation efforts should be on slope stabilization and infrastructure protection. These issues should form the foundation of an action plan that lays out the necessary steps to stabilize and rehabilitate the burn area. (Corresponds to recommendation #45 in the Beasley and Blewett FPA CWPPs and recommendation #46 in the Balfour/Harrop and North Shore FPA CWPPs)	Limited progress has been made to date. See recommendation 13, Table 7 regarding completing detailed hazard assessments and developing response plans for stabilization and rehabilitation of burn areas in watersheds that are vulnerable to post-wildfire debris flows and floods.