Hedley & Upper Similkameen Indian Band

FireSmart Community Assessment Report

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EXECUTIVE SUMMARY

Wildfire seasons in British Columbia (BC), over the past two decades, have increased in numbers and the area burned across the province. Large expenditures in wildfire suppression and forest resource losses have occurred in 2003, 2004, 2009, 2010, 2014, 2015, 2017 and 2018.This is the result of two significant factors: 1) increases in fuel loads associated with long-term fire suppression and insects and disease; and 2) a period of increasing drought during the fire season.

Hedley Improvement District ('Hedley', or 'HID') located in the Similkameen valley in south central BC is situated along Highway 3 ('Highway 3', or 'Crowsnest Highway') in a wildfire prone environment, approximately 100km southwest of where the 2003 Okanagan Mountain Park wildfire occurred. This fire, along with others since, have resulted in structural losses in the Okanagan-Similkameen. The fuel, weather and topography conditions that created the 2003 wildfire still exist in south-central BC, increasing nearby communities' vulnerability to wildfires. Conditions that exacerbate the wildfire risk include the development of vulnerable homes and properties in the wildland urban interface (WUI) zone, and the ingrowth of flammable conifer vegetation in areas previously occupied by low density forests, grass and shrub communities as a result of decades of fire suppression. Hedley Improvement District has a low population and is relatively isolated from other communities except for the Upper Similkameen Indian Band (USIB) population. The nearest municipalities are Princeton to the west (38km), and Keremeos to the east (29 km), both along the Crowsnest Highway. A wildfire event occurring in or near Hedley and the USIB could also impact the area as a whole by blocking the main evacuation route (Highway 3) and by disrupting the delivery of infrastructure services (*i.e.* power, water), while putting the safety and well-being of residents and visitors of the region at risk. These consequences to values at risk from wildfire exist, irrespective of fire size, because damages caused from any fire have the potential to ripple throughout the region. The town of Hedley and the Upper Similkameen Indian Band reservation ('Study Area') is situated in a landscape that supports higher levels of extreme fire behavior, meaning the historical intensity of fires may not match the current and evolving state of fire behaviour. Challenges for the Study Area exacerbating the wildfire threat are:

- Geographic separation from larger communities with better fire suppression services,
- A small population of residents, and
- Limited fire suppression resources including staff, training and equipment.

In recognition of this risk, residents of Hedley and the USIB, with support from the Regional District of Okanagan-Similkameen (RDOS) are seeking FireSmart Canada Community recognition status to incrementally transition their community through homeowner action and collaboration with partners to a wildfire resilient community that effectively addresses the wildfire risk of the environments they reside in. In support of this initiative, B.A. Blackwell and Associates (Blackwell) are assisting in the development of a Community Assessment Report, which is the first step in being recognized as a FireSmart Canada Community. Twenty-nine (29) recommendations have been developed for the neighborhoods and are found in Table 1.

Table 1: Summary of Recommendations

Priority Rating	High	Moderate	Low
	A	B	C
	Within 6 months	Within 2 years	Within five years

Item	Recommendation	Priority Rating	Responsibility
Structure Protection (Section 5.1)			
1	Test and operationalize the refurbished Mark 3 pump to test that it is in good working order for its effective use in fire suppression prior to the 2021 fire season. If pressure, flow or other issues are observed, set in motion the process to source and identify the price of a new pump and avenues to secure grant monies suitable for equipment. In addition, the mutual aid agreements with Princeton and Keremeos should be reviewed to negotiate if the sharing of a Mark 3 pump is possible until Hedley Fie Department (HFD) procures its own.	**A**	Hedley Fire Department
2	To protect vulnerable (flammable) homes constructed of wood which are too costly to replace and re-clad with ignition resistant exterior materials, apply for funding from the UBCM's funding (Union of BC Municipalities) Community Resilience Investment (CRI) program to coordinate exterior rooftop sprinkler kits to community residents (at a cost). Sprinkler kits must be installed and tested at the beginning of every wildfire season (generally May – September) and are effective only for homes and properties which have been modified to FireSmart standards (rated roof, minimal wood siding, no open eaves, no coniferous vegetation within 10m of the home).	**B**	Hedley / USIB FireSmart Community Group in collaboration with the RDOS
3	The FireSmart Community Board, when established, should simplify the range of FireSmart tasks for homeowners by identifying and prioritizing tasks homeowners are capable of implementing themselves at very little cost (i.e. clean up of debris, wood around 1.5m zone directly adjacent to the structure, mowing grass throughout fire season, covering vents with wire mesh to exclude embers), identifying tasks outside of their ability or cost range (i.e. tree removal, pruning but these may be available for a local rebate program)., and developing a strategy for providing assistance to plan for and manage larger items (i.e. roof replacements, application of fire resistant coating to wood cladding).	**A**	Hedley / USIB FireSmart Community Board

Item	Recommendation	Priority Rating	Responsibility
4	A member of the FireSmart Community Board, Hedley Fire Department staff or volunteer firefighter or other community / Band resident should undertake free training to become a Local FireSmart Representative (LFR) capable of conducting FireSmart home assessments. These assessments should identify the hazardous components on the home and develop short and long-term strategies to convert them over time to fire-resistive materials with roof replacements as a first priority, followed by replacement of exterior siding and decking with fire resistant materials.	**B**	Hedley / USIB FireSmart Community Board; Hedley Fire Department
5	Work with the RDOS to enforce the Untidy and Unsightly Premises Regulatory Control Service Establishment Bylaw No. 2520, 2010 for Hedley. The purpose is to address complaints and non-compliance during the wildfire season. Notification format, the number of reminders allowed, and time periods allowed for compliance must be stipulated. This bylaw must be developed in coordination with the community to engender buy-in, educate, and understand the purpose is for the overall safety of the community as a whole. Conversations / negotiations with individual property owners may be necessary to address their concerns and promote willingness to comply. The main goal of developing this bylaw is to encourage and support residents to take responsibility for the care and upkeep of their property.	**C**	Hedley Improvement District / RDOS
6	Purchase or share a sprinkler protection unit (SPU) which should have the capacity to action 30-40 homes	**C**	Hedley Improvement District / RDOS
Vegetation Management – Ornamental Landscaping (Section 5.2.1)			
7	Individual homeowners should incorporate FireSmart landscaping principles within their property and remove all flammable coniferous shrubs and hedges (i.e. juniper, cedar hedging) in a 10 m radius around the home footprint. Larger size coniferous trees may be retained depending upon size and proximity to the home. A larger tree can generally be pruned if no more than 35% of its live foliage is removed. If larger trees are capable of being pruned raise the crown base height to a minimum of 3 m above the ground surface. All coniferous foliage above and to the sides of the home must have a separation distance of 5m.	**B**	Hedley / USIB FireSmart Community Board
8	Homeowners should remove bark mulch, wood chips, and other flammable surface ground coverings in a 2m radius around the home, outbuildings, decks and stairs. These flammable materials are significant ignition sources which often result in fire spread into the home and represent FireSmart Priority Zone 1a	**A**	Hedley / USIB FireSmart Community Board

Item	Recommendation	Priority Rating	Responsibility
9	Encourage individual homeowner participation in removing excess and flammable vegetation from their property by organizing a neighbourhood chipping program, free yard waste drop-off, a scheduled garden debris burning weekend with neighbourhood representatives. Also include distribution of additional educational materials, such as FireSmart landscaping design and FireSmart plant selection information.	**A**	Hedley / USIB FireSmart Community Board; collaborate with the RDOS to organize a neighbourhood chipping day to remove debris
10	Develop an outreach plan to residents to raise public awareness around fire hazard on their property and within their neighbourhood and the actions they can do to reduce the risk. This plan should incorporate public awareness around hazard on their property and within their neighbourhood, and landscaping covenants triggered by re-builds or major renovations which must install FireSmart landscaping. Present opportunities for affordable, aesthetic, low flammability landscaping options that are adapted to the climate (Canadian Plant Hardiness Zone 5a). One such format could be a FireSmart preparedness information day held at the beginning of each fire season in a local venue.	**B**	RDOS to take the lead with assistance from the Hedley / USIB FireSmart Community Board and Hedley Fire Department
Vegetation Management – Fuel Management (Section 5.2.2)			
11	Work with the RDOS to apply to the provincial Community Resilience Investment (CRI) program through the FireSmart Community Funding & Supports program to increase community resiliency by undertaking community-based FireSmart planning and activities that reduce the community's risk from wildfire. For homeowners on private land local rebate programs are available to those who complete eligible FireSmart activities on their own properties.	**B**	RDOS to take the lead with assistance from the Hedley / USIB FireSmart Community Board
12	In order to reduce the ignition of spot fires during an ember shower becoming rapidly spreading surface fire throughout the community, build an inter-community initiative to control and manage grass during the fire season. This would be divided into two separate categories: 1) Improvement District / Indian Band public or common areas, including road rights-of-way and lane ways; and 2) private property edges adjacent to roads managed by and owned by residents. In addition, explore the feasibility of developing a fire break / path of mown grass and removal of hazardous vegetation and road debris (cars) to act as a fuel break around the community perimeter.	**A**	Ministry of Transportation and Infrastructure (MoTI); Hedley Improvement District / USIB / Hedley Fire Department

Item	Recommendation	Priority Rating	Responsibility
13	Due to dense conifer regrowth at the north end of the study area and along the bench east of Hedley Creek, which has grown into dense hazardous fuel types. Fuel treatments by the land owners should consist of thinning smaller stems (<12.5cm diameter at breast height [DBH]), raising the crown base heights of individual trees by pruning the lower branches up to a height of 2m, and removing needles / surface litter and disposing offsite (no dumping). A qualified professional (QP) should be hired to develop a fuel management prescription and coordination with the land owners is necessary. UBCM funding available for fuel treatment works on public land.	**C**	RDOS / Consultant hired to develop fuel management prescriptions
Access and Evacuation (Section 5.3)			
14	Develop an evacuation strategy. Designate official evacuation route(s), sign, and ensure they are kept free and clear of debris and unmown, cured grass. Entry points and access routes should have clearly visible signage so routes can be navigated safely during a wildfire to residents and visitors unfamiliar with the area. Access points and evacuation routes should be developed in conjunction with the RDOS and shared with the BCWS, Emergency Management BC, and residents alike. Development of an evacuation plan may be available for funding through the UBCM, if HID and the RDOS conclude that their existing evacuation plan is not sufficient for the needs of the Hedley / USIB community.	**B**	Hedley Fire Department / Hedley Improvement District / RDOS
15	When developing an evacuation plan, accommodate the need of residents who may have mobility challenges, health issues, or are living alone. This plan should incorporate a shared responsibility for ensuring these individuals will receive timely information updates, regular check ins by neighbours, and assistance during evacuation. One approach could involve stratifying Hedley into different zones comprised of a subset of properties. Within each zone there will be a Zone Leader. Responsibilities for checking in on the welfare of each resident will be shared amongst everyone in the zone or designated to one or two individuals that will report back to the Zone Leader.	**B**	Hedley / USIB FireSmart Community Board
16	in order to test the efficacy and safety of evacuation routes before an actual emergency occurs, conduct mock evacuation exercises in the dark to mimic smokey conditions causing poor visibility and disorientation. These exercises should be organized, coordinated and conducted with the NFD and RDOS.	**C**	Hedley Improvement District / Hedley Fire Department / RDOS / BCWS

Item	Recommendation	Priority Rating	Responsibility
17	Integrate an alternative evacuation route along the Hedley Nickel Plate resource road which begins on the north side of Hwy 3 at a location 2.8 km east of Hedley. Alternatively, explore the possibility of staging a temporary safe zone if Hwy 3 to the west or east is blocked by wildfire.	**C**	RDOS / Hedley Improvement District
18	HFD should set up communication plan and required communication equipment needed for ongoing and regular contact with BCWS in the event of an emergency. This plan should be reviewed every year prior to the start of the fire season, and update personnel, contacts, scope of responsibilities for HID and BCWS, hierarchy of command and communication, and external emergency response agencies.	**B**	Hedley Fire Department / BCWS / Keremeos Fire Department
19	Develop an emergency communication plan and network of distributing individuals to ensure all members of the community are apprised of evacuation alert or evacuation order situations.	**B**	Hedley / USIB FireSmart Community Board
20	Hedley / USIB should engage in regular communication with the BCWS Penticton Fire Zone (K5) to foster a strong relationship and identify potential cooperative wildfire risk reduction opportunities. This could include communication protocols between the RDOS, BCWS, and Hedley / USIB during an emergency to formulate tactical responses, evacuation procedures, or disseminate information on evolving situations.	**B**	Hedley Fire Department / RDOS / BCWS
21	The residents of Hedley and the USIB should designate a community coordinator to set up a neighbour communication and alerting system to ensure that all residents receive emergency information in a timely way. The system should integrate multiple forms of communication including door checks, phone calls, social media to capture everyone irrespective of age, mobility and access to digital sources. A good neighbour system may also suffice and could be that the residents of each block communicate with one another and look out for one another during the fire season and should be reviewed and coordinated at the community level at the start of each fire season so everyone is aware and clear of their responsibility. This kind of system is applicable for all emergencies.	**A**	Hedley / USIB FireSmart Community Board / RDOS Emergency Coordinator

Item	Recommendation	Priority Rating	Responsibility
22	To address the challenges associated with leveraging revenue from a small population of people situated in a wildfire prone environment, Hedley in collaboration with the RDOS should • apply to the UBCM for FireSmart funding for FireSmart activities on private land (coordination of community FireSmart events, community chipping days, and / or a FireSmart local rebate program); and • In collaboration with the RDOS, apply for Wildfire Risk Reduction (WRR) program funding for the treatment of hazardous fuels on public land as identified in the 2020 RDOS Community Wildfire Protection Plan. Alternatively, explore the possibility of staging a temporary safe zone if Hwy 3 to the west or east is blocked by wildfire.	**B**	Hedley Improvement District / RDOS
Critical Infrastructure (Section 5.4)			
23	To address water capacity shortages to fight multiple fires, HID should explore additional measures to provide secondary water supply sources and homeowner self-sufficiency, by applying for funding through FireSmart Canada and / or the UBCM to administer a program that allows the purchase of 500-gallon cisterns for individual homes. Participating homeowners could complement this with the purchase of rooftop sprinkler kits, garden hose and small pump directly connected to the cistern.	**C**	Hedley Improvement District / RDOS / Hedley/USIB FireSmart Community Board
24	Develop a strategy to manage wood power poles and electrical outages and disruption of power. Purchase or re-purpose a back-up generator for the reservoir in the case of a power outage.	**C**	Hedley Improvement District
25	Explore the feasibility of funding future water system improvements through the Regional District of Okanagan Similkameen by the Hedley Improvement District amalgamating with them. This would allow a steady source of funding as well as the provision of an engineer to plan and run projects.	**C**	Hedley Improvement District / RDOS
26	Explore the feasibility of moving Hedley's potable supply to the Similkameen aquifer meaning the Upper Similkameen Indian Band would become the service provider for the water supply. Not only would this provide a safer level of potable water as the Similkameen aquifer has less arsenic in it, but it would also allow the 60 hp pump for the Hedley Creek aquifer to become solely available for water suppression services.	**C**	Hedley Improvement District
27	Specify a suitable area of Hedley Creek to designate the Keremeos water tanker and bladder to draw water easily. The designated could include a engineered headwall to support the tanker or a stand pipe possessing fittings to attach hoses.	**B**	Hedley Improvement District / Hedley and Keremeos Fire Departments

Item	Recommendation	Priority Rating	Responsibility
Next Steps (Section 8.0)			
28	In order to facilitate connection with all members of the community, and to avoid reliance on digital communication methods as the primary means for disseminating information, the Community Group should consider tasking themselves, or another small group of interested residents to spread the word through face to face meetings, door to door visits or phone calls to those community members without access to digital resources. Both digital and non-digital media and methods can be used to comprehensively educate and inform wildfire protection and preparedness issues and initiatives to residents.	**B**	Hedley / USIB FireSmart Community Board
29	The FireSmart Committee should develop a community newsletter and posters (digital and hardcopy versions) and a Hedley Fire Department facebook page as a means to inform, educate, and reach out to all community members irrespective of their access to the internet or personal computer / handheld device about ongoing and upcoming wildfire information and FireSmart community events. In addition, FireSmart information, fire danger ratings and FireSmart community initiatives can be displayed on bulletin boards at HFD, Hedley Museum, Hedley Market, and the Seniors' Centre, as well as the Upper Similkameen Community Band Office and Community Building.	**B**	Hedley / USIB FireSmart Community Board

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COMMONLY USED ACRONYMS

BCWS	British Columbia Wildfire Service
BEC	Biogeoclimatic Ecosystem Classification
CAR	Community Assessment Report
CFFDRS	Canadian Forest Fire Danger Rating System
CRI	Community Resilience Investment Program
FBP	Fire Behaviour Prediction System
FCP	FireSmart Community Plan
FSCCRP	FireSmart Canada Community Recognition Program
HFD	Hedley Fire Department
HID	Hedley Improvement District
HIZ	Home Ignition Zone
LFR	Local FireSmart Representative
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations, and Rural Development
NFPA	National Fire Protection Agency
RDOS	Regional District of Okanagan Similkameen
UBCM	Union of British Columbian Municipalities
USIB	Upper Similkameen Indian Band
WUI	Wildland Urban Interface

COMMONLY USED DEFINITIONS

Combustible describes a material that must usually be heated before it catches on fire at temperatures above normal (~38° to ~93°)

Fire resistant: refers to structures and materials that prevent or retard the passage of excessive heat, flames or gases under conditions of use

Fire resistive: means construction materials designed to provide reasonable protection against fire.

Flammable: describes a material that will catch on fire at a lower flash point closer to normal temperatures (less than ~38°)

Flaming combustion: is the chemical process in which fuel oxidizes to produce visible flames and plume

Ignition: refers to the process initiating combustion or catching fire

Risk: the term used to describe the exposure to the chance of injury or loss; hazard or dangerous chance

Threat: describes a situation or activity that could result in harm or danger

1.0 INTRODUCTION

The FireSmart Canada Community Recognition Program (FSCCRP) is designed to provide an effective management approach for preserving wildland living aesthetics while reducing community ignition potential and subsequent spread of fire through the community during a wildland urban interface fire. The program can be tailored for adoption by any community and/or neighbourhood association that is committed to ensuring its citizens maximum protection from wildland fire. An effective way for communities to address wildfire hazards, coalesce resident's concerns, and gather momentum for action is by achieving FSCCRP status. The first step on the path towards gaining FSCCRP is the preparation of a community assessment report prepared by a Local Fire Smart Representative (LFR) to assess the overall wildfire risk conditions within and adjacent to the community.

The purpose of a Community Assessment Report (CAR) is to assess a study area's wildfire hazard and identify the components which contribute to the community's wildfire risk profile. The study area is composed of Hedley Improvement District and those portions of the Upper Similkameen Indian Band reservation lands (collectively referred to as the 'study area') that are within the Hedley Fire Protection area (Map 1). Once hazard and risks are defined, the community is able to move forward in developing a FireSmart Community Plan that will outline the actionable items the residents can implement over time in a collaborative manner, and updated and modified as needed over time.

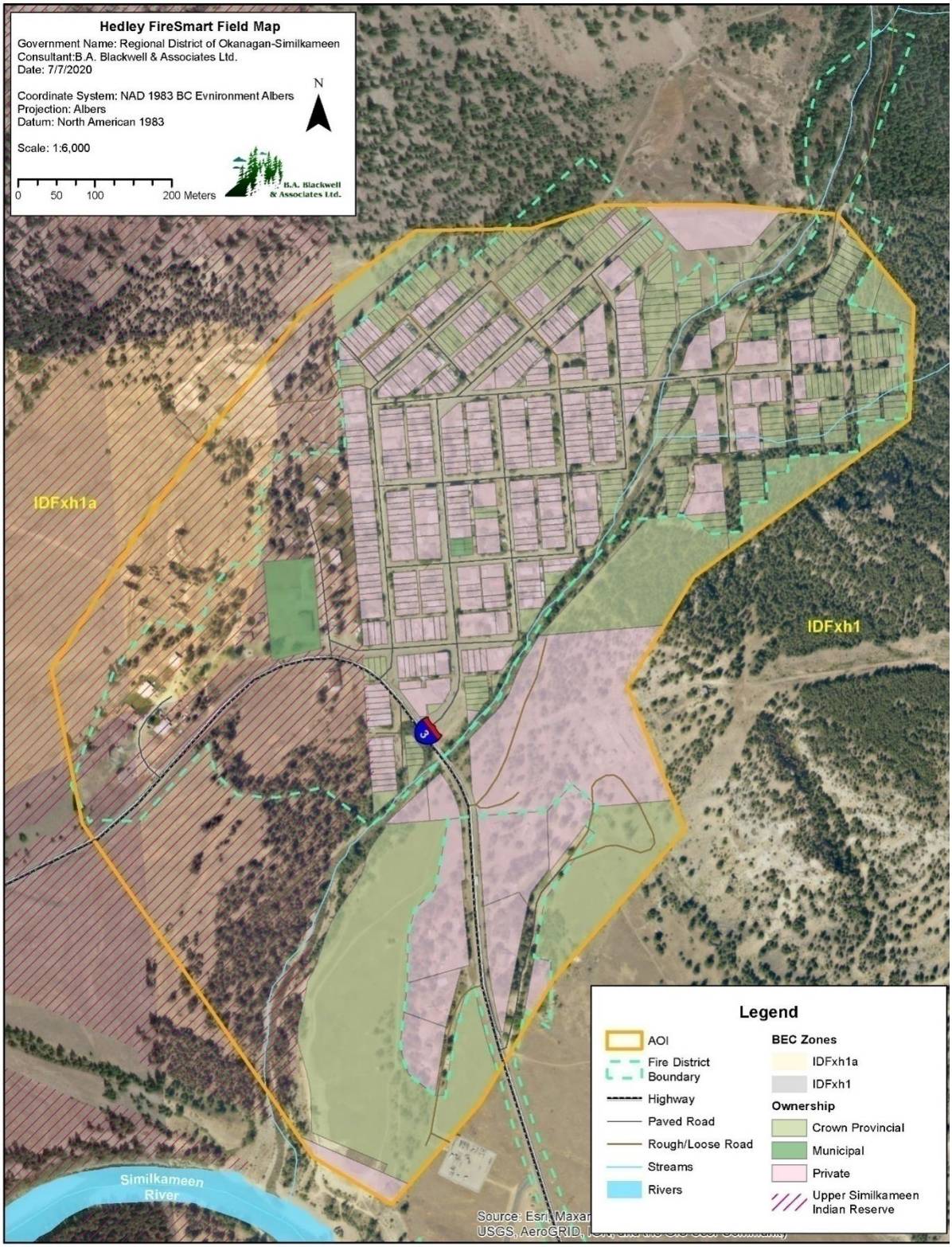
The development of a FireSmart Community Plan is not within the scope of the but rather is intended to be a resource to be used by residents of Hedley and the USIB to guide and support a gradual transition towards becoming a wildfire resilient community. Whereas Community Wildfire Protection Plans (CWPP) are larger scale wildfire management analyses, there are common elements shared with FireSmart Community Assessments that are usually conducted at the neighbourhood, strata or municipal scale. The Regional District of Okanagan Similkameen (RDOS) completed a CWPP in 2020 for the entire regional district, of which Hedley is included.

This CAR has been developed by B.A. Blackwell and Associates, who hold qualified Local FireSmart Representative (LFR) status, in consultation with the Hedley / USIB FireSmart Community Group and the RDOS. The process involved a presentation via videoconferencing to the FireSmart Community Group, and a Community Event open to all interested residents of both communities to share knowledge, generate dialogue, and devise solutions to address the wildfire threat. Considered a first step to achieving FSCCRP status, this CAR is the framework upon which the FireSmart Community Group can develop an achievable FireSmart Community Plan (and subsequent timeline for implementation of actionable items over the next 5-15 years – see the Executive Summary for a synthesis of recommendations). The longer time frame to implement some wildfire mitigation recommendations acknowledges that many homes are constructed of wood, and that replacing elements can be costly and only implementable when the lifecycle of assets (i.e. roofs) require replacement. Incremental build-out of these recommendation over a longer time span allows sufficient time for individual property owners of Hedley and the USIB as well as the Improvement District and the USIB Band Council to prepare and plan for the future.

Building on the CAR template required by FireSmart Canada, this report contains additional elements including a description and spatial analysis of the fire environment for this particular area of the Similkameen Valley. The associated maps illustrate fuel type, land ownership, surrounding topography, ignition and fire perimeter history, head fire intensity and rate of spread as these are important elements in defining risk to the study area from wildfire. In order to engage with residents effectively, a description of the fire environment and subsequent rationale for recommendations are both meaningful and practical measures to mitigate interface fire risks, with greater success.

Funding for the Hedley / USIB FireSmart Community Report project was provided by UBCM Community Resiliency Investment Program (2020) in the form of a FireSmart Planning Grant to the RDOS.

Doug Reeve RFT, ASct (Project Coordinator) and Dave Bodak (FireSmart Coordinator) of the RDOS who were key in providing background documentation and assisting in building community connections for this project. Hedley Fire Department (HFD) Manager Ken Hoyle coalesced the FireSmart Community Group, assisted BA Blackwell in their field visits and provided valuable insights of the HFD's emergency response and fire suppression capacity. Simon Harris, Manager of Utilities for Hedley Improvement District (HID) spent time describing the capacity and vulnerabilities of the water utility system. And finally, the participation of members of the FireSmart Community Group included Karen Cummings, Mike Galics, Michelle Jacobs, Meghan Garbett, Andy English and Terry McFarlane who communicated resident concerns, joined in phone calls and meetings; and helped to coordinate the Community Event held on October 3, 2020. All members provided invaluable information and insights into their community which can only be provided by those who live in the neighbourhood and experience first-hand the reality of living in a wildfire prone environment.

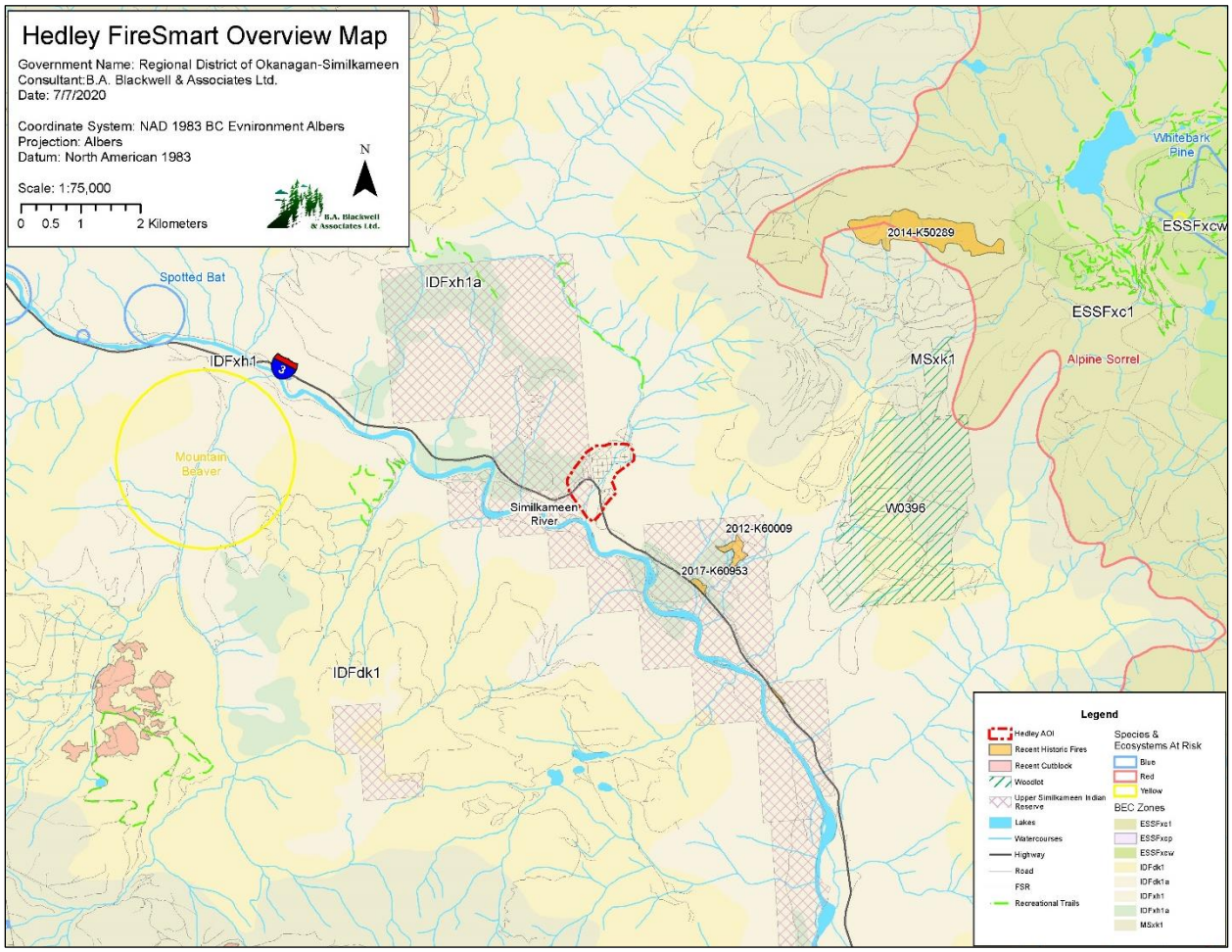


Map 1: The Hedley / USIB FireSmart Assessment study area is outlined in orange.

2.0 BACKGROUND

2.1 SITE DESCRIPTION AND PROJECT AREA

The town of Hedley is located in the Thompson Okanagan Natural Resource region and is part of the Cascades Natural Resource District (DCS). It is encompassed within the RDOS Electoral Area G and is situated at the foot of Nickel Plate Mountain in the Similkameen valley and along the Crowsnest Highway and adjacent to the Upper Similkameen Indian Band treaty lands within the southern interior of British Columbia. The nearest communities are Keremeos to the west (29 km) and Princeton to the east (38 km) (Map 2). Hedley / USIB study area has a relatively small population within an area of approximately 82, 6448 sq. m. (82.6 ha).



Map 2: Overview map of the study area (outlined in red) in relation to surrounding topography.

2.1.1 LAND STATUS

With a governing status of Improvement District, Hedley is an autonomous local government responsible for providing water distribution, fire protection, first response, and street lighting for the benefit of the residents of the town of Hedley.[1]The RDOS provides a range of other services including garbage and recycling, sanitary sewer, recreation and regional economic development. The Upper Similkameen Indian Band has reserve lands of approximately 3,000 ha and administers a range of services to its population including health, education, housing and water delivery.[2] The Hedley Fire Department (HFD) provides public safety services to the residents of Hedley and the Upper Similkameen Indian Band. Its mission is the protection and preservation of life and property for the residents in its fire protection area through the provision of fire suppression and emergency First Responder / Medical Assist services. However, the scope of paid-on-call firefighting duties for the Hedley Fire Department does not include entering building during a fire event.

Comprised entirely of volunteer firefighters, the majority of volunteers are older in age and weekly training sessions occur every Tuesday evening. The standard number of volunteer firefighters required for a community of this size is 15-16 firefighters. With a complement of only 9 firefighters, the current level of fire suppression resources is inadequate. The challenge with volunteer fire departments in general, is that the recruitment and retention of people is difficult because it is unpaid work yet relies on commitment. Hedley Fire Department has recently been approved for a new Fire Engine owing to the fact that resident's fire insurance rates have increased 2-3x (personal communication Fire Department manager, Mr. Ken Hoyle), and has furthermore, received a grant for $22,000 to upgrade and replace firefighting equipment and gear. The HFD's wish list for equipment includes: a WASP wildfire protection kit[3] (contains gutter mounts, sprinkler heads and hoses – each unit is capable of projecting a 10m spray radius), and tender truck due to small water holding capacity of fire engine. The tender would be deployed in one of the 4 low water pressure zones within Hedley. The Mark 3 pump has also recently been repaired and refurbished but has not been operationalized yet at the time of the assessment to determine if it is in good working order.

Map 1 displays the extents of the Hedley Fire Protection Area outlined in a dashed blue line. There are two bylaws regulating fire protection services:

1. No. 215 Fire Regulation Bylaw – outlines powers of the fire chief with respect to inspecting properties for hazardous conditions, issuance of permits, accumulation of combustible materials on private property, the size of campfires, smoking regulations, and restrictions on open-air fires for burning wastes products including wood waste, green waste and construction materials;
2. No. 236 Fire Protection and Street Lighting Taxation Bylaw – stipulates the amount of taxation required to fund fire protection and street lighting services for Hedley.

[1] Hedley Improvement District: https://www.hedleyimprovementdistrict.ca . Retrieved September 15, 2020.
[2] Upper Similkameen Indian Band: https://www.bcafn.ca/first-nations-bc/thompson-okanagan/upper-similkameen
[3] Website for WASP kits: https://www.shop.waspwildfire.com/products/wasp-wildfire-community-pack5 . Retrieved September 22, 2020.

The 2016 Census Canada profile for Hedley tabulated a population of approximately 242 people, with the average age set at 57 years.[4] For the USIB, the British Columbia Assembly of First Nation's website states that a population of 57 people reside permanently (141 live off site) on the land base of 2,725.00 ha [5] with the greatest concentration of residents situated adjacent to Hedley. The total number of people contained within the Hedley Fire Protection Area is approaching 300 with a lesser number of parcels / dwellings. The majority of land within the Hedley Fire Protection Area is private property composed of smaller parcels and larger rural lots. Crown provincial is located in perimeter areas beyond private property boundaries. The province of British Columbia's Ministry of Transportation and Infrastructure has jurisdiction over and manages the local roads within Hedley, as well as Highway 3.

2.2 ECOLOGY

Ecosystems of BC are stratified by climate, soils, vegetation and topography in the Biogeoclimatic Ecosystem Classification (BEC) system of British Columbia. The climate of this region of south-central BC supports both grassland and forest ecosystems. The study area falls within the Interior Douglas Fir Biogeoclimatic Ecosystem Classification (BEC) system of British Columbia, specifically the Very Dry and Hot Interior Douglas Fire Variant (IDFxh1) and the Dry, and Cool Interior Douglas Fire Variant (IDFdk1). The IDF is characterized by warm, dry and relatively long summers (3-5months) with night-time frost occurrences, and cool winters cool with little snow. Situated in the rain shadow of the Coast Mountains, growing season soil water deficits are common in the IDF. The mean annual and summer precipitation averages for the IDFxh1 are 340 and 170 mm, and a mean annual precipitation average of 500 mm for the IDFdk1 (Meidinger and Pojar, 1991). The combination of drought conditions and the adjacency of Highway 3 increases the potential of human ignitions and the risk from wildfire.

The natural disturbance patterns for the Interior Douglas fir and adjacent Ponderosa Pine and Bunchgrass zones were similar. Historically they experienced frequent, low intensity fires prior to the fire-return interval being interrupted by contemporary forest management practices including forest fire suppression. Frequent, stand-maintaining fires consume understory fuels and the lower limbs of overstory conifers leaving the overstory canopy layer relatively intact. These frequent fires kept ladder fuels to a minimum and typically resulted in an open, park-like stand structure.

In the absence of frequent low-intensity fire regimes in the Hedley / USIB study area, small trees that would have typically been killed have established and the benchlands have steadily become ingrown with conifers over the last century. Over time, tree densities have increased forming thickets of even-aged stands with interlocking crowns which have the ability to spread fire through tree crowns, especially if it is wind-driven. Ponderosa pine needles and cones have accumulated on the ground which

[4] 2016 Census Canada profile for Hedley. Retrieved November 17, 2020 from: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=DPL&Code1=590115&Geo2=PR&Code2=59&SearchText=Hedley&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0 .

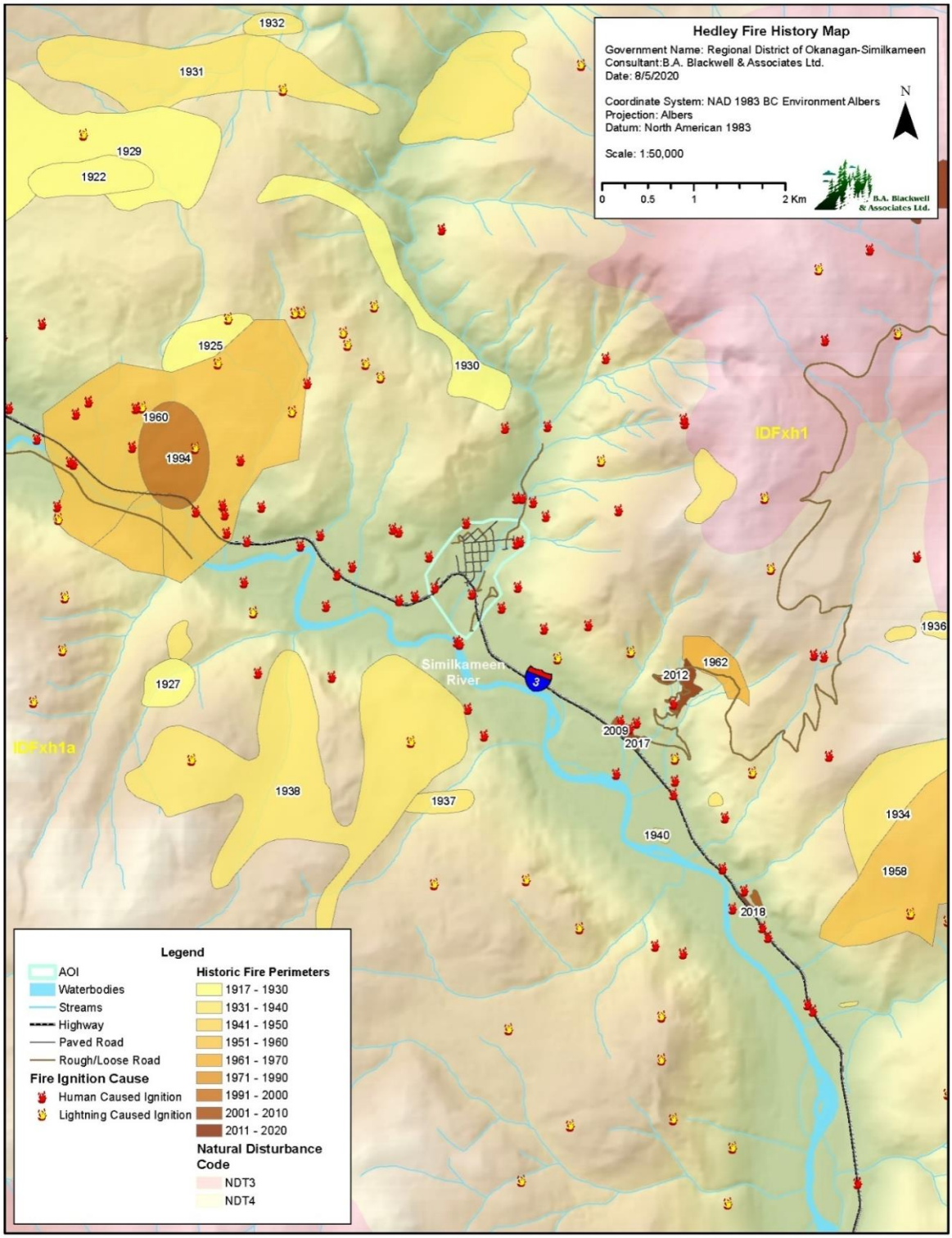
[5] British Columbia Assembly of First Nations. Retrieved November 17, 2020 from: https://www.bcafn.ca/first-nations-bc/thompson-okanagan/upper-similkameen

has resulted in higher fine fuel loading that are capable of transforming into from surface fires into to more dangerous crown fires. Human settlement patterns have expanded into the interface and compounded with the advent of routine and effective fire suppression has led to increasing wildfire risk for communities, residents and landholders. The prevalence of grasses in this ecosystem are a vegetation type that have a high rate of drying during the fire season, which quickly cures and turns this material into flashy fuels which can (and have) contributed to surface fire spread.

Regular irrigation practices during the fire season (which may be challenged during times of water restrictions) allow plants to retain a higher foliar moisture content (i.e. broadleaf-deciduous leaves as opposed to grass). If maintained in this state, the likelihood of fire spread or ignition from spotting is reduced.

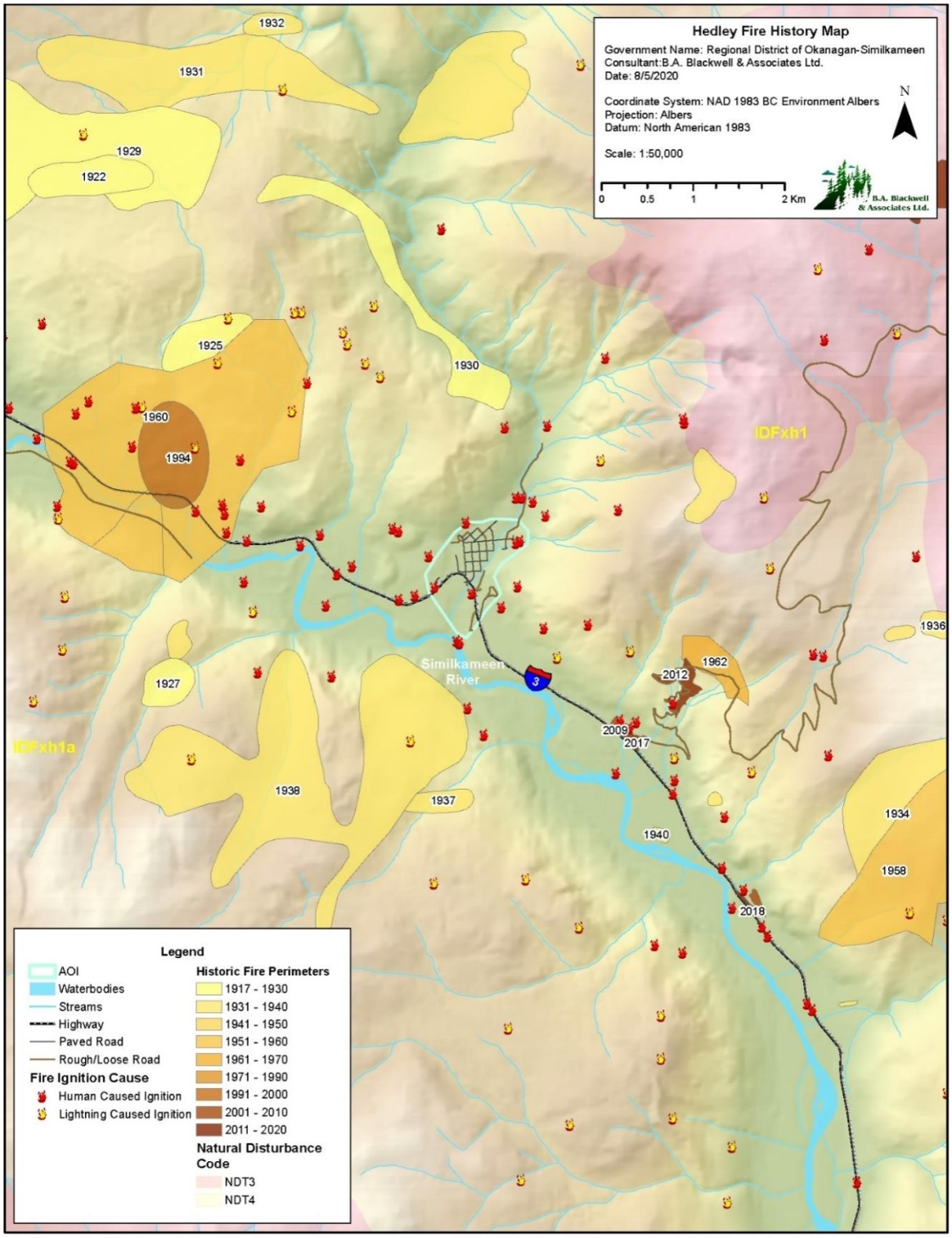
2.3 FIRE HISTORY

Between 1950 and 2019, a total 6,717 wildfires have been recorded within RDOS from which 54% are human-caused and 46% are caused by lightening. On average, 52 human and 45 lightning-caused fires occur each year. The 1970 and 1977 fire seasons had the highest number of occurrences of lightning-caused (254) and human-caused (103) fires, respectively. With pre-1950 perimeter data included, there are two prominent clusters of peaks of burned areas around mid to late 1920s and most recently in 2018. Area G follows a similar pattern, although the earlier burned areas were generally smaller than the recent ones and clustered between 1928 and 1934. The largest recorded wildfire in RDOS occurred in 1929 which burned 33,895 ha.



Map 3 shows the spatial distribution of ignitions (both human and lightning caused) within the study area and inclusive of a 5 km buffer area, and highlight the concentration of ignitions (primarily human-caused) along the Highway 3 corridor and resource/local road networks. Six human ignitions are

displayed in the study area proper. Whereas Ignitions from humans are concentrated along Highway 3 with a lesser density into the backcountry, lightning generally can occur everywhere in the 5 km buffer area, irrespective of land use. It is important to note that lightning ignitions on the hills and mountains above Hedley can grow into fires capable of producing ember show that rain down on the community. This illustrates the vulnerability of Hedley and the USIB to wildfire at a landscape level beyond the limits of the study area. Historically, a number of wildfires prior to 1960 have impacted the study area and 5 km buffer, and highlights that the footprint of historic fires surrounds Hedley / USIB lands and will likely continue into the future. In 1960, a fire spanning Hwy 3 burned an area of 490 ha, 3 km west of the study area. Between 1962 and 2018, 8 fires burned adjacent to Highway 3 and Hedley Nickel Plate Rd and were likely human-caused. Local topography, climate, and the predominance of cured grass capable of fuelling surface fires are also likely contributing factors. These more recent fires have been smaller (between 1 and 11); corresponding with the advent of advanced fire suppression, but combined with the steady rate of human ignitions that have occurred in recent decades (since 1960), illustrate that the risk from ignitions is still prevalent despite the efficacy of fire suppression when they do occur.



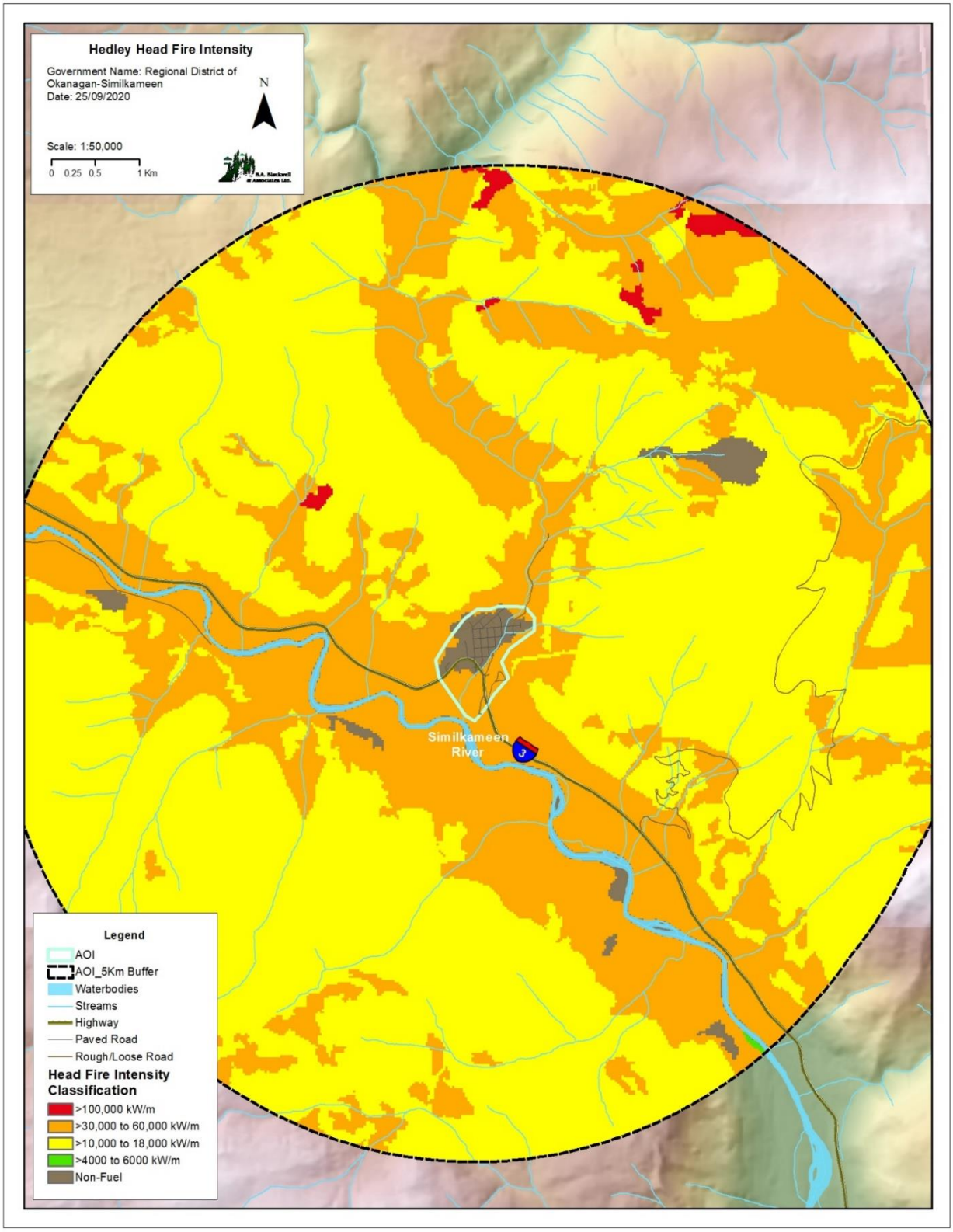
Map 3:Spatial history, by decade, of fires that have occurred between 1917 and 2020.

With regards to wildfire risk, the most important consideration in protection of the values at risk in the Hedley Fire Protection Area is fire behaviour potential. There are three elements to fire behaviour that make up the overall fire behaviour analysis and include:

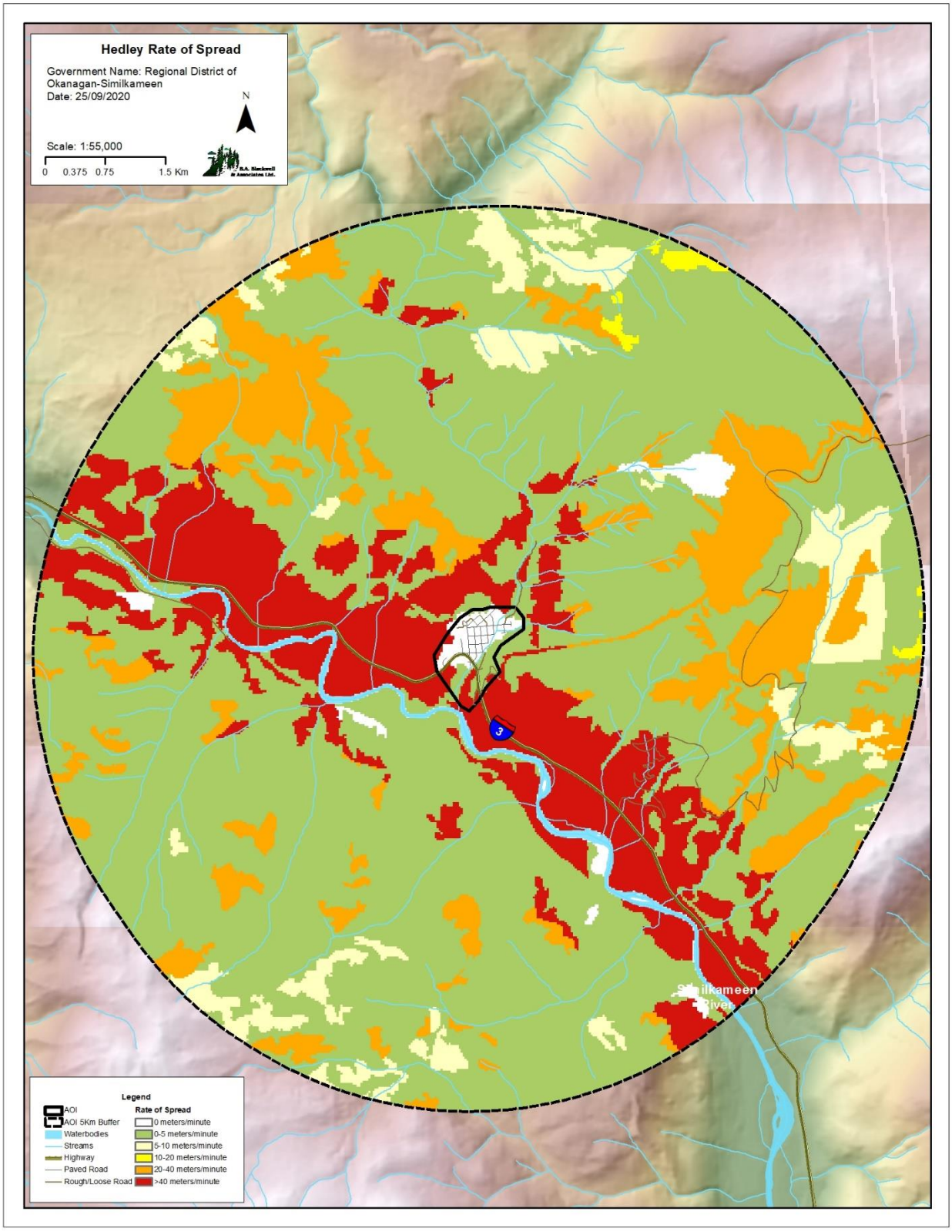
- rate of spread (ROS) – describes how fast a fire can spread under specific fire weather conditions and is usually expressed in metres per second;
- head fire intensity (HFI) – the energy output of the flaming fire front usually expressed as kilowatts per metre; and
- crown fraction burned describes where the fire is expected to move into the tree crowns, is also a measure of the proportion of the tree crowns consumed by fire, and is expressed as a percentage value. It is based on rate of spread, crown base height and foliar moisture content.

These are important measures specifically for fire suppression. In addition, the head fire intensity can also be used to assess where there is significant potential for fire related damage to buildings and structures within the Hedley / USIB study area. The only way residents can directly affect the fire behaviour potential under their control is through the application of FireSmart principles which creates a separation, or defensible space, where radiant heat produced by wildfires is dissipated. Map 4 depicts the 90th percentile head fire intensity for Hedley / USIB. The analysis shows that houses, structures, and critical infrastructure adjacent to the steep sided rock bluffs to the north and along Highway 3 would be impacted by high head fire intensity that could support the spread of fire through structure to structure contact and by igniting cured grass and flammable conifer vegetation around homes. Since head fire intensity mapping only uses data for lands with public ownership, the 'No Data' class (coloured grey) covers the private land, meaning that no data was available.

Map 5 shows the rate of fire spread which is a measure of the speed at which fire expands its horizontal dimensions at the head of the fire and is expressed in meters per minute. The rate of spread was adjusted for the Biogeoclimatic zone (Interior Douglas Fir – IDF), steepness of slopes, and interactions between slope direction and wind direction determined from hourly weather data. High rates of spread will occur along Highway 3 and up steep slopes surrounding the Hedley / USIB study area.



Map 4: Head fire intensity classes for the Hedley / USIB study area.



Map 5: Rate of spread classes for the Hedley / USIB study area.

The Christie Mountain (2020), Terrace Mountain (2009) and Okanagan Mountain Park (2003) wildfires near the study area, are examples of the changing wildfire conditions and illustrate the potential for damaging wildfires to life, property and safety.

3.0 HEDLEY / USIB FIRE ENVIRONMENT

Fire intensity and spread rate depend on the fuel type and fuel conditions, the weather conditions prior to and during ignition, and the topography. Generally, the following relationships hold between the fire behavior and the fuel, weather and topography:

- Fine fuels ignite more easily and spread fire faster with higher intensities than coarser fuels. For a given fuel, the more continuous it is, the faster the fire spreads and the higher the intensities. Fine fuels take a shorter time to burn out than coarser fuels;
- The weather conditions affect the moisture content of the dead and live vegetative fuels. Dead fine fuel moisture content is highly dependent on the relative humidity and the degree of sun exposure. The lower the relative humidity and the greater the sun exposure, the lower will be the fuel moisture content. Lower fuel moistures produce higher fire spread rates and fire intensities;
- Wind speed significantly influences the rate of fire spread and fire intensity. The higher the wind, the greater the spread rate, intensity and ember transport distances (spotting); and
- Topography influences fire behavior principally by the steepness of the slope. However, the configuration of the terrain such as narrow draws, ravines and saddles can influence fire spread and intensity. In general, the steeper the slope, the higher the uphill fire spread and intensity.

Hedley / USIB is historically (prior to the advent of regular wildfire suppression) situated in a fire environment characterized by:

- Vegetation – historically characterized by grasses and low-density tree stands, the ingrowth of dense conifer stands has altered historic vegetation patterns and composition in the study area and the South Okanagan region as a whole;
- Weather - very warm summers with extended drought periods and long fire seasons; and
- Topography - structures built below Stemwinder and Nickel Plate mountains at the confluence of the Hedley Creek and Similkameen valleys are vulnerable to spotting and unpredictable wind patterns, respectively. These conditions, and the region's fire history could lead to home losses by direct flame contact and ember showers.

3.1 FIRE REGIME

Historically, the study area has been exposed to high frequency, low severity surface fires and more recently high severity stand replacement fires (fires that kill larger groups of trees) which occur every 20-120 years (Lloyd *et al.,* 1990) and have the potential to significantly alter the forests.

There are no supporting fire history publications that reference this specific study area. Regional fire history studies publish a return interval of 20-120-year range. However, the southern and central portions of B.C. are expected to become warmer and drier and hence experience more frequent, severe and more extensive area burned. The Okanagan Valley of the southern interior of BC, in which Hedley and the USIB are located, is expected to experience the most significant increases in fire-related weather indices including fire frequency, mean fire size, and fire severity (Spittlehouse, 2008). Given these projections and fire behaviour patterns in recent seasons, it is likely to result in the increased potential for high-severity wildfires to occur more frequently, well below the 20-120-year range. In fact, a review of this specific study area shows a lower area burned in recent years, including 2018, in comparison to other locations in the region and it can be surmised from this that there is a significant probability of large fires in this study area in the near future.

The probability of large wildfires within these Interior forest ecosystems is generally considered high, and in many areas the consequences associated with a large wildfire would be very high to extreme. Fire regime in the IDF is classified as mixed severity meaning that low, moderate and high severity fire occur in close proximity with a historic fire return interval of between 20-40 years.

3.2 FIRE WEATHER RATING

The Canadian Forestry Service developed the Canadian Forest Fire Danger Rating System (CFFDRS) to assess fire danger and potential fire behaviour. Fire Danger Classes provide a relative index of the ease of ignition and the difficulty of suppression. A network of fire weather stations is maintained during the fire season by MFLNRORD and the recorded data are used to determine fire danger, represented by Fire Danger Classes, on forestlands within a community. The information can be obtained from the BCWS and is most commonly utilized by municipalities and regional districts to monitor fire weather, restrict high risk activities when appropriate, and to determine hazard ratings associated with bans and closures.

Hedley / USIB is in one of the highest wildfire risk areas of the province and it is expected that the fire season is expanding (see Section 3.1). An awareness of these conditions is key to focusing resources on the critical elements of hazard mitigation at the site and stand levels

Fire Weather refers to weather conditions that are conducive to fire. These conditions determine the fire season, which is the annual period(s) of the year during which fires are likely to start, spread, and cause sufficient damage to warrant organized fire suppression. Fire weather influences the intensity and duration of summer drought periods as displayed in Figure 1and danger class days in Figure 2.

Fire weather data was obtained from the Environment Canada Stemwinder fire weather station 6 km west of Hedley and adjacent to Highway 3 (Stemwinder). The weather record for the station extends from 1998 to 2008. The daily historical record of temperature, precipitation, relative humidity, wind speed and all Canadian Fire Weather Codes and Indices were obtained. The digital file for the station was imported into an Excel spreadsheet where variables could be summarized by month and year. The

total number of days in which recorded fire weather conditions would promote ignition and spread of fires were compiled by year during the fire season which generally occurs between May and September.

For each of the key parameters, summary graphs (Figure 1 and Figure 2) were produced. It is apparent from the summary graphs that fire weather conditions are of greatest concern in July, August and September where the fire danger class, number of danger class 4 (High) and 5 (Extreme) days are indicative of significant periods where high to extreme fire behavior are possible. The month of greatest concern is August where historically the drought code has exceeded 500 in most years (in 2003 it reached a level of 1400) and the number of danger class 4 days (High) has exceeded 10. Under these conditions fire behavior potential would be considered high to extreme where much of the current forest structure would be capable of supporting a damaging fire.

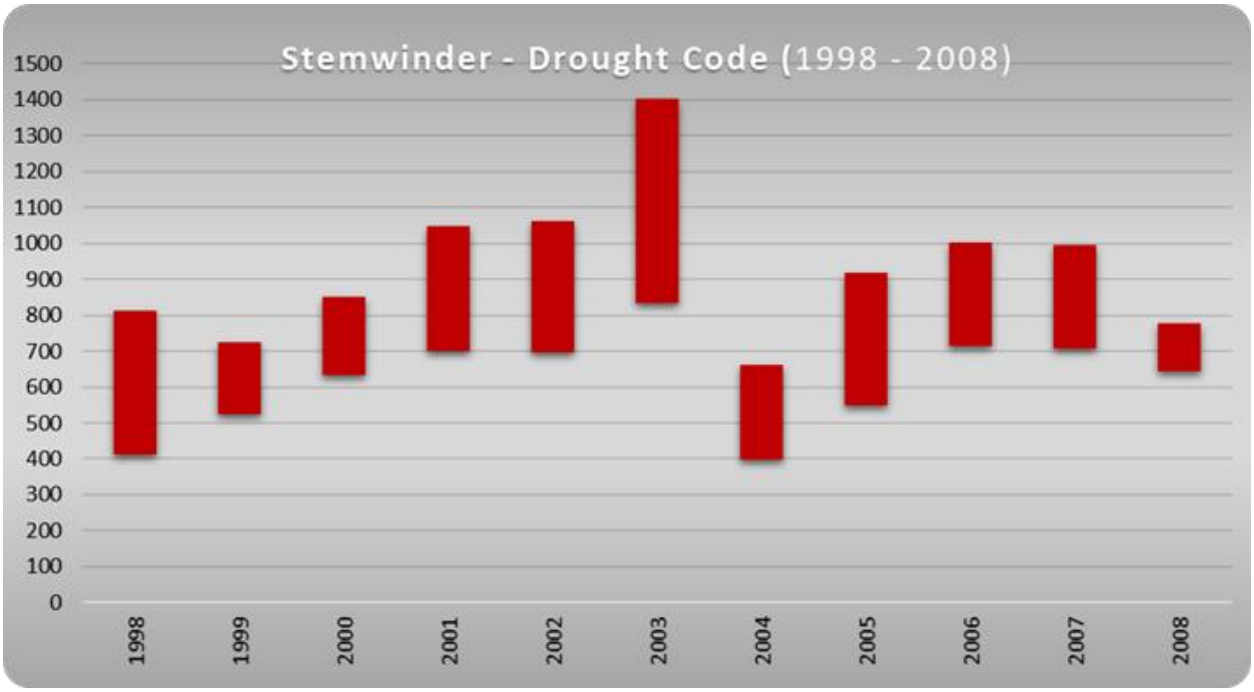


Figure 1: Drought codes for the Similkameen Valley area.

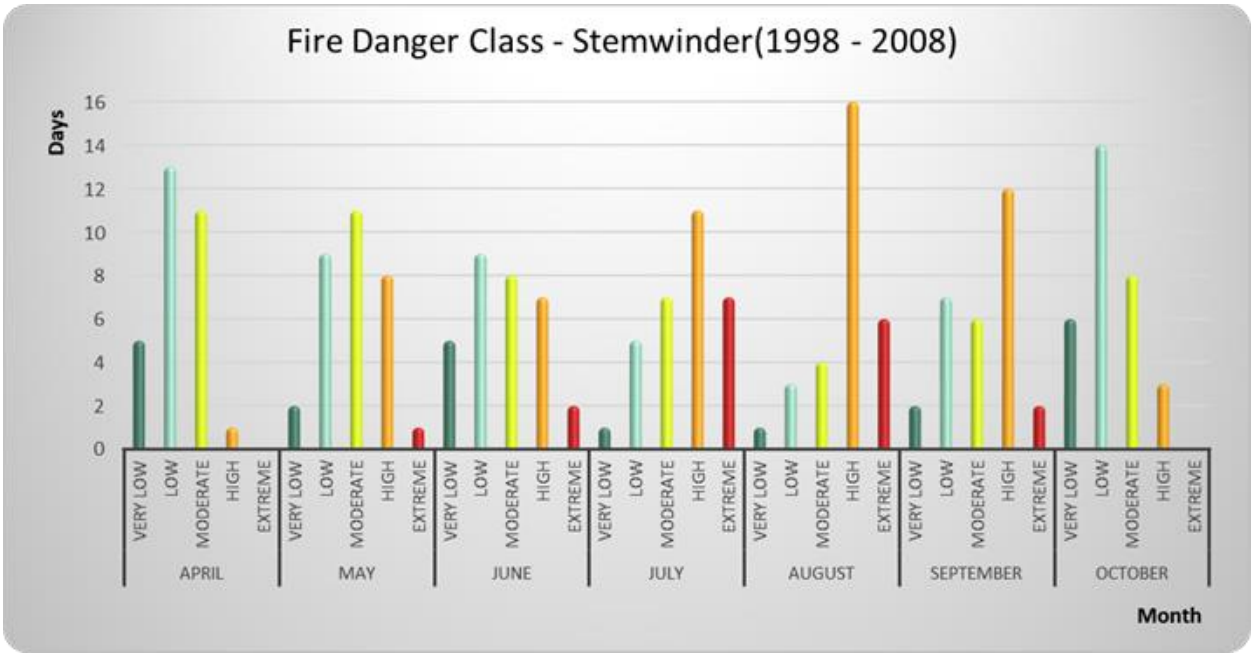


Figure 2: Fire Danger Class for the Similkameen Valley area.

Wind speed, wind direction, and fine fuel moisture condition influence wildfire trajectory and rate of spread. Wind plays a predominant role in fire behaviour and direction of fire spread and is summarized in the Initial Spread Index (ISI) Rose from the local representative weather station, Stemwinder (Figure 3) The ISI rose data is compiled hourly and provides an estimate of prevailing wind directions and wind speed in the area of the weather station. During the fire season (May – September) winds are predominantly from the northwest direction, and with wind speeds of 0-5 km/hour for half the time, increasing to 5-10 and 10-15 km/hour, occasionally gusting at 15-20 km/hour, and infrequently at speeds above 20 km/hour. Winds occur to a lesser degree from the west, at equal amounts (30%) in the three speed classes of 0-5, 5-10, and 10-15 km/hour and occasionally (~10%) occurring at speeds between 15-20 km/hr.

The subdominant wind patterns come from the north and southeast. Winds from the north occur primarily only in the 0-5 km/hour speed class, whereas winds from the southwest have a greater range and encompass three lowest speed classes (0-5, 5-10 and 10-15 km/hour) equally, with occasional gusts between 15-20 km/hour. The higher wind speeds (10 to 15 and >15 km/hour) tend to occur from three different directions during the fire season with potential to cause wind driven fires and increase surface spread and spotting. Mitigation actions to reduce vulnerability to wildfire should take into consideration predominant wind direction - wildfire that occurs upwind of a value poses a more significant threat to that value than one which occurs downwind. The Hedley / USIB situation is vulnerable to both downwind and upwind scenarios.

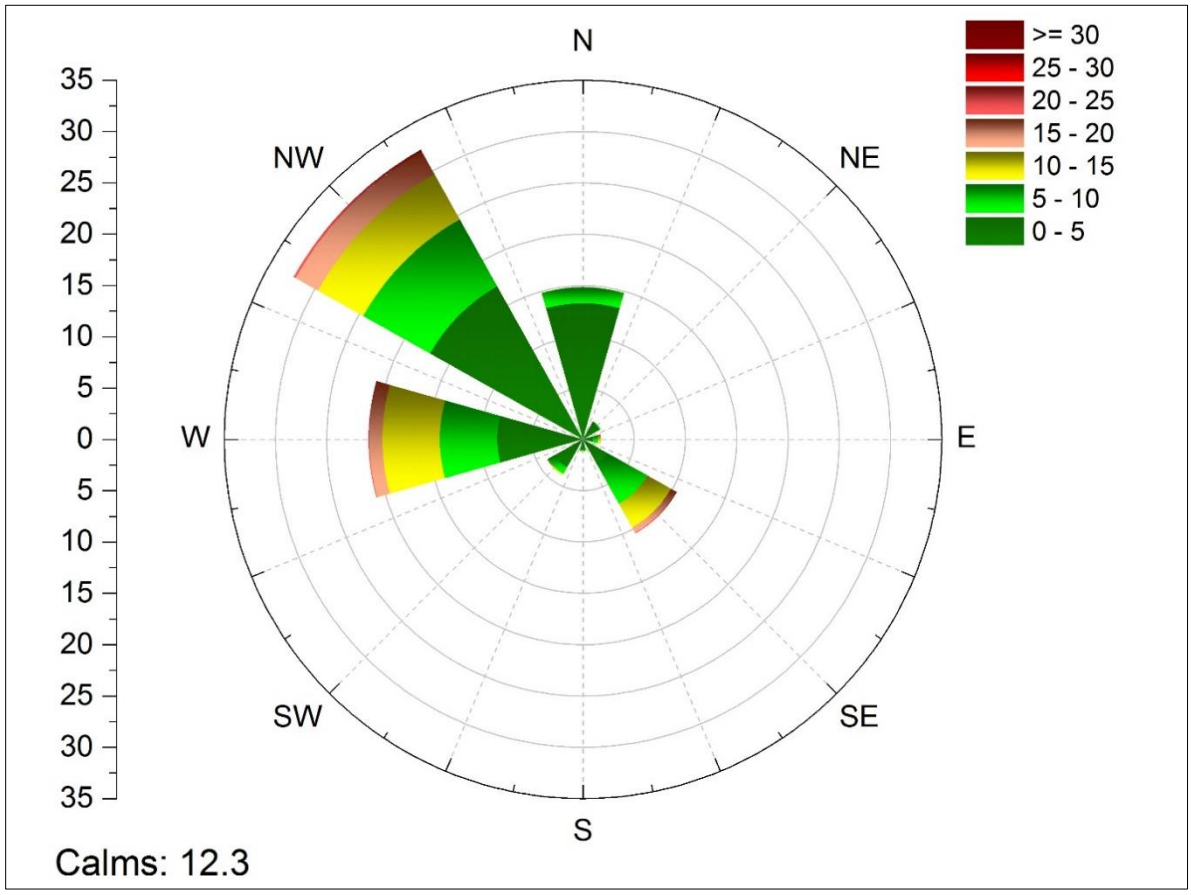


Figure 3: Wind rose for Stemwinder fire weather station based on hourly wind speed data during the fire season (April 1 – October 31) 1998-2008. The length of each bar represents the frequency of readings in percent and bar colour indicates the windspeed range.

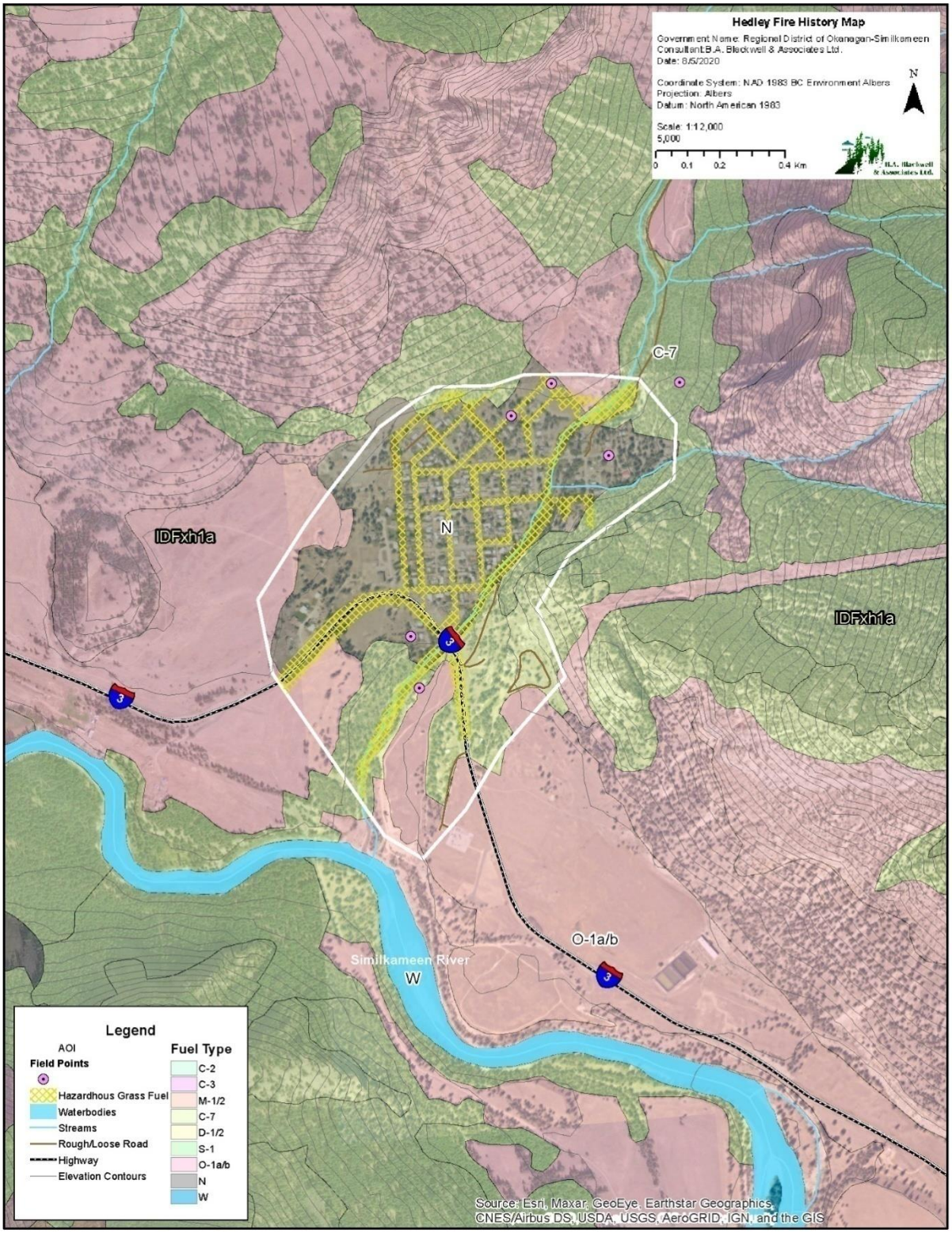
3.3 FUEL TYPES

The Canadian Forest Fire Behaviour Prediction (FBP) System outlines five major fuel groups and sixteen fuel types based on characteristic fire behaviour under defined conditions. In the Hedley / USIB study area, the fuel types observed in the area during site assessment are C-3, C-7, and O-1a/b as summarized by general fire behaviour inTable 2 and displayed in Figure 4 and Map 6.In general, the fuel type that may be considered hazardous in terms of fire behaviour and spotting potential in the Hedley / USIB study area is the C-3 fuel type, particularly if there are large amounts of woody fuel accumulations or denser understory ingrowth. It must be noted that many areas classified as C-7 have been affected by ingrowth and are transitioning more closely to C-3 fuel types (e.g., on the slopes of Stemwinder and Nickel Plate mountains and on the benchland east of Hedley Creek). An O-1b (standing dead grass) fuel type often can support a rapidly spreading surface fire capable of igniting structures, and jeopardizing human life, although it is recognized as a highly variable fuel type dependent upon level of curing.

Table 2. A summary of fuel types, associated hazard and areas within the study area.

Fuel Type	Description	Wildfire Behaviour Under High Wildfire Danger Level
C-3	Fully stocked, young forests, uniform and interconnected ladder fuels	Surface and crown fire, low to very high fire intensity and rate of spread
C-7	Open, uneven-aged forest, crowns separated from the ground except in conifer thickets, understorey of discontinuous grasses, herbs	Surface fire spread, torching of individual trees, rarely crowning (usually limited to slopes > 30%), moderate to high intensity and rate of spread
O-1a/b	Short grass/ Sparse or scattered shrubs, long grass, and down woody fuels.	Rapid spreading, intense surface fire
NF	Non-fuel	Examples: water, rock, irrigated fields

Figure 4: Flammable coniferous vegetation with cured grass surface fuels.



Map 6: Representative fuel types in the Hedley / USIB study area (yellow cross-hatching indicates network of flammable grass throughout the community).

3.4 CLIMATE AND WEATHER

The climatic conditions of south-central interior British Columbia are broadly characterized by warm, dry summers and cool winters and this portion of the Similkameen Valley is classified as a cold and semi-arid climate with July and August holding the peak temperatures and lowest relative humidity. Relative humidity values in the teens or even lower do occur in the Okanagan during the peak fire season (July-August). Occasions when the temperature value is higher than the relative humidity value are critical fire weather conditions that can lead to fast-spreading, intense wildfire behavior typically occurring in the hazardous fuel types in Hedley and the USIB study area (C-3 and O-1a/b). Wind direction is general from the south/southwest The Similkameen Valley and the Okanagan Valley have a high lightning profile (50%), and human ignitions account for the other 50%. In contrast the lightning profile of the coast is approximately 10% lightning and 90% human ignitions.

3.5 TOPOGRAPHICAL FACTORS RELATED TO BUILDING SITES

The topography of the Similkameen Valley is characterized by the basin of the Similkameen River carved from the rugged, steep Cascade Mountains by the Similkameen River, which has over time created a dramatic landscape of eroding rock, talus slopes, and complex deposits of minerals and soils deposited by glacial action. The pattern of development in the Similkameen Valley is contained within the valley bottom at the toe of mountain and hillside slopes.

Topography is an important environmental component that influences fire behaviour. Considerations include slope percentage (steepness) and slope position. Slope percentage affects solar radiation intensity, fuel moisture (influenced by radiation intensity) and influences flame length and rate of spread of surface fires (the steeper the slope the faster the spread). Slope position relates to the ability of a fire to gain momentum during an uphill run. A value placed at the bottom of the slope is equivalent to a value on flat ground. A value on the upper 1/3 of the slope would be impacted by preheating and faster rates of spread. Compounded with topographical factors is the impact from 1) nearly a century of active and successful fire suppression which has resulted in tree colonization and woody debris build-up in areas where historically surface fires maintained grass cover; and 2) the continued existence of communities, grazing tenures, woodlots, and industry in interface areas where homes, structures, and critical infrastructure are at risk from fires exhibiting high and extreme fire behavior.

Although Hedley and the USIB study area's slope position are at the bottom of surrounding steep slopes to the north (considered safer than structures located at slope crests), the communities are vulnerable to spotting from ember showers due to the close proximity of the mountains (Stemwinder, Nickel Plate, and Lookout).See Section 4.1 for more information about spotting..

4.0 THE WILDLAND URBAN INTERFACE

The 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 5.

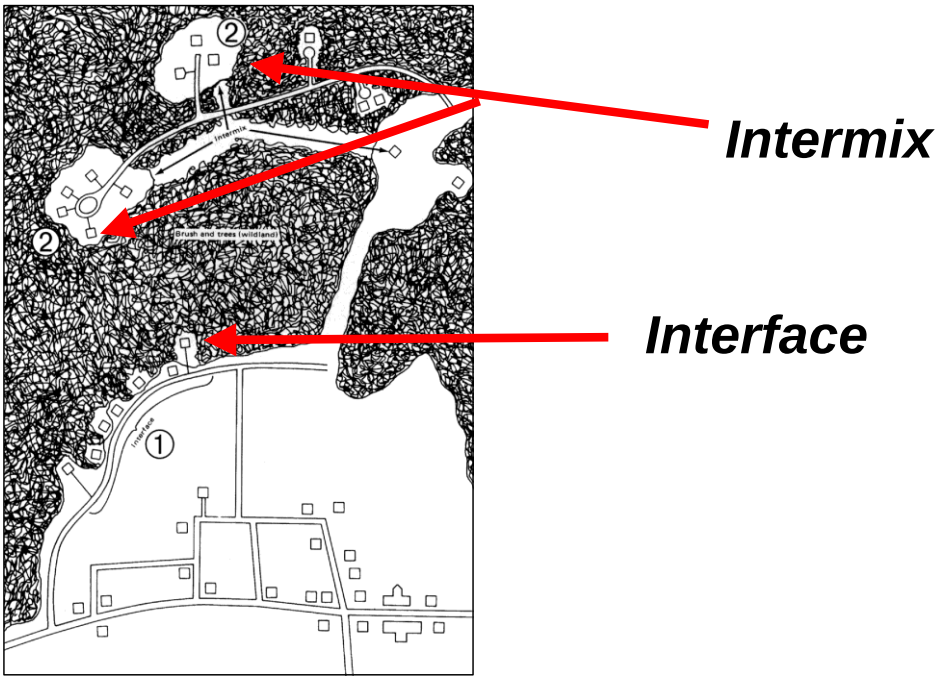


Figure 5: Illustration of intermix and interface areas in the WUI.

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. The entire study area can be considered an interface area due to its small size.

4.1 SPOTTING

Spotting is the ability of embers or firebrands from a burning fire to be sent aloft and start new fires in advance of the firefront, or outside of the fire perimeter as illustrated in Figure 6. It has been found that, during extreme wildfire events, most home destruction has been a result of low-intensity surface fire flame exposures, usually ignited by embers in advance of the fire front.

During the 2003 Okanagan Mountain Park fire, ember density was calculated at 1,000 – 1,700 ignition spots per square metre (m^2); and the ember density calculated at the 2016 Fort McMurray wildfire was approximately 600 embers per m^2. Spotting distance varied, ranging between 2 – 7 km and was highly dependent on relative humidity, and wind speed and direction (prevailing winds for the area are from the south/southwest).

Spotting is a high wildfire risk to homes and structures of the study area due to the small, relatively isolated population, older housing stock built primarily of wood, and limited fire suppression resources. The ensuing damages and consequences to the Hedley and USIB communities will be extreme. This situation signals the urgent need for residents and band members to begin addressing the risk from wildfire with a multi-pronged pro-active approach that includes homeowners, businesses, and local, regional, and provincial levels of government to find, fund and implement mitigation solutions.

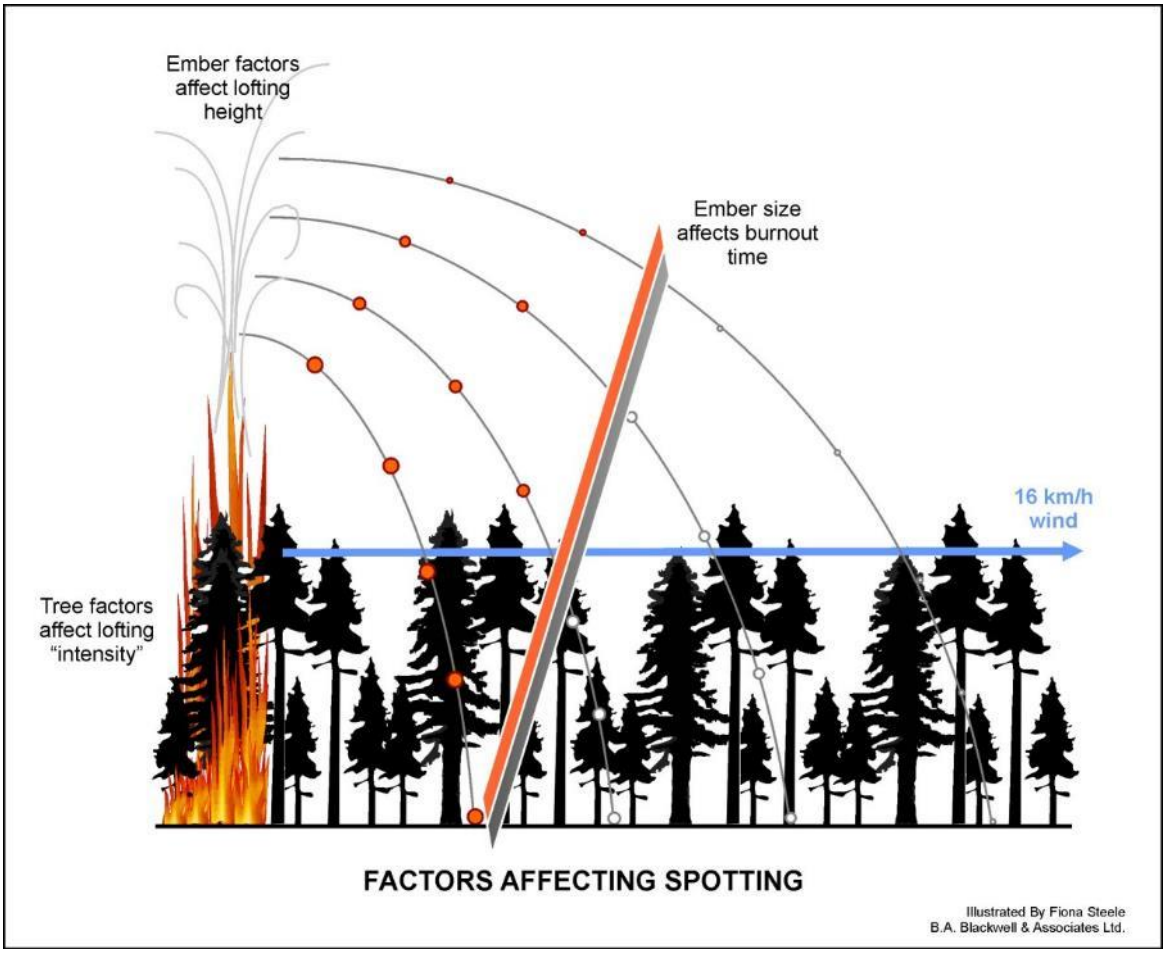


Figure 6: Illustration of embers lofted ahead of a fire front (spotting).

4.2 VULNERABILITY OF THE WILDLAND URBAN INTERFACE (WUI) 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 7).
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 (Figure 8).

Figure 7: Firebrand caused ignitions: burning embers are carried ahead of the fire front and alight on vulnerable building surfaces.

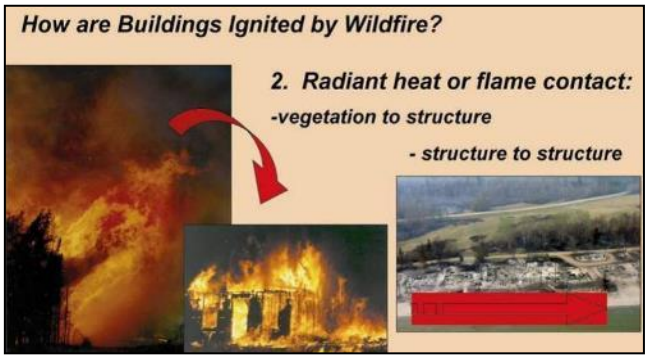


Figure 8: Radiant heat and flame contact allows fire to spread from vegetation to structure or from structure to structure.

4.3 DEFINITION OF THE HOME IGNITION ZONE (HIZ)

Hedley / USIB is located in a wildfire prone environment. Wildfires will happen – exclusion is not a choice. The variables in a wildfire scenario are when the fire will occur, and where. The Home Ignition Zone principally determines the potential for home ignitions during a wildland fire; it includes a house and its immediate surroundings within 100 meters (Figure 9). Given the extent of this zone, the ignition zones of several homes sometimes overlap, and often spill over onto adjacent public or community land where the homeowner has no control or authority over. Then it becomes important to consult and collaborate with public agencies or other private land owners to mitigate ignition potential.

A house burns because of its relationship with everything in its surrounding ignition zone – the house and its immediate surroundings. To avoid a home ignition, a homeowner must eliminate the wildfire's potential relationship with their house. This can be accomplished by interrupting the natural path a fire takes. Changing a fire's path by clearing the ignition zone is an easy to accomplish task that can prevent home loss. To accomplish this, flammable items such as excessive vegetation must be removed from the area immediately around the structure to prevent flames from contacting it. Also, reducing the volume of live vegetation will affect the intensity of the wildfire as it nears the home.

This assessment addresses the wildfire-related characteristics of Hedley / USIB and examines the area's exposure to wildfire as it relates to ignition potential. The assessment does not focus on specific homes,

but examines the study area as a whole and includes observations made by Blackwell during the field visit to determine the ease with which home ignitions can occur under severe wildfire conditions, and how ignitions might be avoided within the ignition zones of affected residents. Residents of Hedley / USIB can reduce the risk of structure loss during a wildfire by taking actions within their ignition zones.

The results of the assessment show (under current conditions) that wildfire behavior and subsequent losses will be dominated by the residential characteristics of this area. The good news is that residents will be able to substantially reduce their exposure to loss by addressing neighbourhood vulnerabilities. This relatively small investments of time and effort will improve wildfire safety. See Section 6.0.

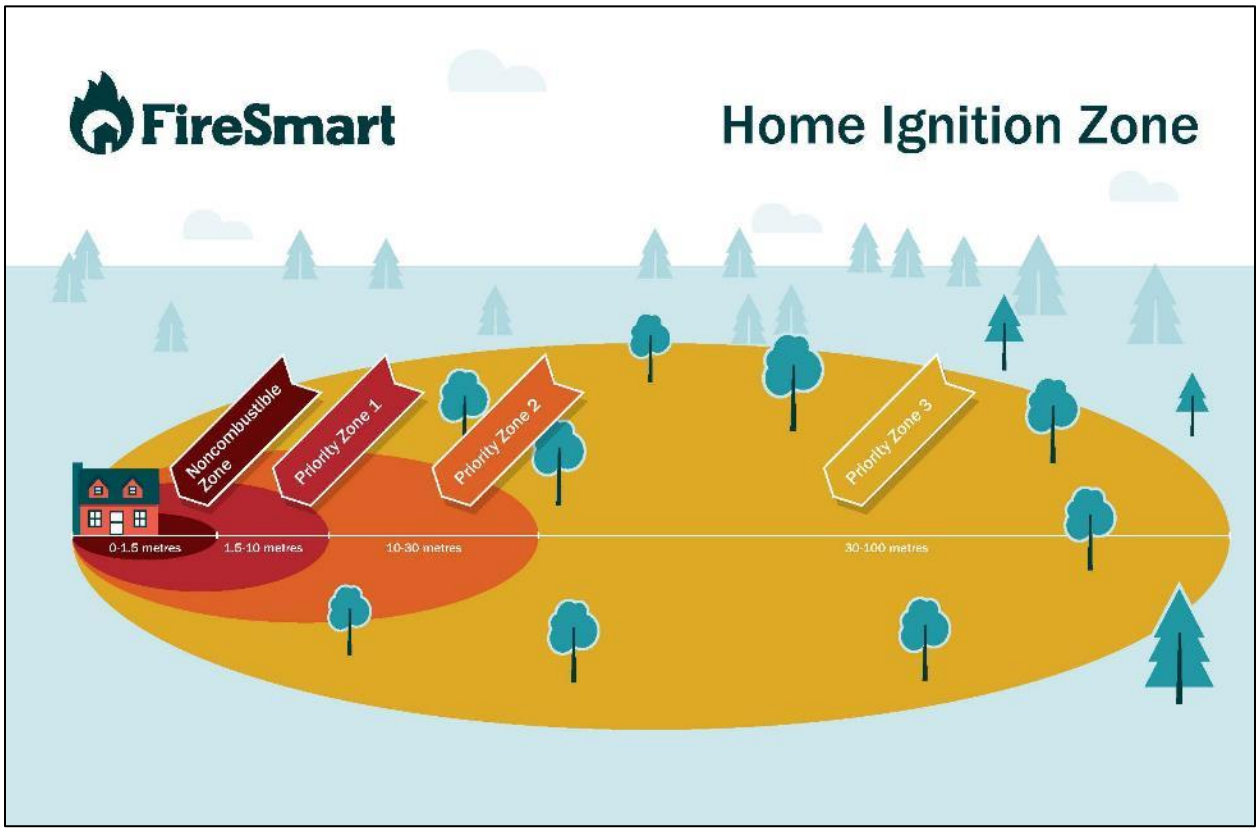


Figure 9: Fire Priority Zones 1a, 1, 2, and 3 collectively comprise the 100m home ignition zone (HIZ).

5.0 OBSERVATIONS FROM FIELD ASSESSMENT

Field reviews of the Hedley / USIB study area was conducted by Bruce Blackwell RPF, RPBio and Judith Cowan, RPF on August 6 and 7, 2020. The intent of the field visits was to assess the level of wildfire risk to the community and to furthermore identify specific vulnerabilities which Hedley / USIB and the RDOS could address to assist in bolstering their resilience to future interface fire events.

To this end, complete coverage of the study area was needed during the field assessment and focused especially on homes and properties occurring immediately adjacent to forested or grass vegetation, as

well as building construction typologies and materials, landscaping around homes, one-way access routes, dead end roads, and the location of water delivery (fire hydrants) and electrical power supply.

The following data was collected as part of the field review:

- The location of access points into the Hedley / USIB neighbourhood;
- Evacuation routes;
- Exterior building materials commonly used on homes;
- Forest / grassland vegetation beyond private property boundaries;
- Ornamental landscaping around homes and along roads;
- Critical infrastructure including water systems and power supply; and
- Topographical factors influencing the spread of, or barrier to wildfire.

Photographs and notes of the neighbourhoods were taken for documentation.

5.1 BUILDING CONSTRUCTION

The majority of homes are older building stock and constructed of wood, but many have rated roofing defined as Class A or B which is considered fire resistive (metal, Duroid (asphalt) shingles, though there are still some homes with unrated cedar shake roofs and other non-rated roofing. Due to the small community size and its rural character, many homes back directly up to forest and grassland. Cladding, soffits, and eaves throughout the study areas are constructed of primarily wood and from unrated vinyl. (Figure 10) which can melt during a fire and expose combustibles in the building assemblies within the walls and further ignite combustibles within the home. Impacts to surrounding homes clad with non-rated vinyl is evidenced from the recent house fire in August 2020 (Figure 11).

The key building elements which should be constructed to FireSmart standards are outlined below.

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 (as described above). 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.

Figure 10. Non-compliant homes with cedar shakes and wood cladding

Figure 11: Response of non-rated vinyl to melting during adjacent house fire.

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. The smoke column will transport burning embers, which may lodge against siding materials.

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. Locating these fuels away from structures helps to reduce structural fire hazards and makes it easier and safer for suppression crews to implement suppression activities.

Other Factors:

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.

A 2016 investigation by Alan Westhaver[6]commissioned by the Institute of Catastrophic Loss Reduction [7]after the Fort McMurray wildfire revealed that the leading contributor to hazard and hence home survivability was 1) vegetation, and 2) fuel conditions surrounding the home. This highlights that these factors need to be addressed in tandem in order for a structure to be in FireSmart compliance.

5.2 VEGETATION ISSUES

Landscaping on private property within the study area is generally composed of a mix of deciduous, broad-leafed evergreen and flammable (coniferous) vegetation. Most properties are largely landscaped with shrubby herbaceous perennials, deciduous shrubs and trees, and intermixed with juniper ground cover, and tall cedar privacy hedges in varying proportions. Juniper, cedar, and other coniferous hedging are highly flammable. Some also have coniferous trees with interconnected crowns (Figure 12). Coniferous overstory, such as Douglas-fir, deposit dry and flammable needles onto roofing and can accumulate in roof corners and in gutters. The combination of grass on private lots and on road verges throughout the community adjacent to large conifers with low crown base heights (*i.e.* branches in touch with the ground level and hence in contact with the grass) is not compliant with FireSmart principles and represents a considerable hazard to individual properties and the entire community by creating conditions where a lower intensity surface fire can climb into trees and become a much more dangerous crown fire.

The majority of hazard to individual homes across the study area can be attributed to vegetation much of which is predominant in this ecosystem, and is ubiquitous on both private and public land. Since the grass forms a network along road verges throughout Hedley, a surface fire starting in any one part of the town can easily spread to other parts along these fire pathways. Keeping grass maintained during the fire season is important to reduce the amount of cured biomass available to fuel a rapidly spreading surface fire. See Figure 13 for examples of unmaintained versus maintained grass.

[6]Westhaver, A. 2017. Why some homes survived: Learning from the Fort McMurray wildland/urban interface fire disaster. Retrieved from: https://issuu.com/iclr/docs/westhaver_fort_mcmurray_final_2017

[7] Institute for Catastrophic Loss Reduction https://www.iclr.org/. Accessed September 21, 2020.

Figure 12: Homes surrounded by hazardous vegetation.

Figure 13: Unmaintained (left photo) versus maintained grass (right photo) along road verges.

5.2.1 PUBLIC LAND AND TENURES

In addition to these observed vegetation issues on private properties, some structures are built proximal to and are intermixed with hazardous fuel types at the toe of mountains and bluffs to the north (Figure 14 and Figure 15). These structures are at the outside edge of the wildland urban interface (WUI) boundary making them vulnerable to ember showers and radiant heat from a fire front. Crown provincial land, municipal land, private land and Indian Reserve land surround the study area. Approximately 258.4 ha of Crown Provincial land exists within the 5 km WUI boundary, with the Ministry of Transportation and Infrastructure maintaining tenure rights to majority of this land while some range tenures encompass the east and west WUI edges. The Upper Similkameen Indian Reserve accounts for approximately 315.26 ha of the interface, spanning beyond the WUI boundary to the SE and NW. An area of 0.9 ha of Municipal land exists within the study area and does not extend beyond the Hedley Improvement District administrative boundary. Private land encompasses approximately 78 ha of the WUI, with some ownership extending beyond the administrative boundary into the northeast mountains and bluffs.

Figure 14: Homes and structures at the base of forested slopes vulnerable to ember showers.

Figure 15: Structures at the base of forested slopes with hazardous fuel types.

5.2.2 LANDSCAPING AND HAZARDOUS FUELS

The entire study area for Hedley and the USIB are at risk from spotting, and the grass and flammable (coniferous) landscaping have the potential to act as conduits for houses to catch on fire. When grasses cure, they become flashy fuels that ignite easily and spread quickly. Conifers have volatile extracts and combined with their low foliar moisture content during the dry summer months their overall flammability is magnified.

With respect to mulching materials, wood chips do not carry flaming combustion if they are no more than 5-10cm deep. Bark mulch; however, comes in larger piece sizes (7.5-10 cm or 3 / 4" in length), and furthermore is drier and therefore more hazardous. The piece size of mulch materials to be concerned with is ≤ 12.5 cm / 5" in length.

There are considerable challenges to achieving FireSmart landscaping throughout Hedley / USIB. In older neighbourhoods where the landscaping is mature, there is little incentive to replace landscaping. Additionally, FireSmart landscaping is seen by some as not aesthetically pleasing, costly, or high-maintenance.

These landscaping challenges faced by homeowners pertain specifically to cost, limited space, privacy and the desire to create visually explicit edge treatments to demarcate property ownership from adjacent lots with evergreen vegetation screens. Ornamental plant characteristics fulfilling these criteria have an upright branching habit, compact form, dense foliage, as well as a moderate growth rate. Dwarf and ornamental conifers such as juniper and cedar hedging are popular choices and grow well in the Similkameen Valley if supplied with supplemental water. Yet conifers such as these which have needle or scale-like foliage are highly flammable and not compliant with FireSmart principles and should be omitted from the 10 m Fire Priority Zone of the planned home footprint.

5.3 ACCESS AND EVACUATION

The evacuation of residents during an interface fire along with the possibility of entrapment scenarios is a significant problem for Hedley / USIB and will require discussion and the preparation of a coordinated plan between the RDOS, residents, the business community, Emergency Management BC, and first responders. Most residences and structures are within 500m of Highway 3 and therefore have direct access to a major road corridor for evacuation purposes. There are a number of dead-end roads that may be inaccessible / unsafe during a wildfire and lead to entrapment issues (Rogers Ave, White St and Highland St. on the bench east of Hedley Creek; Snazaist Rd, and Holmes Dr on the west side of the study area; and the network of roads north of Webster St. including Scott Ave.

Access (for first responders) and evacuation during a wildfire emergency often must happen simultaneously and road networks should have the capacity to handle both. In some areas, the local road network in Hedley is constricted with household debris and parked vehicles that have spilled over from private lots (Figure 16) which may inhibit safe and effective evacuation of residents during multiple home ignitions from spotting. Taking into consideration poor visibility from smoke conditions and some people with mobility issues, entrapment of residents could occur.

The September 2020 Almeda fire in Oregon exhibited extreme fire behaviour and swept along both sides of the highway corridor challenging evacuation efforts by residents and first responders. This highlights the need for communities to develop and test evacuation routes, protocols and resources in the event of an emergency.

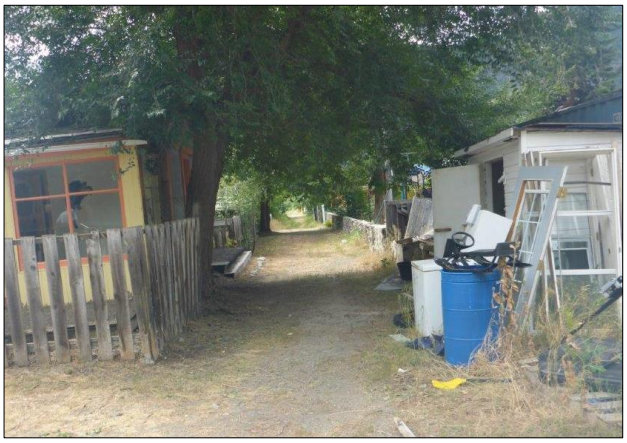



Figure 16: The local road network in Hedley leads to dead end roads north of Webster St (L);example of household materials and debris adjacent to lanes and roads.

5.4 CRITICAL INFRASTRUCTURE

Protection of infrastructure during a wildfire event is important to ensure that emergency response is as effective as possible, coordinated evacuation can occur if necessary, and essential services in the Hedley / USIB can be maintained and/or restored quickly. Critical infrastructure includes emergency and, water, electrical service, transportation, water infrastructure, and communications infrastructure (Figure 17). It is recognized that these physical structures, systems, and facilities that are extremely valuable to the RDOS and Hedley / USIB and are required for the healthy, efficient functioning of the local economy and the livability of the community.

Emergency services within the study area include the Hedley Fire Department and Hedley Improvement District which contains the Hedley Centre (formerly called the Seniors Centre). The location of an Emergency Operations Centre and incident command station for Hedley during an emergency is yet to be determined. It is important that communication protocols of the EOC and incident command station are formalized. Currently there are no communication protocols for communicating with BCWS during an emergency to formulate tactical responses, evacuation procedures, or disseminate information on evolving situations. Back-up power supply for the HFD and HID office is an electric powered pump and generator. The Upper Similkameen Indian Band office in the Hedley Fire Protection area serves as their Emergency Operations Centre along with a designated Emergency Response Coordinator. The current emergency response plan does not contain an evacuation plan. Electrical service for most of the study area is received through a network of wood pole transmission and distribution infrastructure supplied by Fortis BC, and a communications tower is located across from the Fire Department. The entire study area depends on wood pole distribution lines (small, street-side poles) to connect homes and businesses, and would be vulnerable to fire, which has the potential to disrupt service to portions of the community. There are no back-up generators to supply secondary power to water and power infrastructure other than to the HID and HFD offices.

Figure 17: Critical infrastructure of power, water and communications facilities for the study area.

Hedley Improvement District (HID) owns, operates and maintains the water infrastructure system. The HID office manages the water supply for Hedley. Two aquifers supply the area:

- Hedley Creek aquifer
- Similkameen aquifer

Potable water for Hedley comes via two well sites from a 100,000-gallon reservoir supplied by the Hedley Creek aquifer. A 30-horsepower pump draws water from one well site and a 60-horsepower pump draws water from the other. Due to the geology of the area, arsenic has been detected and measured in the water supply with the 30 hp pump containing lower levels (7.5 – 10 ppb) while the 60 hp pump has arsenic levels between 15 and 20 ppb. Since the provincial Interior Health Guidelines stipulate that arsenic levels at 10 ppb is the maximum limit, HID uses the 30 hp pump exclusively to supply potable water to residents. Watering restrictions are in use to conserve this water during the dry season. Even though there are two different wells and pumps drawing from the same reservoir and aquifer, the 60 hp pump cannot be used in tandem for fire suppression purposes while potable water from the 30 hp pump is in use. Electricity to power the pumps is supplied to HID through the network of wooden distribution poles.

Vulnerabilities of the system: 1) infrastructure costs – taxes fund provision of water to Hedley residents so funding of new projects can be cost prohibitive. In response to this, the water operator for the HID, Mr. Simon Harris conducted a cost analysis during the Daly Ave water system upgrades to determine the amount of funding required to service future upgrades. This has been an informative exercise in preparing Hedley to plan for future upgrades to the system; 2) Lack of secondary power sources (back up generators) for the utility system in the event of a power outage; 3) Water supply restricts capability of actioning more than one house fire at a time and cannot address multiple home ignitions. During the August 2020 house fire, Hedley's fire engine tanker was pumping water in excess of the water system's capability to supply, and this highlighted the scenario that automatic irrigation or untended garden hose / sprinkler assembly draw enough water to restrict supply for fire suppression. 4) Hydrants are located throughout the community, albeit at distances of ~300m which are considered far apart for wildfire suppression purposes. 5) In the event that Hedley runs low on water supply, automatic aid from

Keremeos will provide suppression equipment in the form of tanker and bladder to draw water from Hedley Creek.

The BCWS Structural Protection Branch have also conducted a critical infrastructure assessment for Hedley and have identified CI requiring protection during a wildfire and have itemized necessary protection measures. In the event of a wildfire threatening the community, it is understood that Hedley Fire Department will triage homes to assess safety for fire suppression crews and identify candidates suitable for protection in advance of the arrival of BCWS or other fire department services.

6.0 FIRESMART RECOMMENDATIONS

A fire originating in, or spreading from the forested hills and grasslands surrounding Hedley / USIB has the potential to spread into the community under high or extreme fire danger by means of radiant or convective heat transfer or through spotting. With FireSmart building materials, FireSmart landscaping, and executing fuel management, evacuation, and water / power supply recommendations in this report, the risk to the neighbourhoods from spotting and/or an ember shower can be somewhat mitigated and the safe evacuation of residents secured.

Furthermore, FireSmart mitigation activities should be approached as a multi-year (> 10-year) project with incremental build-out as homes are renovated, large ticket items (*i.e.* roofs) require placement and critical infrastructure is upgraded or replaced. There are two levels of modification: at the site (individual lot or parcel) and at the community level.

Establishing a FireSmart community will reduce losses and impacts related to wildfire. For this FireSmart Canada Community Assessment Report, two classes of structures were considered: critical infrastructure; and residential or commercial structures. Critical infrastructure is distinct as it provides important services that may be required during a wildfire event or may require additional considerations or protection. As outlined in Section 4.3 – Definition of the Home Ignition Zone, FireSmart principles are important when reducing wildfire risk to both classes and are reflected in the outlined recommendations. The RDOS and Hedley / USIB collaboratively aim 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.

6.1 STRUCTURE PROTECTION

Ensuring that homes can withstand or are less vulnerable to an interface fire event is a key consideration in protecting the wildland urban interface (WUI) zone from fire. Often, it is a burning ember traveling some distance (spotting) and landing on vulnerable housing materials, rather than direct fire/flame

(vegetation to house) contact, that ignites a structure. Alternatively, the convective or radiant heating produced by one structure may ignite an adjacent structure if it is within 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 is less likely to be impacted by interface fires. Since the rate of new housing development in Hedley and the USIB is low, other measures to protect homes are needed.

Although many communities established in the Similkameen and Okanagan valleys (and generally in rural BC) were built without significant consideration with regard to interface fire, there are still ways to reduce home vulnerability. Changes to roofing materials, siding, decking, and landscaping as well as the application of exterior sprinkler systems during the fire season can be achieved by individuals, the community, and support by local government through the amendment and/or enforcement of bylaws.

The FireSmart approach 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 and mitigation outlined for vegetation management, structure protection, and infrastructure. Where fire risk is unacceptable, the FireSmart standard should, at a minimum, be applied to new developments and, wherever possible, the standard should be integrated into changes to, and new construction within, existing residential structures within WUI areas. Following are a number of recommendations that the Hedley / USIB and RDOS can implement over time to transition the community to be more fire resilient.

Recommendation 1: Test and operationalize the refurbished Mark 3 pump to test that it is in good working order for its effective use in fire suppression prior to the 2021 fire season. If pressure, flow or other issues are observed, set in motion the process to source and identify the price of a new pump and avenues to secure grant monies suitable for equipment. In addition, the mutual aid agreements with Princeton and Keremeos should be reviewed to negotiate if the sharing of a Mark 3 pump is possible until HFD procures its own.

Recommendation 2: To protect vulnerable (flammable) homes constructed of wood which are too costly to replace and re-clad with ignition resistant exterior materials, apply for funding from the Union of BC Municipalities' Community Resilience Investment (CRI) program to coordinate exterior rooftop sprinkler kits to community residents (at a cost). Sprinkler kits must be installed and tested at the beginning of every wildfire season (generally May – September) and are effective only for homes and properties which have been modified to FireSmart standards (rated roof, minimal wood siding, no open eaves, no coniferous vegetation within 10m of the home). Exterior sprinklers afford additional protection measures and can be effective at increasing a structure's resistance to ignition by elevating moisture levels and relative humidity in the atmosphere on and around the home, including surface and fine fuels (conifer needles and small twigs) within 10 m of the home footprint. Because of this, sprinklers are effective at slowing fire spread and extinguishing wind-carried embers that may ignite portions of the home, or leaf litter that has accumulated around the home. Sprinklers used for structure protection should follow the United States' National Fire Protection Association (NFPA) standards[8].

Recommendation 3: The FireSmart Community Board, when established, should simplify the range of FireSmart tasks for homeowners by identifying and prioritizing tasks homeowners are capable of implementing themselves at very little cost (i.e. clean up of debris, wood around 1.5m zone directly adjacent to the structure, mowing grass throughout fire season, covering vents with wire mesh to exclude embers), identifying tasks outside of their ability or cost range (i.e. tree removal, pruning but these may be available for a local rebate program)., and developing a strategy for providing assistance to plan for and manage larger items (i.e. roof replacements, application of fire resistant coating to wood cladding).

Recommendation 4: A member of the FireSmart Community Board, Hedley Fire Department staff or volunteer firefighter or other community / Band resident should work with the RDOS to become a Local FireSmart Representative (LFR) capable of conducting FireSmart home assessments. These assessments should identify the hazardous components on the home and develop short and long-term strategies to convert them over time to fire-resistive materials with roof replacements as a first priority, followed by replacement of exterior siding and decking with fire resistant materials. For exterior siding materials (cladding) cement fibre, 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, new treatments and paints are now available for wood that increase its resistance to fire and they should be considered for use. In addition, propane tanks and wood piles should be containerized, sealed and located 10m away from the home and outbuildings should not abut the primary residence but have a minimum separation of 5 m.

To encourage the retrofitting of existing homes, create incentives such as granting rebates for roof replacement or developing a life-cycle replacement plan that can be incrementally implemented over time (*i.e.* 1 roof replaced every 2-5 years).

[8] NFPA 1144 Standard for Reducing Structure Ignition Hazards from Wildland Fire. 2013 Edition.

Recommendation 5: Work with the RDOS to develop and adopt an Unsightly Premises bylaw for Hedley and supported with enforcement resources to address complaints and non-compliance during the wildfire season. Notification format, the number of reminders allowed, and time periods allowed for compliance must be stipulated. This bylaw must be developed in coordination with the community to engender buy-in, educate, and understand the purpose is for the overall safety of the community as a whole. Conversations / negotiations with individual property owners may be necessary to address their concerns and promote willingness to comply. The main goal of developing this bylaw is to encourage and support residents to take responsibility for the care and upkeep of their property.

Recommendation 6: Purchase or share a sprinkler protection unit (SPU) which should have the capacity to action 30-40 homes

6.2 VEGETATION MANAGEMENT

Vegetation management, also referred to as fuel management is considered a key element of the of the FireSmart approach.

Vegetation management should be strategically focused on minimizing impact while maximizing value to neighbourhoods. For example, understory thinning or surface fine woody debris removal may suffice to lower fire risk. In situations where the risk is high, a more aggressive vegetation management strategy may be necessary. Vegetation management must be evaluated against the other elements outlined above to determine its necessity. Its effectiveness depends on the longevity of treatment (vegetation grows back), cost, and the resultant effect on fire behaviour. Some of the concerns encountered by both approving authorities (local government) and residents:

- Challenges with adjacent private / crown land
- Challenges with debris disposal: opportunity is a community chipping program
- Surface fuel accumulation and loading

Of all the actions that homeowners can perform with minimal cost, landscaping of smaller items including debris removal falls entirely within homeowner control and does not necessitate approvals from outside agencies; in contrast to more complicated issues such as road and water delivery system improvements. Vegetation types can be classified into ornamental landscaping (plantings by homeowners - Section 6.2.1) and native vegetation (Fuel management – Section 6.2.2).

6.2.1 ORNAMENTAL LANDSCAPING

Conifers trees have needle or scale-like foliage are highly flammable and not compliant with FireSmart principles and must be omitted from the 10 m Fire Priority Zone of the home property. Deciduous trees (*i.e.* maple) or broadleaf evergreen (*i.e.* magnolia) contain more foliar moisture during the dry summer months and should be planted instead of coniferous vegetation. There are a number of broadleaved deciduous and evergreen plants with low flammability which can be used for landscaping within FireSmart PZ 1 (within 10 m of structures) for the appropriate Canadian Hardiness Zone (Zone 5a) for the study area and that region of the Similkameen Valley. Hedge and shrub examples which thrive in Zone 5a and are low flammability include, but are not limited to: honey locust, pin oak, gingko, saucer

magnolia, and crabapple. Plants that are fire resistant/ have low flammability generally have the following characteristics:

- Foliage with high moisture content (moist and supple),
- Little dead wood and do not tend to accumulate dry and dead foliage or woody materials, and
- Sap that is water-like and without a strong odour

Hedge and shrub examples which thrive in Zone 5a and are low flammability include, but are not limited to: boxwood, wolf willow, Oregon grape, mock orange, euonymus, cranberry cotoneaster, firethorn, Cheyenne privet, and rose. Table 3 displays a list of low flammability or fire-resistant landscaping options suitable for the Similkameen and Okanagan Valley areas. This list is not comprehensive, but instead should be seen as a starting point to be followed up with local nursery growers who can confirm their regular availability in stores.

Table 3: Low flammability landscaping options for the Okanagan area.

Zone	Latin Name	Common name
Ornamental species		
4	*Berberis thunbergii*	Japanese Barberry
5	*Euonymus japonicus 'Green Spire'*	Green Spire Euonymus
5	*Leucothoe fontanesiana 'Rainbow'*	Rainbow Leucothoe
4	*Ligustrum vulgare 'Cheyenne'*	Cheyenne Privet
5	*Pieris japonicum cultivars*	Japanese Pieris
5a	*Pyracantha coccinea 'Teton'*	Firethorn
4	*Rosa rugosa 'Hansa' or 'Mediland'*	Rose
Species native to the Okanagan and parts of the Similkameen Valley		
3	*Ceanothus sanguineus*	Red-stemmed ceanothus
4	*Elaeagnus commutata*	wolf willow
3	*Mahonia aquifolium*	Oregon grape
2	*Sorbus sitchensis*	Mountain ash

Grass, shrubs, and herbs must be maintained in a state that reduces fire hazard by maintaining foliar moisture content. This can be accomplished by:

- Choosing plant species that are well-adapted to the site (microclimate and soil conditions of the parcel); and
- Incorporating a planted garden where shrubs, herbs, and grasses are planted in discrete units manageable by hand watering.

There are a number of resources available to aid in development of FireSmart compliant landscaping, In addition, a number of broadleaved deciduous and evergreen plants with low flammability may be used for landscaping within FireSmart PZ 1 (within 10 m of structures). Landscaping should be selected for the appropriate Canadian Hardiness Zone (Zone 5a). Hedge and shrub examples which thrive in this zone with low flammability include, but are not limited to;

For further assistance in creating a FireSmart landscape and to obtain a list of fire resistant plants, refer to the FireSmart Guide to Landscaping at https://www.firesmartcanada.ca/resources-library/firesmart-guide-to-landscaping. [9]

Other helpful links for finding fire resistant landscaping options can be found at:

- http://www.wacdpmc.org/images/Fire-Resistant-Plants.pdf[9]
- http://www.firefree.org/wp-content/uploads/2016/02/Fire-Resistant-Plants.pdf[10]
- https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/for-your-home-community[11]
- http://articles.extension.org/pages/32729/selecting-firewise-plants[12]

Placement of combustible materials such as firewood or wooden structures (sheds, storage or other outbuildings) must be a minimum of 5 m from the primary building (including neighbouring houses). This will limit the potential for these materials to be ignited and spread fire to an adjacent building.

Recommendation 7: Individual homeowners should incorporate FireSmart landscaping principles within their property and remove all flammable coniferous shrubs and hedges (i.e. juniper, cedar hedging) in a 10 m radius around the home footprint. Larger size coniferous trees may be retained depending upon size and proximity to the home. A larger tree can generally be pruned if no more than 35% of its live foliage is removed. If larger trees are capable of being pruned raise the crown base height to a minimum of 3 m above the ground surface. All coniferous foliage above and to the sides of the home must have a separation distance of 5m.

Recommendation 8: Homeowners should remove bark mulch, wood chips, and other flammable surface ground coverings in a 2m radius around the home, outbuildings, decks and stairs. These flammable materials are significant ignition sources which often result in fire spread into the home and represent FireSmart Priority Zone 1a.

Recommendation 9: Encourage individual homeowner participation in removing excess and flammable vegetation from their property by organizing a neighbourhood chipping program, free yard waste drop-off, a scheduled garden debris burning weekend with neighbourhood representatives. Also include distribution of additional educational materials, such as FireSmart landscaping design and FireSmart plant selection information.

[9] Government of Alberta "FireSmart Guide to Landscaping"
[9]Washington Association of Conservation Districts (WACD) Plant Material Center
[10] A Pacific Northwest Extension Publication: Oregon State University, Washington State University, University of Idaho. August 2006.
[11]BC Wildfire Service: Wildfire Prevention for Your Home & Community from Wildfire.
[12] Cooperative extension "Selecting Firewise Plants"

Recommendation 10: Develop an outreach plan to residents to raise public awareness around fire hazard on their property and within their neighbourhood and the actions they can do to reduce the risk. This plan should incorporate public awareness around hazard on their property and within their neighbourhood, and landscaping covenants triggered by re-builds or major renovations which must install FireSmart landscaping. Present opportunities for affordable, aesthetic, low flammability landscaping options that are adapted to the climate (Zone 5a). One such format could be a FireSmart preparedness information day held at the beginning of each fire season in a local venue.

It is important to note that even fire-resistant plants can burn if not maintained. Grass, shrubs, and herbs must be maintained in a state that reduces fire hazard by maintaining foliar moisture content through watering as needed throughout the summer dry months. In times of watering restrictions, place irrigation of plants must be accomplished via a hand-held spring-loaded nozzle attachment to the hose.

6.2.2 FUEL MANAGEMENT

Vegetation management is the planned manipulation and/or reduction of living and dead forest fuels for land management objectives (*e.g.*, hazard reduction). Fuels can be effectively manipulated to reduce fire hazard by mechanical means, such as tree removal or modification, or abiotic means, such as prescribed fire. The goal of fuel management is to lessen potential fire behaviour proactively, thereby increasing the probability of successful containment and minimizing adverse impacts to values at risk. More specifically, the goal is to decrease the rate of fire spread, and in turn reduce fire size and intensity, as well as crowning and spotting potential (Alexander, 2003).

Recommendation 11: Work with the RDOS to apply to the provincial Community Resilience Investment (CRI) program through the FireSmart Community Funding & Supports program to increase community resiliency by undertaking community-based FireSmart planning and activities that reduce the community's risk from wildfire. For homeowners on private land local rebate programs are available to those who complete eligible FireSmart activities on their own properties.

Recommendation 12: In order to reduce the ignition of spot fires during an ember shower becoming rapidly spreading surface fire throughout the community, build an inter-community initiative to control and manage grass during the fire season. This would be divided into two separate categories: 1) Improvement District / Indian Band public or common areas, including road rights-of-way and lane ways; and 2) private property edges adjacent to roads managed by and owned by residents. In addition, explore the feasibility of developing a fire break / path of mown grass and removal of hazardous vegetation and road debris (cars) to act as a fuel break around the community perimeter. Advise the Ministry of Transportation and Infrastructure of initiatives as they manage all local roads and Highway 3.

Recommendation 13: Due to dense conifer regrowth at the north end of the study area and along the bench east of Hedley Creek, which has grown into dense hazardous fuel types. Fuel treatments by the land owners should consist of thinning smaller stems (<12.5cm diameter at breast height [DBH]), raising the crown base heights of individual trees by pruning the lower branches up to a height of 2m, and removing needles / surface litter and disposing offsite (no dumping). The hazardous fuels are ingrown Douglas fir. The objective of fuel treatment is to reduce crown bulk density and ladder fuels an either side of the road to improve its safety as an evacuation route. A qualified professional (QP) should be hired to develop a fuel management prescription and coordination with the land owners is necessary. UBCM funding available for fuel treatment works on public land.

6.3 ACCESS AND EVACUATION

Emergency access and evacuation planning is of particular importance in the event of a wildfire event or other large-scale emergency. Road networks in a community serve several purposes including providing access for emergency vehicles, providing escape/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. If a wildfire were to impact these roads or any of the major evacuation routes described above, smoke and poor visibility, car accidents, wildlife, and other unforeseen circumstances can further complicate evacuations and hinder safe passage.

Highway 3 is the only access and evacuation route to and from the community. If a fire were to impact this transportation corridor, as occurred in the 2020 Almeda fire in Oregon, the safe evacuation of residents would be challenging and entrapment could occur. As such, a review of accessibility issues within the fire protection area is suggested.

Recommendation 14: Develop an evacuation strategy. Designate official evacuation route(s), sign, and ensure they are kept free and clear of debris and unmown, cured grass. Entry points and access routes should have clearly visible signage so routes can be navigated safely during a wildfire to residents and visitors unfamiliar with the area. Access points and evacuation routes should be developed in conjunction with the RDOS and shared with the BCWS, Emergency Management BC, and residents alike. Development of an evacuation plan may be available for funding through the UBCM, if HID and the RDOS conclude that their existing evacuation plan is not sufficient for the needs of the Hedley / USIB community.

Recommendation 15: When developing an evacuation plan, accommodate the need of residents who may have mobility challenges, health issues, or are living alone. This plan should incorporate a shared responsibility for ensuring these individuals will receive timely information updates, regular check ins by neighbours, and assistance during evacuation. One approach could involve stratifying Hedley into different zones comprised of a subset of properties. Within each zone there will be a Zone Leader. Responsibilities for checking in on the welfare of each resident will be shared amongst everyone in the zone or designated to one or two individuals that will report back to the Zone Leader.

Recommendation 16: in order to test the efficacy and safety of evacuation routes before an actual emergency occurs, conduct mock evacuation exercises in the dark to mimic smokey conditions causing poor visibility and disorientation. These exercises should be organized, coordinated and conducted with the HFD and RDOS.

Recommendation 17: Integrate an alternative evacuation route along the Hedley Nickel Plate resource road which begins on the north side of Hwy 3 at a location 2.8 km east of Hedley. The road passes by a mining site before it traverses the saddle between Mt Riordan and Beaconsfield Mountain before the road transitions to Green Mountain road as it passes by Apex Mountain Resort on the slopes of Apex Mountain. Following Green Mountain Rd south, it eventually connects to Hwy 3A which is the connecting route between Keremeos (south) and Penticton and Skaha Lake (north). Hedley Nickel Plate Rd is ~ 2.4m wide and the foregoing road description is 3.8 km in length. Alternatively, explore the possibility of staging a temporary safe zone if Hwy 3 to the west or east is blocked by wildfire. Hedley Nickel Plate Rd could offer access to potential shelter in place sites in the open and non-fuel areas of the open pit mine site and associated buildings located ~ 8 km north from Hwy 3. The mine is privately owned and contact with the owner will be necessary to establish and formalize a portion of the area as an EOC or safe zone where people could congregate in an emergency.

Recommendation 18: HFD should set up communication plan and required communication equipment needed for ongoing and regular contact with BCWS in the event of an emergency. This plan should be reviewed every year prior to the start of the fire season, and update personnel, contacts, scope of responsibilities for HID and BCWS, hierarchy of command and communication, and external emergency response agencies.

Recommendation 19: Develop an emergency communication plan and network of distributing individuals to ensure all members of the community are apprised of evacuation alert or evacuation order situations.

Recommendation 20: Hedley / USIB should engage in regular communication with the BCWS Penticton Fire Zone (K5) to foster a strong relationship and identify potential cooperative wildfire risk reduction opportunities. This could include communication protocols between the RDOS, BCWS, and Hedley / USIB during an emergency to formulate tactical responses, evacuation procedures, or disseminate information on evolving situations.

Recommendation 21: The residents of Hedley and the USIB should designate a community coordinator to set up a neighbour communication and alerting system to ensure that all residents receive emergency information in a timely way. The system should integrate multiple forms of communication including door checks, phone calls, social media to capture everyone irrespective of age, mobility and access to digital sources. A good neighbour system may also suffice and could be that the residents of each block communicate with one another and look out for one another during the fire season and should be reviewed and coordinated at the community level at the start of each fire season so everyone is aware and clear of their responsibility. This kind of system is applicable for all emergencies.

Recommendation 22: To address the challenges associated with leveraging revenue from a small population of people situated in a wildfire prone environment, Hedley in collaboration with the RDOS should:

- apply to the UBCM for FireSmart funding for FireSmart activities on private land (coordination of community FireSmart events, community chipping days, and / or a FireSmart local rebate program); and

- In collaboration with the RDOS, apply for Wildfire Risk Reduction (WRR) program funding for the treatment of hazardous fuels on public land as identified in the 2020 RDOS Community Wildfire Protection Plan.

6.4 CRITICAL INFRASTRUCTURE

6.4.1 POWER SUPPLY AND DELIVERY (FORTIS BC) WATER SUPPLY AND DELIVERY (HID)

Water is the single most important suppression resource. Recommendations include: installing reservoir or hydrant systems in areas of poor water availability, identifying and mapping alternative water sources, and ensuring new developments have sufficient hydrant coverage. Improving water availability in identified areas and mapping alternative water sources is ongoing and should continue.

Back-up power sources should be installed for all critical infrastructure, including pump-supplied water systems, to ensure the system can continue to operate at an acceptable level during a wildfire event.

Recommendation 23: To address water capacity shortages to fight multiple fires, HID should explore additional measures to provide secondary water supply sources and homeowner self-sufficiency, by applying for funding through FireSmart Canada and / or the UBCM to administer a program that allows the purchase of 500-gallon cisterns for individual homes. Participating homeowners could complement this with the purchase of rooftop sprinkler kits, garden hose and small pump directly connected to the cistern.

Recommendation 24: Develop a strategy to manage wood power poles and electrical outages and disruption of power. Purchase or re-purpose a back-up generator for the reservoir in the case of a power outage.

Recommendation 25: Explore the feasibility of funding future water system improvements through the Regional District of Okanagan Similkameen by the Hedley Improvement District amalgamating with them. This would allow a steady source of funding as well as the provision of an engineer to plan and run projects.

Recommendation 26: Explore the feasibility of moving Hedley's potable supply to the Similkameen aquifer meaning the Upper Similkameen Indian Band would become the service provider for the water supply. Not only would this provide a safer level of potable water as the Similkameen aquifer has less arsenic in it, but it would also allow the 60 hp pump for the Hedley Creek aquifer to become solely available for water suppression services.

Recommendation 27: Specify a suitable area of Hedley Creek to designate the Keremeos water tanker and bladder to draw water easily. The designated could include an engineered headwall to support the tanker or a stand pipe possessing fittings to attach hoses.

7.0 ROLES AND RESPONSIBILITIES

There are a range of hierarchies and relationship between all the different players involved in moving the Hedley/USIB study area to a more wildfire resilient community, and includes:

- All Hedley and Band residents;
- The FireSmart Community Group;
- Communication between individual residents, in particular neighbours that are directly adjacent to one another;
- Collaboration with the RDOS; and
- Interaction with emergency responders (RCMP, Emergency Management BC, BCWS) during emergency response situations;

8.0 NEXT STEPS

This Community Assessment Report contains the necessary information and forms the basis from which a FireSmart Community Plan can be developed. The recommendations contained within this report should be implemented in a collaborative manner amongst residents and Band members, the RDOS, and outside agencies as necessary, and should be updated and modified as needed over time. A multiplicity of groups and agencies with varied jurisdictions over land use in the Regional District of Okanagan Similkameen including municipal, regional and provincial authorities, First Nations, and utility providers will be important partners throughout the implementation of this report and the development of an actionable FireSmart Community Plan. Ultimately, this FireSmart initiative, and subsequent wildfire

mitigation actions have been and will be created by the community of Hedley / USIB for the Hedley Fire Protection area.

After reviewing the content of this assessment and its recommendations, the Hedley / USIB FireSmart Board will be created, and in consultation with its advisors will determine whether or not it wishes to pursue seeking FireSmart Community recognition status.

If the report and recommendations are accepted and recognition sought, the Hedley / USIB FireSmart Board will create agree-upon, area-specific solutions to the FireSmart Community Assessment Report recommendation and prepare a FireSmart Community Plan in cooperation with their LFR, the RDOS and Hedley Fire Department and local Emergency Coordinator personnel.

Assuming Hedley / USIB seeks to achieve national recognition as a FireSmart Community, it will integrate the following standards into its FireSmart Community Plan:

- Sponsor a local FireSmart Board that maintains the FireSmart Community program and recognition status;
- Continue to work with the LFR or enlist the assistance of a WUI specialist to complete a FireSmart Community Plan which identifies agreed-upon, achievable local solutions;
- Invest a minimum of $2.00 annually per capita in its local FireSmart events and activities (work done by volunteers, as can provincial grants dedicated for that purpose);
- Hold a FireSmart event (*e.g.* FireSmart Day, community chipping and disposal day) each year that is dedicated to a local FireSmart project; and
- Submit an application form with supporting information to FireSmart Canada. This application process documents continuing participation in the FireSmart Communities Program with respect to the above criteria.

Recommendation 28: In order to facilitate connection with all members of the community, and to avoid reliance on digital communication methods as the primary means for disseminating information, the Community Group should consider tasking themselves, or another small group of interested residents to spread the word through face to face meetings, door to door visits or phone calls to those community members without access to digital resources. Both digital and non-digital media and methods can be used to comprehensively educate and inform wildfire protection and preparedness issues and initiatives to residents.

Recommendation 29: The FireSmart Committee should develop a community newsletter and posters (digital and hardcopy versions) and a Hedley Fire Department Facebook page as a means to inform, educate, and reach out to all community members irrespective of their access to the internet or personal computer / handheld device about ongoing and upcoming wildfire information and FireSmart community events. In addition, FireSmart information, fire danger ratings and FireSmart community initiatives can be displayed on bulletin boards at HFD, Hedley Museum, Hedley Market, and the Seniors' Centre, as well as the Upper Similkameen Community Band Office and Community Building.

9.0 REFERENCES

Alexander, M.E. 2003. Understanding Fire Behaviour – The key to effective fuels management. Fuel management workshop. Hinton, AB.

Klinka, K., and Green, R.N. A field Guide for Site Identification and Interpretation for the Vancouver Forest Region. Province of BC – Ministry of Forests Research Program, Victoria BC. 1994

Lloyd, D, K. Angove, G. Hope and C. Thompson. 1990. A Guide to Site Identification and Interpretation for the Kamloops Forest Region. Land Management Handbook No. 23. ISSN 0229-1622.

Meidinger D. and Pojar, J. *Ecosystems of British Columbia – Special Report Series 6*. British Columbia Ministry of Forests – Research Branch, February 1991.

National Fire Protection Association. *Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas (1141)*. 2012.

National Fire Protection Association. *Standard for Reducing Structure Ignition Hazards from Wildland Fire (1144).* 2012.

PCIC, 2014: Testing the Monthly drought code as a metric for fire weather in southeast BC, Summary Report. Shumlich, M. (ed).

Partners in Protection. *Wildfire Hazard Assessment System*. In FireSmart: Protecting Your Community from Wildfire. Chapter 2: 1 – 31, 2003.

Partners in Protection Program. *FireSmart Homeowner's Manual.* BC Wildfire Service, 2009.

Spittlehouse, D.L. 2008. Climate change, impacts, and adaptation scenarios: climate change and forest and range management in British Columbia. B.C. Ministry of Forests and Range, Resources Branch, Victoria, B.C. Technical Report 045. Accessed December 12, 2018: https://www.for.gov.bc.ca/hfd/pubs/docs/Tr/Tr045.htm.

Westhaver, A. 2017. Why some homes survived: Learning from the Fort McMurray wildland/urban interface fire disaster. Retrieved from: https://issuu.com/iclr/docs/westhaver_fort_mcmurray_final_2017

10.0 SIGNATURES OF LOCAL FIRESMART REPRESENTATIVE

Project Forester

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November 27, 2020

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November 27, 2020

APPENDIX 1

FCCRP COMMUNITY WILDFIRE HAZARD ASSESSMENT FORM

This Community Wildfire Hazard Assessment form provides a written evaluation of the overall community wildfire hazard – the prevailing condition of structures, adjacent vegetation and other factors affecting the FireSmart status of a small community or neighbourhood. This hazardis based on the **hazard factors** and **FireSmart recommended guidelines** found in **FireSmart: Protecting Your Community from Wildfire** (Partners in Protection, 2003) and will assist the Local FireSmart Representative in preparing the FireSmart Community Assessment Report. **NOTE: Mitigation comments refer to the degree to which the overall community complies or fails to comply with FireSmart recommended guidelines with respect to each hazard factor**

Community Name: Hedley / Upper Indian Similkameen Band		**Date: (mm/dd/yyyy)** August 7, 2020
Assessor Name: Bruce Blackwell, Judith Cowan		**Accompanying Community Member(s):** Ken Hoyle, Hedley Fire Department Manager
Hazard Factor	**Ref**	**Mitigation Comments**
1. Roof Assemblies		
a. Type of roofs ULC rated (metal, tile, asphalt, rated wood shakes) unrated (unrated wood shakes)	2-5 3-21	There is a mix of roofing materials - mainly asphalt composition shingles. A few homes have cedar shake or metal roofing.
b. Roof cleanliness and condition * *Debris accumulation on roofs/in gutters; curled damaged or missing roofing material; or any gaps that will allow ember entry or fire impingement beneath the roof covering*	2-6	The accumulation of needles from Douglas fir and ornamental conifers on roofs and in gutters was common for those homes which have mature trees close to the home.
2. Building Exteriors		
2.1 Materials		
a. Siding, deck and eaves	2-7 2-8 2-9	Many homes were older building stock, and composed entirely of wood; some homes had vinyl siding; a few were clad in stucco
b. Window and door glazings (single pane, sealed double pane)	2-10	It can be assumed that all newer homes built after 1970 have double-paned windows, older homes may have single-paned glazing
c. Ember Accumulator Features (scarce to abundant) * *Structural features such as open eaves, gutters, unscreened soffits and vents, roof valleys and unsheathed crawlspaces and under-deck areas*		Moderate to abundant. Decks, roof valleys, and overhanging projections and open gutters.
d. Nearby Combustibles – firewood, fences, outbuildings	2-11	Abundant. Many homes had combustible debris in their yards and spilling onto the street or laneways.

FCCRP COMMUNITY WILDFIRE HAZARD ASSESSMENT FORM

Hazard Factor	Ref	Mitigation Comments
3. Vegetation		
3.1 **PZ-1:** Vegetation - 0 - 10m from structure **Page Reference 3-5**		
a. Overstory forest vegetation (treated vs. untreated)	2-14	Douglas fir C-3 stands on the bench east of Hedley Creek. Stand alone specimens of Douglas fir and ornamental conifers closer to homes.
b. Ladder fuels (treated vs untreated)	2-17	Some lots had tall cedar hedging planted in linear alignments along property boundaries, often connecting to structures and combustibles. They are surface, ladder and canopy fuels combined into a single plant and highly capable of spreading fire and igniting structures.
c. Surface fuels - includes landscaping mulches and flammable plants (treated vs untreated)	2-16	Cured and unmaintained grasses form an interconnected network throughout the community along boulevards, road rights of ways and building edges. This material is capable of spreading a surface fire quickly throughout the community. Juniper ground cover on some properties.
3.2 **PZ-2:** Vegetation - 10 - 30m from structures **Page Reference 3-9**		
a. Forest vegetation (overstory) treated vs untreated	2-14	Consists primarily of Douglas fir C-3 fuel type adjacent to homes at the furthest extent of the WUI (streets north of Websters St). Crown land lies immediately to the north of the project area
b. Ladder fuels treated vs untreated	2-17	Most ladder fuels are young to mature Douglas fir.
c. Surface fuels treated vs untreated	2-16	Composed of common juniper, native grasses, and some invasive species. Surface layer of conifer needles and cured grasses often present.
3.3 **PZ-3:** Vegetation - 30 - 100m from structures **Page Reference 3-13** Provide mitigation comments on the prevailing PZ3 fuel type		
a. Light fuel - deciduous – grass, shrubs	2-16	Expanses of cured grasses which over easily ignitable fuel

FCCRP COMMUNITY WILDFIRE HAZARD ASSESSMENT FORM

Hazard Factor	Ref	Mitigation Comments
b. Moderate fuel - mixed wood – light to moderate surface and ladder fuels, shrubs	2-17	common juniper, soopolallie, birch-leaved spirea, Saskatoon berry, snowberry
c. Heavy fuel - coniferous - moderate to heavy surface and ladder fuels, shrubs	2-14	Dense C-3 stands of young Douglas fir are encroaching into the WUI in areas formerly occupied by grasslands, and is a result of active fire suppression over the last century
d. Logging slash, dead/down fuel accumulations	2-16	No slash or dead/down fuel accumulations
e. Diseased forest – without foliage vs with foliage		No significant forest health factors observed
f. Fuel islands within community - treated vs untreated		Fuel islands are scattered throughout the study area and dense C-3 fuel types occupy Crown land and the bench east of Hedley Creek. Extensive areas of grass occur on public and private property.
4. Topography		
4.1 Slope (within 100m of structures)		
a. Slope - Flat or < 10 %, 10 – 30% or >30%	2-19	The Hedley / Upper Similkameen Indian Band study area occupy the Similkameen valley along Highway 3 and can be consider flat or <10 % slope. The study area is surrounded by steep rocky bluffs to the north and east.
4.2 Buildings setback on slopes >30 %, position on slope Provide mitigation comments on items a – c as applicable		
a. Setback from top of slope > 10m, or bottom of slope – valley bottom. b. Buildings located mid-slope c. Setback from top of slope <10m, or upper slope	2-12	Hedley is a compact community with relatively small lots. The portion of USIB in the Hedley Fire Protection Area has larger lot sizes, comparatively. The study area is at the base of steep rocky bluffs vegetated with grass and dense C-3 stands making it vulnerable to ember showers.

FCCRP COMMUNITY WILDFIRE HAZARD ASSESSMENT FORM

Hazard Factor	Ref	Mitigation Comments
5. Infrastructure – Access / Egress, Roads, Driveways and Signage		
5.1 Access Routes – Road Layout To FireSmart Recommended Guideline?		
a. Single Road or Looped Road	3-28	The study area is adjacent to Highway 3. Roads form a network with multiple access points, except for those homes at the edges of the community situated at the end of roads. These can be considered single access routes.
5.2 Roads- width, grade, curves, bridges and turnarounds		
a. To FireSmart Recommended Guideline?	3-30	Primarily paved, but are narrow in some sections.
5.4 Fire Service Access / Driveways - Grade, Width/Length, Turnarounds		
a. To FireSmart Recommended Guideline?	3-30	Property owner debris, and multiple cars effectively narrow the width of the streets for emergency vehicles to access and for the safe evacuation of residents.
5.5 Street Signs / House Numbers		
a. To FireSmart Recommended Guideline?	3-30	Variable - some were visible; while others not.
6. Fire Suppression - Water Supply, Fire Service, Homeowner Capability		
6.1 Water Supply		
a. Fire Service water supply – hydrants, static source, tender or no water supply	3-32	Hedley Improvement manages the water supply and the pressure during the summer months cannot always compete with fire suppression equipment. Agreement with Keremeos for use of their water tender to draft water from Hedley Creek.
6.2 Fire Service		
a. Fire Service < 10 minutes or > 10 minutes, no fire service	2-25	Hedley Fire Department has < 10 min fire service as it is in the community
6.3 Homeowners Suppression Equipment		
a. Shovel, grubbing tool, water supply, sprinklers, roof-top access ladder	3-28	Assessment did not go to this detail. Hedley Fire Department may know more.