Eveningstar

FIRESMART COMMUNITY ASSESSMENT REPORT

Prepared for

TOWN OF OLIVER

&

EVENINGSTAR/SPARTAN PLACE RESIDENTS

January 2018

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1.0 Introduction

The FireSmart Canada Community Recognition Program is designed to provide an effective management approach for preserving wildland living aesthetics while reducing community ignition potential during a wildland-urban interface (WUI) fire. The program can be tailored for adoption by any community and/or neighborhood association that is committed to ensuring its citizens maximum preparation for wildland fire. The following Community Assessment Report (CAR) is intended to be a resource for residents of Eveningstar for carrying out the recommendations and actions contained in the Eveningstar FireSmart Community Plan (FCP).

Although this FireSmart project is referred to as the *Eveningstar* FireSmart project for simplicity, the project area includes the neighbourhood depicted in Figure 1, and contains the following residential roads:

- Eveningstar Crescent;
- Eveningstar Close
- Spartan Place

Both the CAR and FCP have been developed by a trained Local FireSmart Representative (LFR). Funding for the Eveningstar FireSmart project was provided by the Union of BC Municipalities (UBCM) Strategic Wildfire Prevention Initiative in the form of a FireSmart Planning Grant to the Town of Oliver. The grant enabled Oliver to retain the services of Davies Wildfire Management Inc. to manage the project, in collaboration with the Town.

This project did not result in the creation of a FireSmart Board for the neighbourhood, as very little interest was shown by residents to take part in the FireSmart community recognition program. All deliverables required to make an application to FireSmart Canada for community FireSmart recognition have been prepared through this project should interest in forming an Eveningstar FireSmart Board materialize in the future.

Community assessments were carried out in May and October 2017 by Andrew Low, RPF.

FIGURE 1 The Eveningstar FireSmart project area is comprised of Eveningstar Court and Close and Spartan Place within the Town of Oliver.

2.0 Definition of the Ignition Zone

Eveningstar is situated in a wildfire environment. The wildland areas surrounding the community are typical of ecosystems that have developed with historically frequent low intensity fires. With the advent of modern forest protection policies, the typical fire cycle has been interrupted, contributing to a host of cascading ecological effects, including a buildup of forest fuels.

Wildfires have and will continue to occur in the Okanagan – attempting to eradicate fire has proven to be an impossible strategy. The variables in a wildfire scenario are when the fire will occur, and where. This assessment report addresses the wildfire- related characteristics of Eveningstar and examines the area's exposure to wildfire as it relates to home ignition potential. The assessment does not focus on specific homes, but examines the entire community.

A house ignites during a wildfire 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 action that can prevent home loss. To accomplish this, flammable items such as excessive vegetation and flammable debris must be removed from the area immediately around the structure to prevent direct flame contact with the house. Reducing the volume of live and dead vegetation will affect the intensity of the wildfire as it nears the home.

Included in this assessment are observations made while visiting Eveningstar. The assessment addresses the ease with which home ignitions can occur under severe wildfire conditions and how these ignitions might be avoided

within the ignition zones of affected residents. Eveningstar residents can reduce the risk of structure loss during a wildfire by taking actions within their ignition zones. This zone principally determines the potential for home ignitions during a wildland fire; it includes a house and its immediate surroundings within 100 m (Figure 2). Given the extent of this zone, the ignition zones of several homes sometimes overlap, and often spill over onto adjacent public or community land.

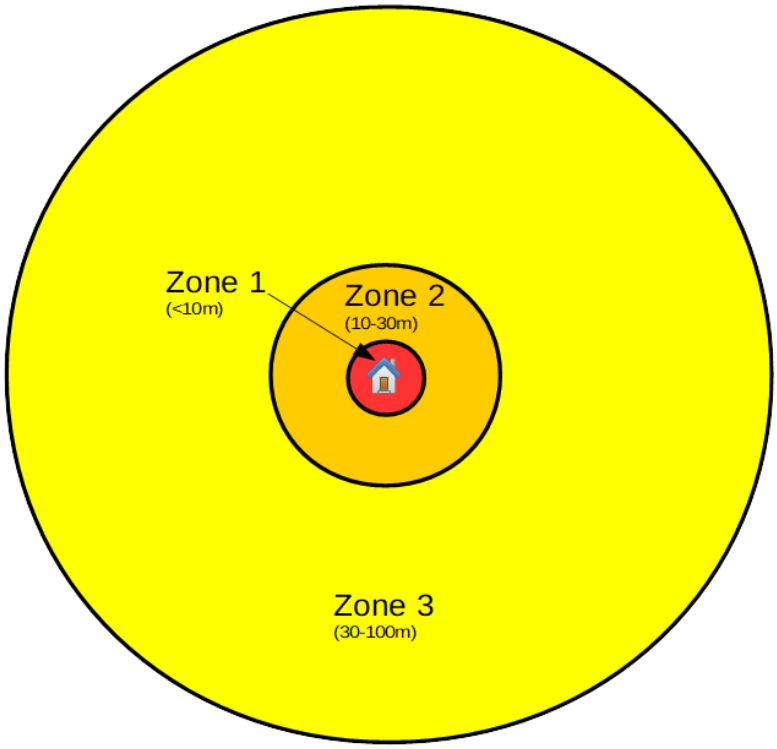


FIGURE 2 FireSmart Canada utilizes the concept of three priority zones surrounding a home to help residents prioritize their hazard reduction efforts. A home's immediate surroundings (Zone 1) is of immediate concern to the homeowner and should targeted aggressively to reduce ignition hazards to the home.

The results of the assessment indicate that wildfire behaviour 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. Relatively small investments of time and effort will reap great rewards in wildfire safety.

3.0 Description of the Fire Environment

Wildland fire behaviour is influenced by the interaction of three broad environmental factors: fuel, weather and topography. Collectively, these factors describe the fire environment and determine the intensity and rate of spread of a wildland fire. A working knowledge of the factors that characterize the fire environment is helpful to building an awareness of hazard mitigation at the site level.

3.1 Fuels

In the context of wildland fire, fuel refers to the organic matter involved in combustion. When referring to the wildland-urban interface, structures, vehicles and other improvements become a component of the fuel complex. An awareness of the fuel conditions around the home will help residents properly assess and mitigate fuel hazards.

In Canada, wildland fuels are classified into 16 fuel types within the Canadian Forest Fire Behaviour Prediction (FBP) System. The FBP system is informed by the Canadian Forest Fire Danger Rating System (CFFDRS), which is the primary tool to obtain predictive wildfire management intelligence used by agencies across Canada.

3.1.1 Fuel layers

The structure and arrangement of fuels are described in terms of their horizontal and vertical continuity within three broad layers of the fuel complex – ground fuels, surface fuels and canopy (or aerial) fuels (Figure 3). Ground fuels occupy the *duff layer* and the uppermost portions of the soil mineral horizon. In general terms, the duff layer is comprised of decomposing organic material and is found beneath the litter layer and above the uppermost soil mineral horizon (A-horizon). The constituents of the duff layer lack identifiable form due to decomposition (as opposed to the *litter layer*, which is composed of identifiable material).

The surface fuel layer begins above the duff layer and extends 2 m vertically. Surface fuels are characterized by the litter layer (leaves, needles, twigs, cones etc.) as well as plants and dead woody material up to a height of 2m. In some cases, surface fuels may act as *ladder fuels* that can carry fire from the surface fuel layer into the canopy layer.

Canopy fuels are the portions of shrubs and trees that extend from 2 m above the duff layer, upwards to the top of the fuel complex. Certain tree species, such as several spruce species (*Picea sp.)* are characterized by branches extending down to the forest floor, whereby these lower branches act as ladder fuels. Other species, particularly those found in drier, fire-maintained ecosystems, such as Ponderosa pine, lack these ladder fuels and form a distinct separation between the surface fuel layer and canopy fuel layer.

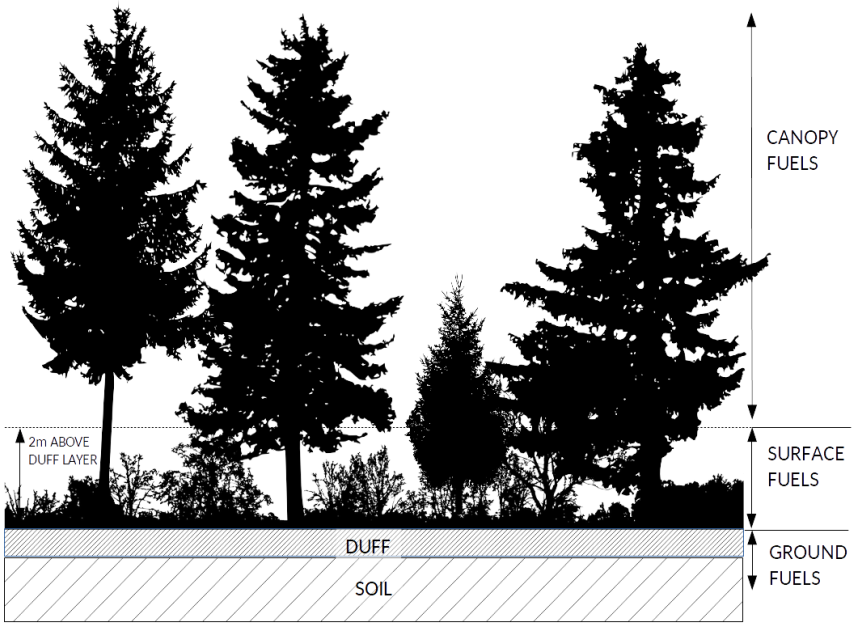


FIGURE 3 Wildland fuels can be described within three broad fuel layers: Ground fuels, surface fuels (to a height of 2 m above the duff layer), and canopy fuels. Canopy fuels are also referred to as aerial fuels.

3.1.2 Fuel size

Wildland fuel can be further described in terms of relative size – so called *fine fuels* and *coarse* or heavy fuels. Fine fuels include leaves and conifer needles, grasses, herbs, bark flakes, lichen, twigs etc. Large branches, downed logs and other large woody material are considered coarse or heavy fuels. Fine fuels have a higher surface area/volume ratio than coarse fuels, and this characteristic influences the rate of drying and ease of ignition.

With a higher surface area/volume ratio than coarse fuels, fine fuels are more readily influenced by changes in environmental conditions (e.g. relative humidity, wind, precipitation etc.). Dead fine fuels react to changes in environmental conditions at a relatively faster rate than green (i.e. live) fine fuels.

When available to burn, fine fuels ignite more easily and spread fire faster than coarser fuels. This characteristic makes fine fuels particularly susceptible to ignition from embers. For any given fuel, the more there is and the more continuous it is, the faster the fire spreads and the higher the intensities. Finally, fine fuels take a shorter time to burn out than coarser fuels.

3.2 Weather

Weather conditions affect the moisture content of wildland fuels and influence the rate of spread and intensity of a wildland fire. Weather is the most dynamic element of fire environment and the most challenging to assess and forecast.

3.2.1 Wind

Wind speed and direction influences the rate and direction of spread of a wildland fire. The application of wind on

open flame has the effect of tilting the flame away from the wind, and, in the case of wildland fire, placing the flame into closer proximity (or contact) with downwind fuels, and contributing to fire spread. Wind can also contribute to a preheating effect on fuels immediately downwind from open flame.

Wind can also hasten the drying process of exposed fuel, with the rate of drying being a function of the surface area/volume ratio. Having a relatively higher surface area/volume ratio, fine fuel moisture content is affected to a greater degree by wind when compared to coarse fuel.

3.2.2 Precipitation and relative humidity

The effect of moisture, in the form of precipitation or atmospheric moisture, on wildland fuel is dependent on the size and state of the fuel. The moisture content of dead fine fuel is highly reactive to changes in relative humidity, precipitation and wind. Fine fuels require less precipitation to reach saturation than do coarse fuels, and in turn dry out at a faster rate.

The moisture content of wildland fuel is constantly seeking to equalize with the moisture content of the surrounding air. This effect is most pronounced with dead fuel. When the relative humidity is high, dead fine fuels will readily absorb moisture *from* the air and conversely, when the relative humidity is low, dead fine fuels will readily give up moisture *to* the air.

3.3 Topography

In the context of the fire environment, topography refers to the shape and features of the landscape. Of primary importance for an understanding of fire behaviour is slope. When all other factors are equal, a fire will spread faster up a slope than it would across flat ground. When a fire burns on a slope, the upslope fuel particles are closer to the flame compared to the downslope fuels. As well, hot air rising along the slope tilts the flame uphill, further increasing the ease of ignition of upslope fuels. A pre-heating effect on upslope fuels also contributes to faster upslope fire spread.

Topography influences fire behavior principally by the steepness of the slope. However, the configuration of the terrain such as narrow draws, saddles and so forth can also influence fire spread and intensity. Slope aspect (i.e. the cardinal direction that a slope faces) determines the amount and quality of solar radiation that a slope will receive, which in turn influences plant growing conditions and drying rates.

3.4 Eveningstar Fire Environment

Eveningstar is situated in a fire environment characterized by fuel, weather and topographical factors that are conducive to the type of fire behaviour that could lead to home losses in the event of a WUI fire. An awareness of these conditions is key to focusing on the critical elements of hazard mitigation at the site level.

3.4.1 C7 Fuel type

In the Eveningstar area, the FBP fuel type is O1-Grass. The O1 fuel type is characterized by continuous grass cover and occasional trees and shrubs. Generally, surface fuels are characterized by perennial grasses, herbs, and scattered shrubs. In the absence of periodic fire (or other maintenance), sagebrush tends to build up and become decadent. Duff layers are relatively shallow – typically less than 3 cm.

3.4.2 Climate and weather

The climatic conditions of the southern interior of British Columbia are broadly characterized by warm, dry summers and cool winters. The south Okanagan is classified as a cold semi-arid climate. Not surprisingly, July - August is the period with lowest average relative humidity and highest daily average temperatures. What may be surprising to people not familiar with the southern interior climate is that June is normally the month with the highest average precipitation amounts (Figure 4).

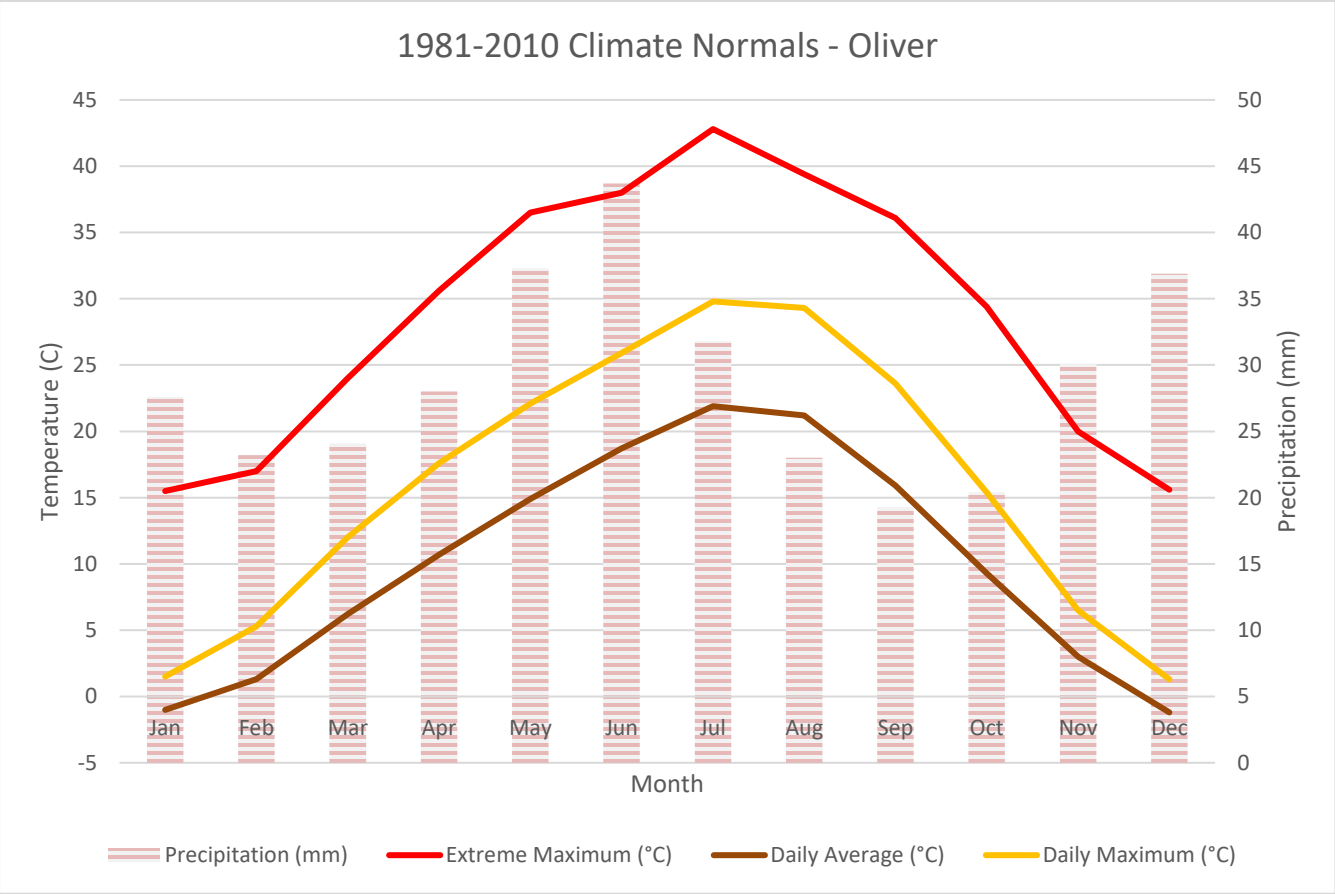


FIGURE 4 Canadian climate normals (1981-2010) for the Environment Canada station at Oliver. June is normally the month with the greatest amounts of precipitation.

Absent from the climate normals dataset for this particular station is average relative humidity information. Relative humidity in the teens or even lower do occur in the Okanagan during the peak fire season. 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 behaviour. For example, an ambient air temperature of 30°C and a relative humidity of 25% (an example of a condition known as *cross-over*) can contribute to a greater ease of ignition in fine fuels, faster rate of spread and higher fire intensity.

3.4.3 Topography

Eveningstar is situated at the base of Oliver Mountain (Figure 6). Immediately to the north-west of the area, the terrain rises steeply up the south-east face of Oliver Mountain. The Eveningstar area has multiple access/egress routes via looped roads.

FIGURE 5 Hillshade map of the Eveningstar FireSmart project area.

4.0 Site Description

The Eveningstar FireSmart project area is approximately 5.5 ha and includes 44 homes (Figure 7). The project area has seen development occurring at various times, with initial residential construction beginning in the mid 1970's and continuing up to the present infill of the last remaining undeveloped lot. The average lot size is approximately 20,000 sq ft and the overall home density the project area is roughly eight homes per hectare.

FIGURE 6: The Eveningstar FireSmart project area is approximately 2.8 ha and includes 24 homes. Home density is approximately 8.6 homes per hectare.

4.1 Ecology

The ecological classification of the area is defined as the Bunchgrass biogeoclimatic zone, specifically the Very Dry Hot subzone (BGxh). The natural disturbance pattern of the BGxh has been characterized by historically *frequent low-intensity fires* prior to the fire-return interval being interrupted by contemporary forest management and fire suppression policies. Low-intensity surface burns consume understory fuels while retaining occasional large trees, mainly Ponderosa pine and Douglas-fir. These frequent fires kept ladder fuels to a minimum and typically resulted in an open, grassy areas.

In the absence of periodic low intensity fire in the area, small trees and sagebrush that would have typically been fire-killed have become established, increasing the fuel load and resulting in relatively higher fire intensity. Fine fuels, most notably decadent sagebrush and dead Ponderosa pine needles, have accumulated resulting in higher fine fuel loading that could produce fire intensity great enough to result in lethal scorching of the few trees whose thick bark would have otherwise protected the vital phloem and cambial tissues.

4.2 Land Status

The land within the Eveningstar project area is residential private property. Abutting the north-west side of the project area is the Oliver Mountain proposed protected area.

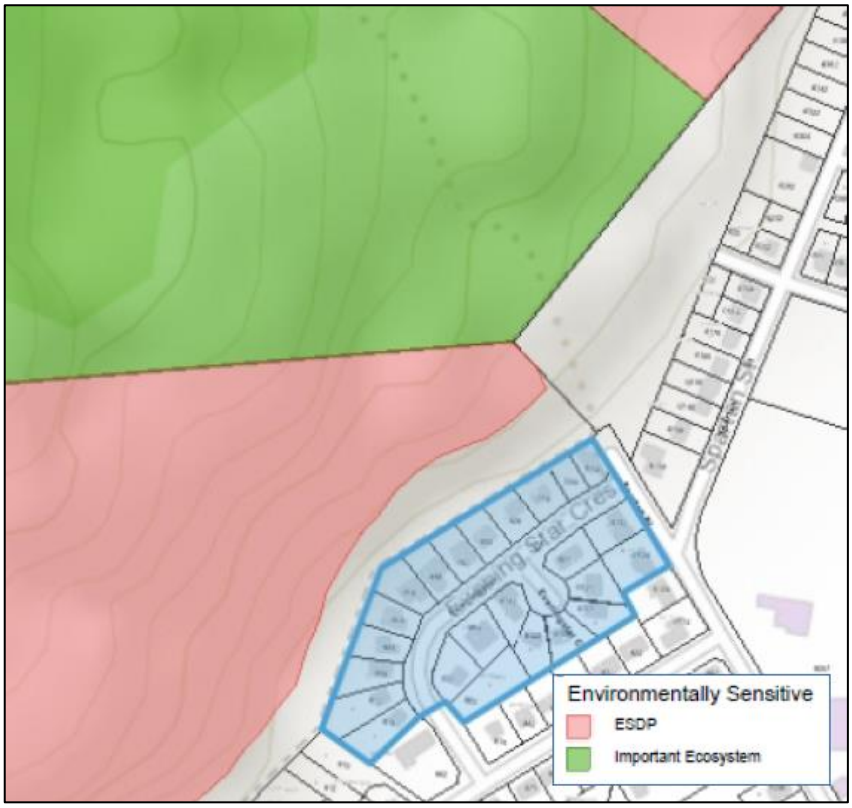


FIGURE 7 The Eveningstar FireSmart project area is bordered by the Oliver Mountain proposed protected area.

4.3 Fire History

Fire history data from the provincial government indicates that large wildfires have been a regular occurrence in the immediate Oliver area since contemporary fire record-keeping began in the early 1900s and certainly well before that. The ecology of the area is typical of landscapes that experienced frequent low-intensity natural and anthropogenic fires in the past, so the area should be viewed as one that has seen frequent and extensive wildfires – in excess of what is reflected in the government fire record.

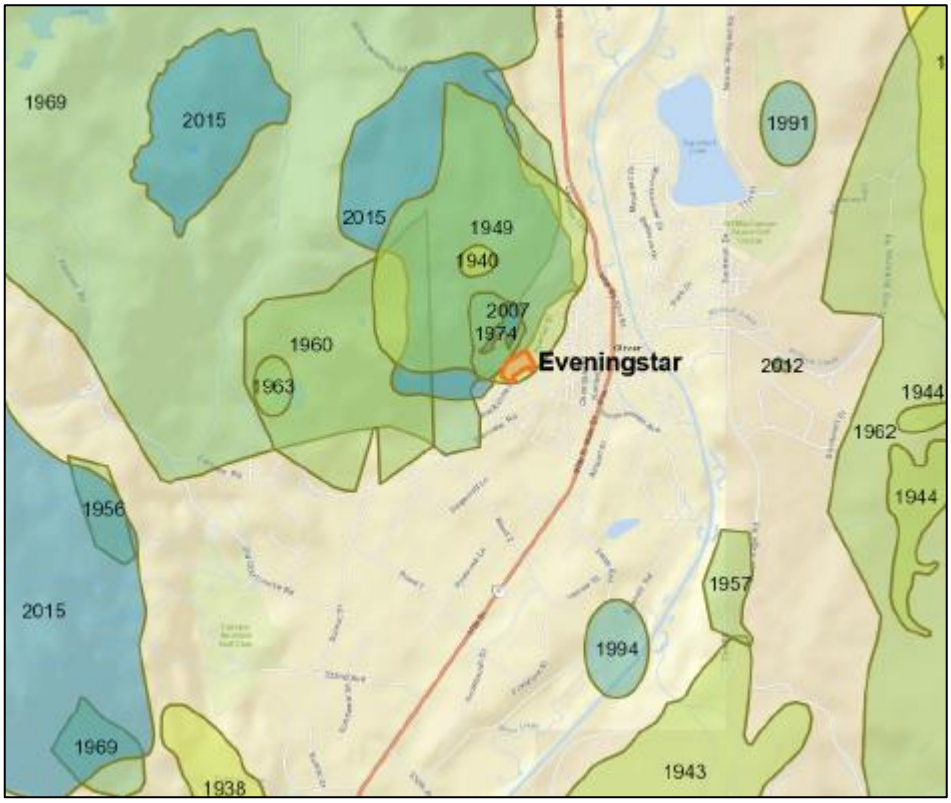


FIGURE 8 Historic fire perimeters (greater than 3ha) dating back to the early 1900s, as recorded in the BC Wildfire Service fire history database. See Appendix 3 for map image.

In the 1950s detailed wildfire record-keeping was standardized and is available from the province for analysis. This dataset indicates that a number of smaller fires (< 3 ha) have occurred in close proximity to the Eveningstar FireSmart area since that time. As illustrated in Figures 9 and 10, numerous small wildfires have occurred within 2 km of Eveningstar since 1950.

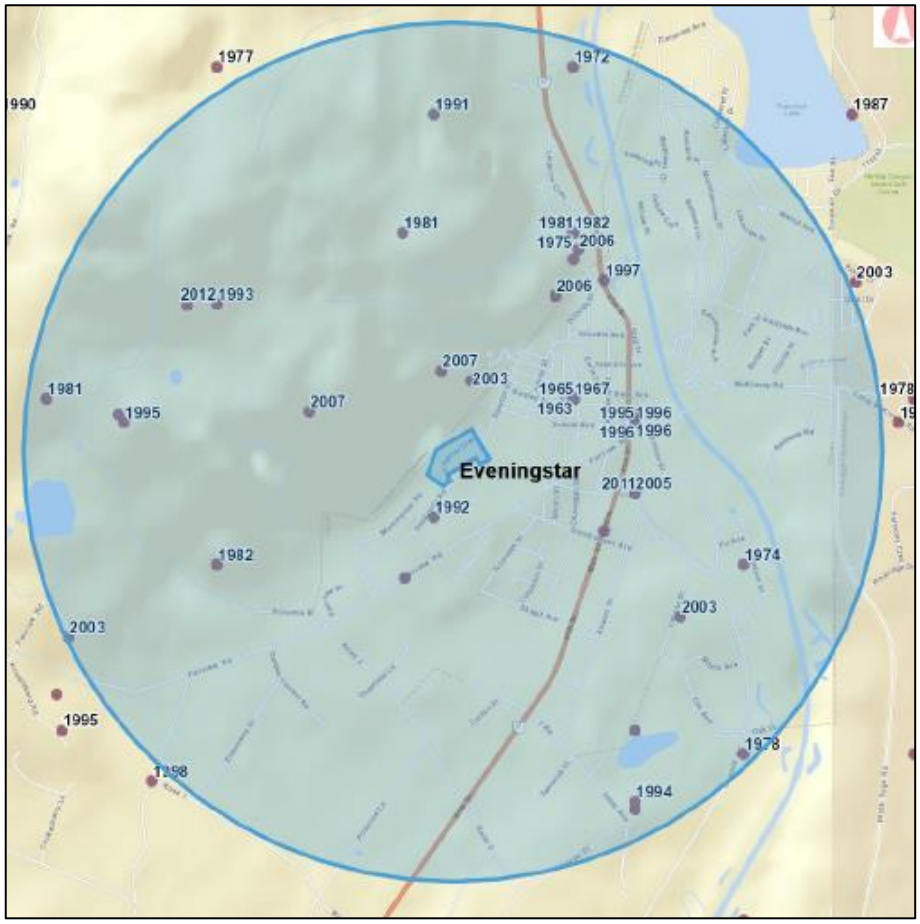


FIGURE 9 Historical fire points (<3 ha) in the Oliver area, including fires that have occurred within 2 km of the Eveningstar project area since the 1950s. See Appendix 3 for map image.

4.3.1 Past wildfires near Eveningstar

The modern provincial dataset for detailed fire information, including fire cause, dates to the 1950s. This dataset shows a total of 60 wildfires occurring within approximately two kilometers of the Eveningstar project area between 1950 and 2017. Of these fires, 13 are recorded as lightning-caused and remainder as person-caused (Figure 10). The most fires in a single year (1 lightning and 4 person-caused fires) occurred in 2007.

It should also be noted, as mentioned in Figure 10, that this analysis only includes wildfires listed in the provincial dataset and does not reflect small fires that may have been suppressed by the fire department without any assistance from BCWS crews or aircraft.

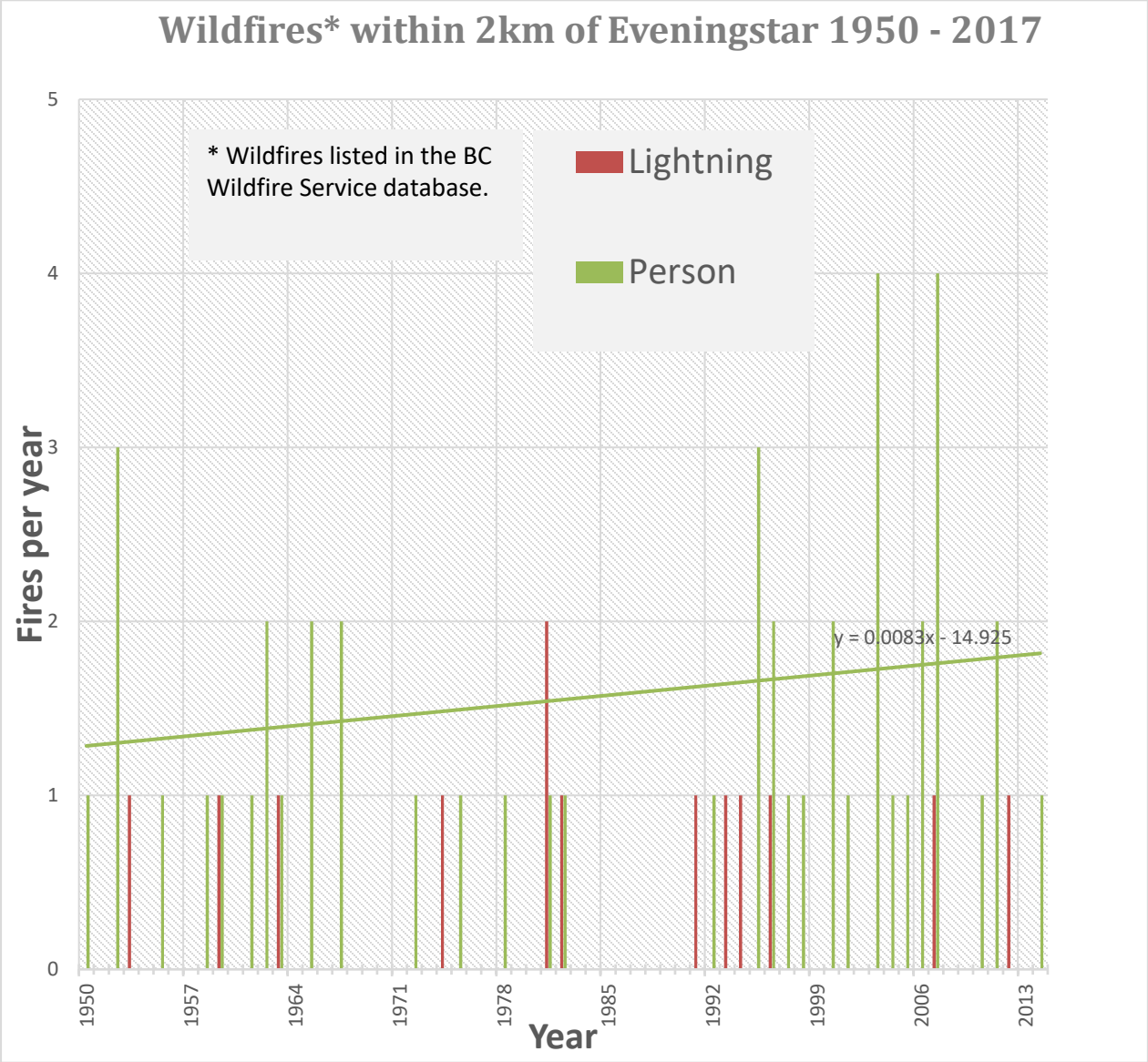


FIGURE 10 Wildfires that have occurred within 2km of Eveningstar, from 1950 to 2017, as recorded in the BC Wildfire Service fire history database.

5.0 Assessment Process

An initial reconnaissance of the project area was conducted in May 2017 by the author to gain familiarity with the neighbourhood in the context of FireSmart guidelines. A letter was then mailed to all addresses in the Eveningstar project area, inviting them to the initial FireSmart community meeting, held on June 24, 2017 at the Town of Oliver Community Centre. The meeting was an opportunity to learn about the FireSmart Communities Program and explain the community recognition process. One household attended the meeting and it was uncertain whether a FireSmart Board could be formed for Eveningstar.

By September 2017 no interest had been expressed from residents regarding the FireSmart project. In the hope

that the historic 2017 fire season may have generated some interest in wildfire preparedness, a second letter was mailed to residents in the project area, inviting them to a second meeting on October 4 in the Town of Oliver council chambers. This second meeting attempt was attended by one (different) household and no interest was expressed in forming a FireSmart Board and pursuing community recognition.

The assessment process was carried out to develop this CAR in the hope that residents may see some benefit in learning about steps they can take to improve the chances of their home surviving a wildfire event. The assessment process follows the three-phased approach of the FireSmart Canada Community Recognition Program (FCCRP) and residents may use this CAR to pursue community recognition in the future, should this be of interest to them.

6.0 Observations and Issues

The following observations were noted during the community wildfire hazard assessment. See Appendix 1 to view the entire community wildfire hazard assessment form and notations.

6.1 Roof assemblies

A home's roof is the largest surface most exposed to embers during a wildfire. Homes with a flammable wood shake roof have a much higher probability of igniting during a wildfire compared to non-wood roofing systems. In Eveningstar, a mix of roofing materials are in use, the most common being composite shingles (i.e. asphalt shingles), while a smaller percentage have tar-and-gravel or torch-on roofing systems. Fortunately, no homes were observed to have a wood shake roof.

There are very few large trees in the project area and this bodes well for maintaining a roof free of combustible litter. The fire-resistant properties of a rated roof are reduced when flammable accumulations are present on the roof surface. The key problem areas that should be attended to are accumulations that occur at a roof to wall joint (e.g. where a dormer meets the roof), in the rain gutters or in or near any opening in the roof (vent, skylight etc.). Inspecting and cleaning debris accumulations in the spring, prior to the start of the summer fire season is a recommended practice.

6.2 Building exteriors

Risk factors associated with the exterior surface of a structure are less dependent on the characteristics of the exterior cladding system (i.e. stucco vs. cement board vs. vinyl siding etc.) and more dependent on the likelihood of direct flame contact and/or ember accumulation on the structure. Accumulated fuel along an exterior wall can negate the fire-resistant advantages that any particular exterior cladding system provides, should the fuel ignite (Figure 13).

Figure 11 The choice of any particular siding material on its own does not dramatically increase the hazard rating of a structure. The presence of nearby vegetation and combustibles that can ignite with relative ease, and in turn ignite the siding or eaves, is of much more concern, as illustrated by the cedar hedge against the home in this photo.

This is especially important when assessing features that are attached to a home, such as decks and porches. Decks are often used for dry storage of a variety of materials, including firewood, building materials, outdoor furniture etc. Should these stored materials ignite, the deck above is likely to ignite as well, most likely leading to the ignition and subsequent destruction of the home (Figure 14).

When boards are used for the decking surface, any gaps between boards should be viewed as avenues for organic debris to fall through and accumulate underneath the deck or accumulate on the deck surface. These gaps can also permit embers to fall through and ignite accumulated debris under the deck, likely resulting in the ignition of the deck and the house.

If combustible material is going to be stored under a deck, this area should be sheathed in 12 mm exterior-grade plywood or screened with 3 mm non-corrosive metal screening to prevent embers from entering the space and igniting the stored material. An example of an enclosed porch and stairs is provided in Figure 17. Areas underneath deck boards should be assessed for debris accumulations and cleaned out as needed.

6.3 Vegetation

Vegetation is assessed in three concentric zones around a home (Figure 2), with Zone 1 being the area occupying the first 10 m around the structure. The quantity and condition of canopy, ladder and surface fuels are the key factors assessed.

FIGURE 12 This mature cedar hedge presents a significant fuel hazard to the newly constructed home in this photo.

One vegetation feature that is very popular and pervasive in landscaping is the use of arborvitaes (cedar) and juniper shrubs and hedges. Eveningstar area has a considerable amount of these plants incorporated into the landscaping (Figures 17 and 18). The presence of these conifers in Zone 1 needs to be carefully considered, as they are extremely volatile from a fire behaviour standpoint. Having a cedar or juniper shrub growing up against a house could very well be the source of a home ignition in the very likely event that these plants combust during a wildfire. A long cedar hedge that leads up to a house can be viewed as a veritable wick of fuel waiting for a wildfire to light it.

FIGURE 13. Although there is some separation between the cedar hedge and the home in this photo, the hedge is likely still too close. If the hedge were to catch fire during a wind-driven fire, flames could impinge on the adjacent window, siding and eaves of the home.

Another popular, low maintenance landscaping strategy that unfortunately presents a home ignition hazard is the use of bark mulch as a ground cover. Eveningstar has few examples of bark mulch used in landscaping and residents should avoid incorporating bark mulch into future landscape designs. During the hot summer months, bark mulch will dry out and become extremely receptive to ember ignition and conducive to persistent surface fire spread. Bark mulch should be viewed as a fuel bed that can effectively transport fire throughout its extent. Homeowners should consider any flammable connections between a bark mulch bed and the house (e.g. wood siding, wood stairs etc.) as a pathway for direct flame contact that could result in the ignition of the home.

All homes in Eveningstar have overlapping Zones. In many cases, one home's Zone 1 is the adjacent home's Zone 1. This is a common characteristic of higher-density WUI areas and it reinforces the view that many individual FireSmart efforts can increase the overall wildfire resilience of the entire neighbourhood. Unfortunately, the same holds true when one (or more) homes aren't FireSmart and pose a threat to adjacent homes that are.

6.4 Nearby combustibles

In the context of the structure and site hazard assessment, *nearby combustibles* refer to non-vegetative fuel, such as patio furniture, wood fences, sheds etc. Combustible items stored in a carport during fire season should be avoided due to the potential for ember ignition.

Wood fences, particularly those that attach to the house, can provide a pathway for fire to potentially ignite the house. Where a wood fence is within 10 m of a house, the entire fence should be assessed for locations where the

fence intersects any fine fuel beds, such as bark mulch, natural grasses etc. For example, a wood fence with a bark mulch bed up against it is susceptible to embers igniting the bark mulch and in turn igniting the fence (Figure 22). As well, a wood fence that backs onto natural grasses could ignite from a low-intensity surface fire moving through the grass. In either case, the length of the fence could burn, including the portion where the fence attaches to the house, potentially leading to ignition of the structure. One strategy that can help to maintain the privacy of a wood fence while also lowering the chance of a connected fence from igniting the house, is to install a metal gate at or near the fence-house junction.

FIGURE 14 Carports should be assessed for any combustible items stored during the fire season, as this material could be receptive to embers and ignite during a wildfire. The cedar hedge is presenting a fuel hazard to this home, particularly the carport area which can act as a heat trap should the hedge ignite during a wildfire.

Even innocuous items commonly found around the outside of a home may act as combustibles that could ignite the structure. Flammable patio furniture (particularly seat cushions), sisal doormats and rugs, or even a corn broom leaning against the house are all potential fuels that could ignite from ember accumulation.

7.0 Recommendations

The FireSmart Canada Community Recognition Program seeks to create a resilient balance between residential safety and the natural aesthetics that are attractive to living in the WUI. Homeowners already balance their decisions about fire protection measures against their desire for certain flammable components on their properties. It is important for them to understand the implications of the choices they are making. These choices directly relate to the ignition potential of their home ignition zones during a wildfire.

Homeowners, and the community, must focus attention on the home and surrounding area and eliminate a wildfire's potential relationship with the house. This can be accomplished by disconnecting the house from high

and/or low-intensity fire that could occur around it, and by being conscious of the devastating effects of wind-driven embers.

The following recommendations are intended to guide homeowners in focusing their efforts to reduce fuel hazards on their property and reduce the likelihood of a home ignition:

- Substantially reduce or eliminate the amount of cedar and juniper shrubs and hedges in yards, especially within 10 m of a structure. A cedar or juniper shrub/hedge should never be grown directly against the home.
- Replace bark mulch with a non-flammable ground cover where it adjoins the home or intersects with a wood structure attached to the home.
- Remove flammable material from under deck spaces and car ports. If the space under a deck is to be unsheathed or unscreened, the space must be free of any material that could ignite via ember or direct flame contact.
- Remove accumulated debris from the roof and gutters prior to the start of fire season each spring, at minimum. Remove accumulated debris from decks, porches and stairs.
- Place firewood and other combustibles a minimum of 10 m from the home, or store these in such a way as to eliminate the chance of embers igniting them.
- Carefully assess the ignition potential of wood fences, especially those that are connected to the house. Consider a metal gate or fence panel to eliminate connectivity between the house and a susceptible wood fence.

8.0 Successful FireSmart Mitigations

When adequately prepared according to FireSmart guidelines a house can likely withstand a wildfire without the intervention of the fire service. Furthermore, a house and its surrounding community can be both FireSmart and compatible with the area's ecosystem. The FireSmart Communities Program is designed to enable communities to achieve a high level of protection against wildfire loss while maintaining a sustainable ecosystem balance.

Other than the replacement of an unrated wood roof or replacing a flammable deck, most FireSmart hazard mitigations around the home are inexpensive and straightforward. In many ways, hazard mitigation and spring yardwork go together and can be scheduled as such. Most often it is the little things that a homeowner attends to that can make a big difference in whether their home will survive during a WUI fire. The following are good examples of small steps that homeowners in Eveningstar have put in place to make their neighbourhood more resilient to wildfire:

8.1 Fire-Resistant Roofing

Replacing a roof is one of the single-most expensive FireSmart improvements. Fortunately, Eveningstar is an example of a community where almost all the observed roofs consisted of some type of rated roofing system. Additionally, it is apparent that numerous properties maintain a high degree of roof cleanliness, aided by the relative scarcity of litter producing trees in Zone 1. The combination of a rated roof that is free of fuel accumulations is a big step to improving the survivability of a home during a wildfire event.

8.2 Landscaping

Residents of Eveningstar can look to several examples where their neighbours have established less-flammable vegetation and landscaping solutions in their respective Zone 1 areas (Figure 20). Maintaining a green lawn and strategically placing walkways and patios are also examples of landscape design that serves to disconnect the home from direct flame contact from adjacent fuel. In each of these examples, the landscaping employed has the effect of minimizing the chance of embers igniting fuel adjacent to the home and reducing the chance of direct flame contact to occur.

FIGURE 15 An example of non-flammable ground cover being used in the landscaping on the property in the right side of the photograph. Unfortunately, the cedar hedge is posing a fuel hazard.

9.0 Next Steps

As mentioned, there has not been an appetite from residents to form a FireSmart Board for Eveningstar, and therefore a key requirement for community recognition from FireSmart Canada is missing. As the Local FireSmart Representative retained to complete this project on behalf of the neighbourhood and Oliver, the author has prepared

all deliverables needed for an application, should interest increase in the future and residents take the step to forming a FireSmart Board.

In addition to this assessment report, the author has drafted the initial FireSmart Community Plan for Eveningstar. This plan is intended to be the first iteration of the annual operating plan for the FireSmart Board, in the event that one is established by residents. Subsequent annual FireSmart Community Plans would be drafted by the Eveningstar FireSmart Board, with the initial template providing a solid starting point.

To help with potential community recognition in the future, the following standards have been incorporated into the Eveningstar FireSmart Community Plan:

- Support the Eveningstar FireSmart Board in their goal to maintain the Eveningstar FireSmart Community Plan and ongoing recognition status.
- Invest a minimum of $2.00 annually per capita in its local FireSmart Events and activities (work done by municipal employees or volunteers, using municipal or other equipment, can be included, as can provincial/territorial grants dedicated to that purpose).
- Hold a FireSmart Event (e.g. FireSmart Day) each year that is dedicated to a local FireSmart project.
- Submit an application form or annual renewal application form with supporting information to FireSmart Canada. This application or renewal process documents continuing participation in the FireSmart Communities Program with respect to the above criteria.

10.0 Signature of Local FireSmart Representative

Signed: 	01/24/2018 Date:

Andrew K. Low, RPF

Davies Wildfire Management Inc.

andy@davieswildfire.com

APPENDIX 1:

Community Wildfire Hazard Assessment Form for Eveningstar, October 4, 2017

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 hazard is 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: Eveningstar (Town of Oliver)		**Date: 10/04/2017**
Assessor Name: Andy Low, RPF		**Accompanying Community Member(s):**
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	Eveningstar has a mix of roofing materials in use. Roofing materials observed include ULC rated materials (mainly asphalt).
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	Roofs appear to be clean. The fire resistance of most roofing materials is reduced when accumulated debris burns on the roof surface. Gutter accumulations were not able to be observed.
2. Building Exteriors		
2.1 Materials		
a. Siding, deck and eaves	2-7 2-8 2-9	A broad range of siding materials were observed, including wood, stucco, vinyl and cement board. Eave conditions were not observed.
b. Window and door glazing (single pane, sealed double pane)	2-10	Window construction can be difficult to assess at the community level. However, given the age and characteristics of the homes in the community, it can be assumed that most windows are double pane, which provide at least moderate protection. Regarding windows, focus vegetation management or removal within 10m of windows and glass doors, paying particular attention to fuels that could impinge on large picture windows.
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. Most exposure is attributed to under-deck areas and deck board surfaces. For under-deck areas, remove combustible accumulations that could that could be ignited by embers. If able to do so, enclose or at minimum screen, ember accumulator features. Screening should consist of corrosion-resistant, 3mm non-combustible wire mesh.
d. Nearby Combustibles – firewood, fences, outbuildings	2-11	Mainly patio furniture and wood fences. During fire season, store firewood at least 10m from the building. When choosing fencing options that adjoin the building, consider the flammability of the fencing, particularly where it attaches to the house.

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	Overstory in the PZ-1 is minimal. Minor components of ornamental conifers are well-established in PZ-1 and in some cases, these are presenting a fuel hazard to adjacent homes.
b. Ladder fuels (treated vs untreated)	2-17	Majority of ladder fuels in PZ-1 are attributed to cedar hedges that have branches extending down to ground level, as well as extensive use of cedar hedges established along lot boundaries for privacy.
c. Surface fuels - includes landscaping mulches and flammable plants (treated vs untreated)	2-16	Bark mulch is being used on very few properties for landscaping ground cover; in some cases, immediately adjacent to buildings. Coniferous ornamental plants (e.g. juniper; cedar; and cypress) are also highly abundant and often found immediately adjacent to buildings. Bark mulch is a receptive fuel bed for ember ignition, when available to burn. In general, ornamental conifers are highly flammable, due to volatile compounds, as well as a form and structure conducive to ignition and flaming combustion.
3.2 **PZ-2:** Vegetation - 10 - 30m from structures **Page Reference 3-9**		
a. Forest vegetation (overstory) treated vs untreated	2-14	Minimal PZ-2 overstory.
b. Ladder fuels treated vs untreated	2-17	Majority of ladder fuels are attributed to cedar hedges.
c. Surface fuels treated vs untreated	2-16	PZ-2 transitions to native plants (e.g. Bluebunch wheatgrass, pinegrass, and arrow-leaved balsamroot). Examples of landscaping extending from PZ-1 to PZ-2.
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	PZ-2 transitions to native plants (e.g. Bluebunch wheatgrass, pinegrass, and arrow-leaved balsamroot).

Hazard Factor	Ref	Mitigation Comments
b. Moderate fuel - mixed wood – light to moderate surface and ladder fuels, shrubs	2-17	Minimal.
c. Heavy fuel - coniferous - moderate to heavy surface and ladder fuels, shrubs	2-14	Minimal.
d. Logging slash, dead/down fuel accumulations	2-16	No slash or significant dead/down fuel accumulations observed.
e. Diseased forest – without foliage vs with foliage		No issues observed.
f. Fuel islands within community - treated vs untreated		Eveningstar can be described as a classic interface area, where a clear distinction is evident between private property and adjacent wildlands. As such, there are no significant fuel islands inside the neighbourhood.
4. Topography		
4.1 Slope (within 100m of structures)		
a. Slope - Flat or < 10 %, 10 – 30% or >30%	2-19	Eveningstar is situated on flat ground.
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	Slope setback is not a concern in this neighbourhood.

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	Eveningstar is accessed by a looped road.
5.2 Roads- width, grade, curves, bridges and turnarounds		
a. To FireSmart Recommended Guideline?	3-30	Eveningstar roads are paved. Cul-de-sac turnaround is adequate. Road widths and curves are adequate.
5.4 Fire Service Access / Driveways - Grade, Width/Length, Turnarounds		
a. To FireSmart Recommended Guideline?	3-30	Most driveways are short and inconsequential for fire response.
5.5 Street Signs / House Numbers		
a. To FireSmart Recommended Guideline?	3-30	All streets have signage and house numbers appeared prominent.
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	Eveningstar is serviced with hydrants, as per RDOS mapping.
6.2 Fire Service		
a. Fire Service < 10 minutes or > 10 minutes, no fire service	2-25	Fire protection for Eveningstar is provided by the Town of Oliver. Less than 10 min response time.
6.3 Homeowners Suppression Equipment		
a. Shovel, grubbing tool, water supply, sprinklers, roof-top access ladder	3-28	Limited to typical garden tools and equipment.
Hazard	**Ref**	**Mitigation Comments**

Factor		
7. Fire Ignition and Prevention – Utilities, Chimneys, Burn Barrel / Fire Pit, Ignition Potential		
7.1 Utilities		
a. To FireSmart Recommended Guideline?	2-24	Overhead powerlines on wood poles service a portion of the area. Clearance is impinged by vegetation in places.
7.2 Chimneys, Burn Barrel / Fire Pit		
a. To FireSmart Recommended Guideline?	2-22	Not assessed.
7.3 Ignition Potential - Provide mitigation comments on items a – d as applicable		
a. Topographic features adversely affect fire behaviour b. Elevated probability of human or natural ignitions c. Periodic exposure to extreme fire weather or winds d. Other	2-21	a. Eveningstar has topographic advantages, being situated at the bottom of the slope on the lakeshore. b. Some trail use occurs in adjacent protected area. Public education on interface risks for non-resident users of the area could be beneficial. c. Lower elevation areas of the Okanagan experience elevated fire weather conditions through much of the summer. Hot and windy conditions are characteristic of the region during fire season and have influenced past WUI fire incidents in the past in the region.

General Comments:

- **Eveningstar has extensive use of cedar and juniper shrubs and hedges in close proximity to homes. This factor will be one of the primary determinants of structure survivability in the event of a wildland urban interface fire.**
- **Hazard reduction efforts should focus on reducing the volume of cedar and juniper plants on properties.**

APPENDIX 2:

Structure and Site Hazard Assessment Form

STRUCTURE AND SITE HAZARD ASSESSMENT FORM

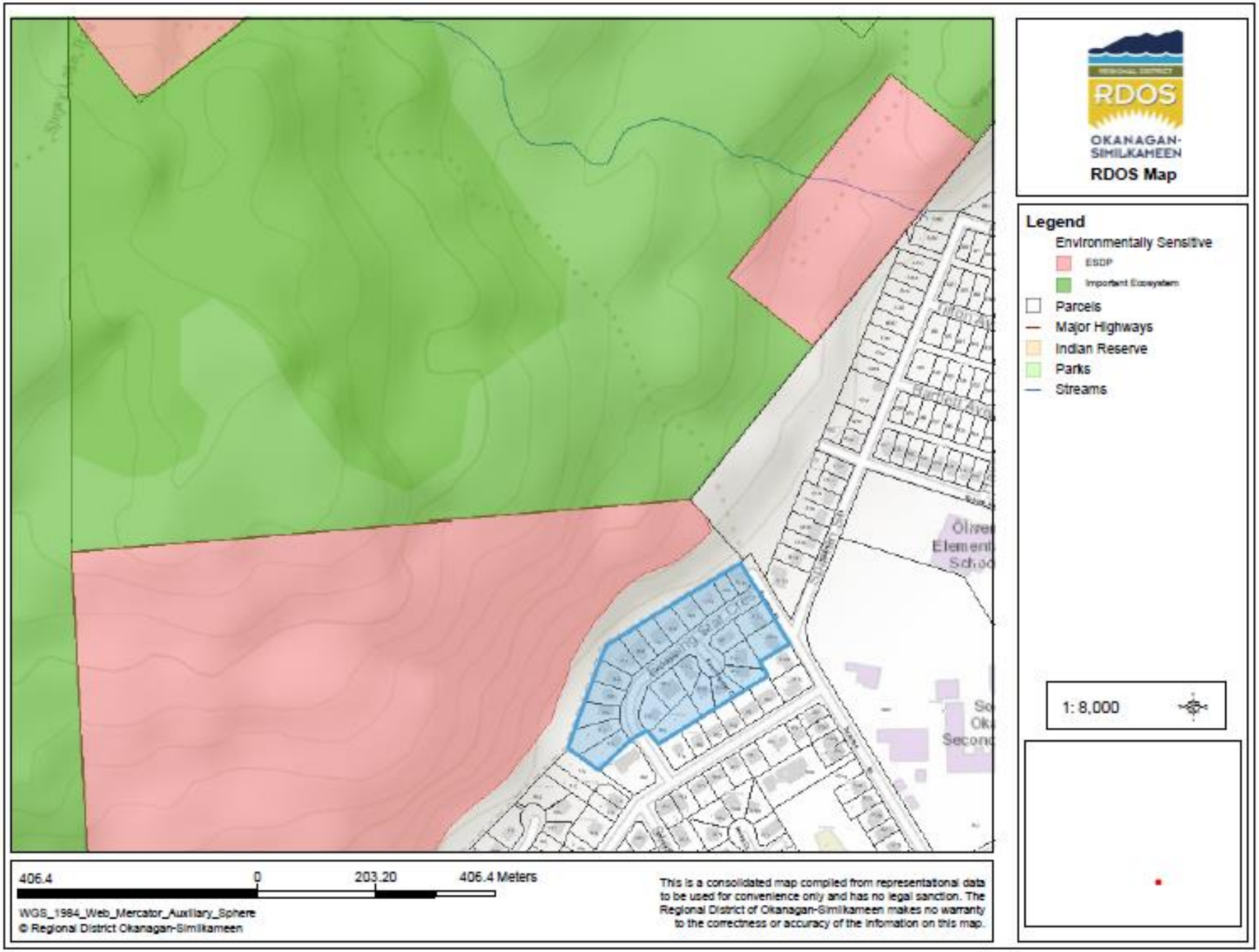
Factor	Page reference	Characteristics and point ratings				Score
1 **Roofing material**	2-5	Metal, tile, asphalt, ULC-rated shakes or non-combustible material		Unrated wood shakes		
		0		30		
2 **Roof cleanliness**	2-5	No combustible material	Scattered combustible material, <1 cm in depth	Clogged gutter, combustible material ≥1 cm in depth		
		0	2	3		
3 **Building exterior**	2-7	Non-combustible stucco or metal siding	Log, heavy timbers	Wood or vinyl siding or wood shake		
		0	1	6		
4 **Eaves, vents and openings**	2-8	Closed eaves, vents screened with 3 mm mesh and accessible	Closed eaves, vents not screened with 3 mm mesh	Open eaves, vents not screened, debris accumulation		
		0	1	6		
5 **Balcony, deck or porch**	2-9	None, or fire-resistant material sheathed in	Combustible material, sheathed in	Combustible material, not sheathed in		
		0	2	6		
6 **Window and door glazing**	2-10	Tempered	Double Pane		Single Pane	
			Small/medium	Large	Small/medium	Large
		0	1	2	2	4
7 **Location of nearby combustibles**	2-11	None or >10 metres from structure		<10 metres from structure		
		0		6		
8 **Setback from edge of slope**	2-12	Adequate		Inadequate		
		0		6		
9 **Forest vegetation (overstory)**	2-14	Deciduous	Mixed wood	Coniferous		
				Separated	Continuous	
<10 metres		0	30	30	30	
10 - 30 metres		0	10	10	30	
10 **Surface vegetation**	2-15	Lawn or non-combustible material	Wild grass or shrubs	Dead and down woody material		
				Scattered	Abundant	
<10 metres		0	30	30	30	
10 - 30 metres		0	5	5	30	
11 **Ladder fuels**	2-17	Absent	Scattered	Abundant		
10 - 30 metres		0	5	10		
					Total Score for Factors 1 – 11	
					Structure and Site Hazard Level	

Hazard Level Low <21 points Moderate 21-29 points High 30-35 points Extreme >35 points

PARTNERS IN PROTECTION

APPENDIX 3:

Selected project maps


RDOS
OKANAGAN-SIMILKAMEEN
RDOS Map
Legend
Environmentally Sensitive
ESDP
Important Ecosystem
Parcels
Major Highways
Indian Reserve
Parks
Streams
1: 8,000
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WGS_1984_Web_Mercator_Auxiliary_Sphere
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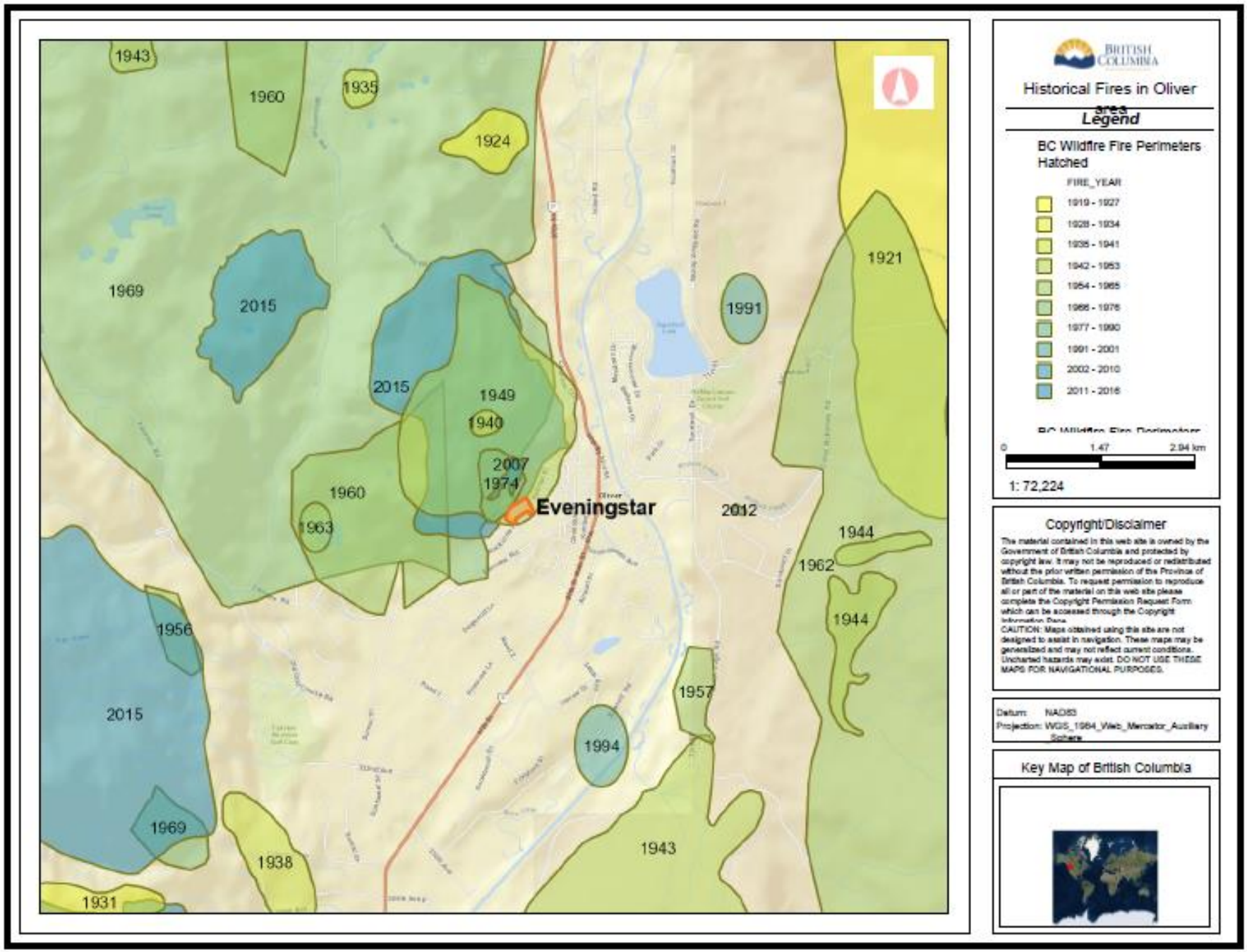
1943
1960
1935
1924
1969
2015
2015
1949
1940
2007
1974
1960
1963
Eveningstar
2012
1921
1991
1944
1962
1944
1956
2015
1957
1994
1969
1938
1931
1943
Historical Fires in Oliver area
Legend
BC Wildfire Fire Perimeters Hatched
FIRE_YEAR
1919 - 1927
1928 - 1934
1935 - 1941
1942 - 1953
1954 - 1965
1966 - 1976
1977 - 1990
1991 - 2001
2002 - 2010
2011 - 2016
0
1.47
2.94 km
1: 72,224
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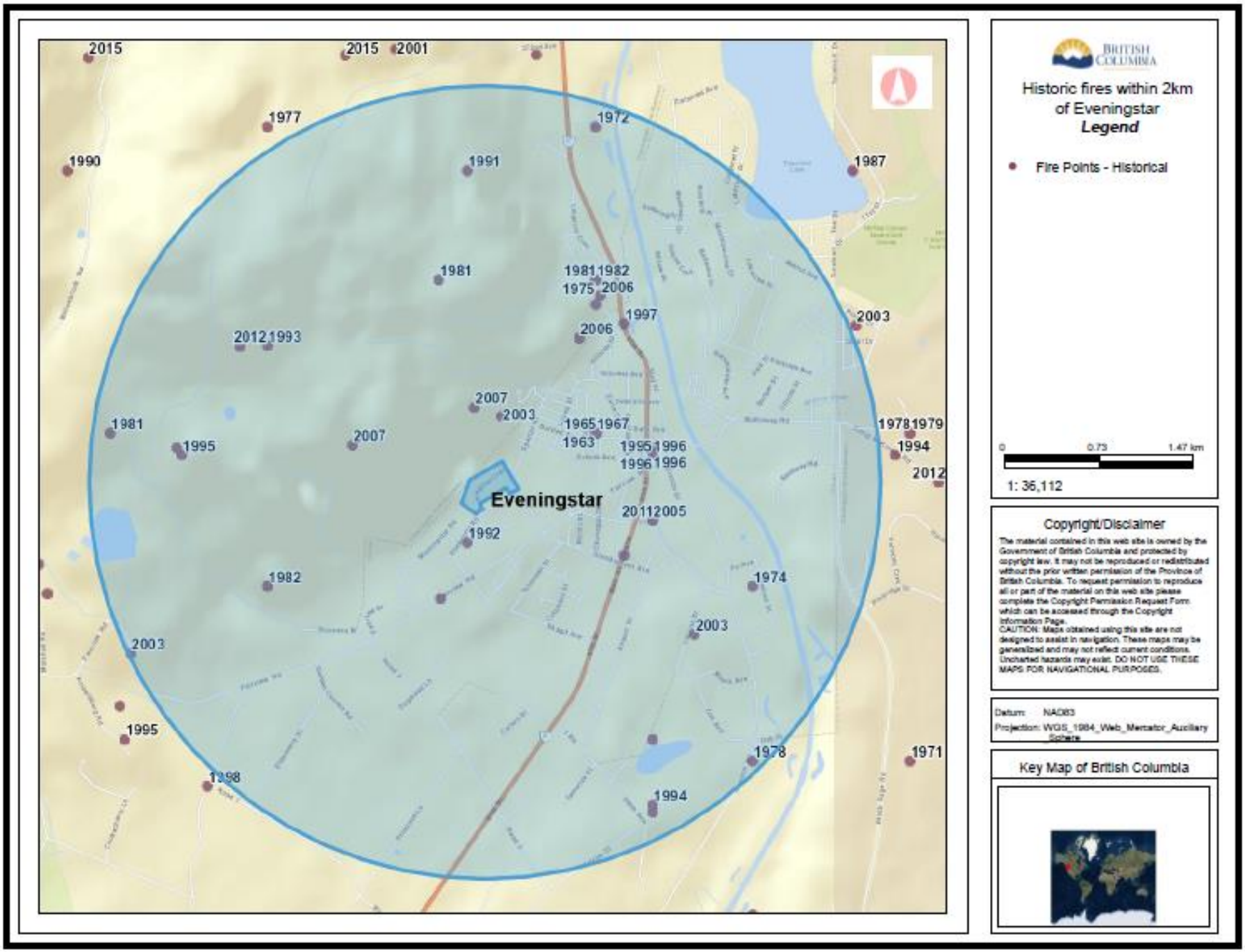
Datum: NAD83
Projection: WGS_1984_Web_Mercator_Auxiliary Sphere
Key Map of British Columbia



Historic fires within 2km of Eveningstar

Legend

- Fire Points - Historical

0 0.73 1.47 km

1: 36,112

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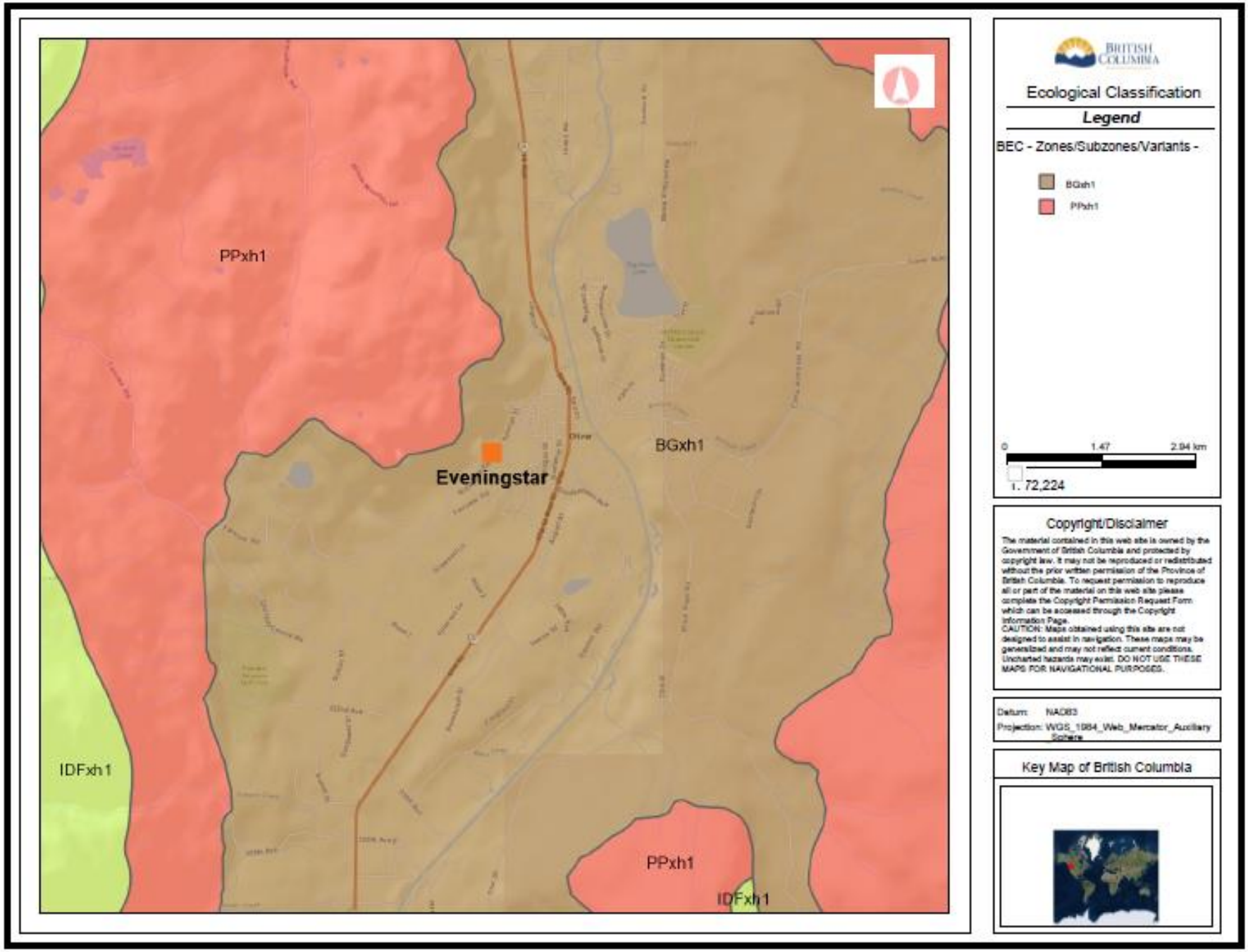
Datum: NAD83

Projection: WGS_1984_Web_Mercator_Auxiliary Sphere

Key Map of British Columbia


PPxh1
BGxh1
Eveningstar
IDFxh1
PPxh1
IDFxh1
BRITISH COLUMBIA
Ecological Classification
Legend
BEC - Zones/Subzones/Variants -
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PPxh1
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2.94 km
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