Missezula Lake

FIRESMART COMMUNITY ASSESSMENT REPORT

Prepared for

REGIONAL DISTRICT OF OKANAGAN SIMILKAMEEN &

THE MISSEZULA LAKE FIRESMART BOARD

DECEMBER 2018

Andy Low, RPF
Brandy Maslowski, BA
DWM WILDFIRE MANAGEMENT INC. | 11510 UPPER SUMMIT DRIVE, COLDSTREAM BC V1B 2B4

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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 Missezula for carrying out the recommendations and actions contained in the Missezula FireSmart Community Plan (FCP).

Both the CAR and FCP have been developed by a trained Local FireSmart Representative (LFR). Funding for the Missezula FireSmart project was provided by the Union of BC Municipalities (UBCM) Strategic Wildfire Prevention Initiative (now the Community Resiliency Investment program) in the form of a FireSmart Planning Grant to the Regional District of Okanagan-Similkameen (RDOS). The grant enabled the RDOS to retain the services of Davies Wildfire Management Inc. to conduct the project.

Community assessments were carried out in June and November 2018 by Andrew Low, RPF. A community event was held on July 1st, 2018 at the public beach area.

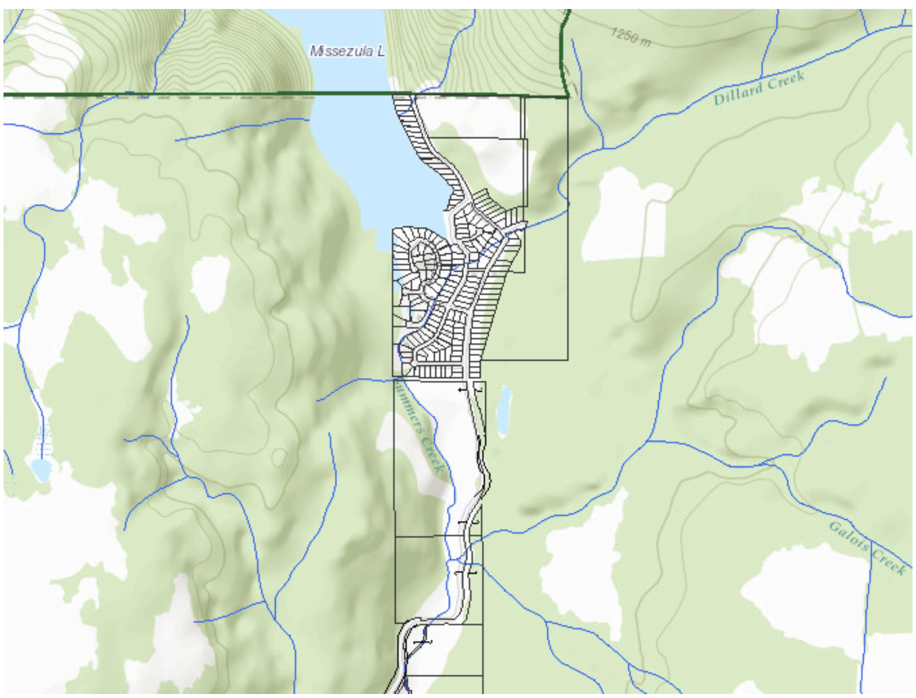

Figure 1 The Missezula FireSmart project area.

2.0 Definition of the Ignition Zone

Missezula 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 South Okanagan/Similkameen – 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 Missezula 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 neighbourhood.

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 Missezula. 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. Missezula 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.

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.

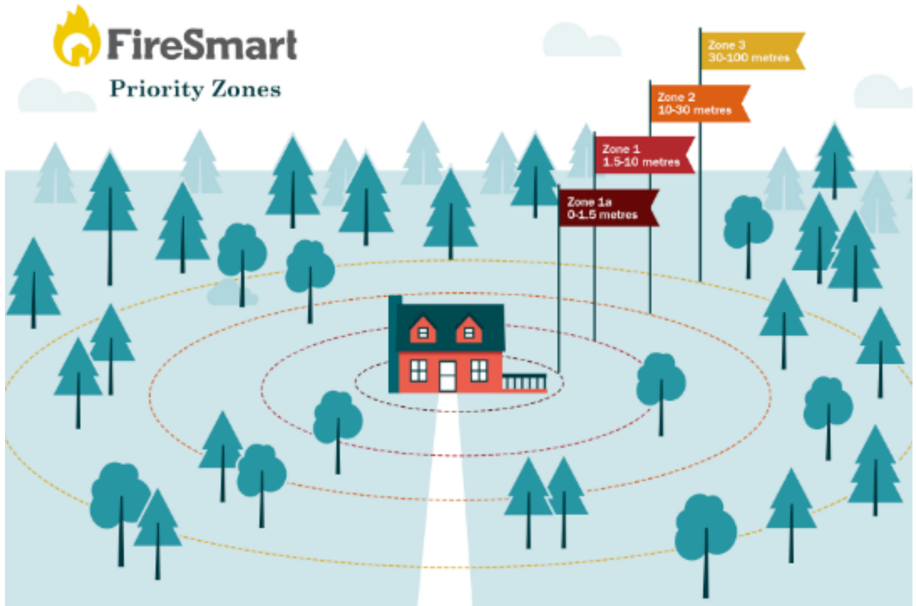

Figure 2 FireSmart Canada utilizes the concept of priority zones surrounding a home to help residents prioritize their hazard reduction efforts. A home's immediate surroundings (Zones 1 and 1a) are of immediate concern to the homeowner and should be targeted aggressively to reduce ignition hazards to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

3.0 Description of the Fire Environment

Wildland fire behavior 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 Behavior 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 2 m. 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.

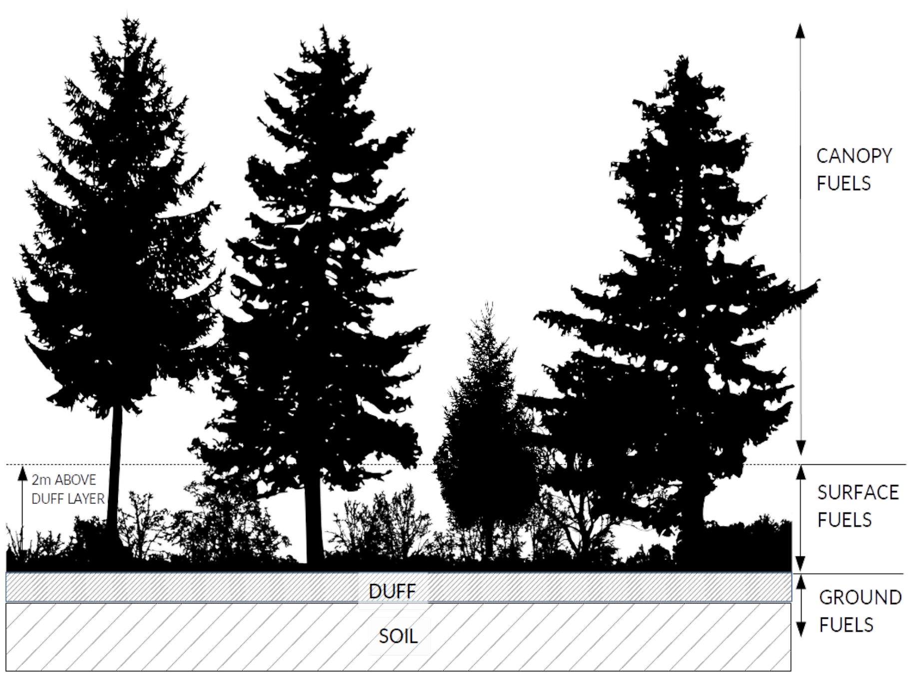

Figure 3 Wildland fuels can be described within three broad fuel layers: Ground fuels, surface fuels (to a height of 2 m above the duff layer), and canopy fuels. Canopy fuels are also referred to as aerial fuels.

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 behavior 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 Missezula Fire Environment

Missezula is situated in a fire environment that requires an awareness of the conditions and critical elements of hazard mitigation at the site level.

3.4.1 C7, C3 and C5 Fuel types

Classifying fuel complexes in BC according to the FBP fuel types is an imperfect process, given the diversity of ecosystems in the province in comparison to the rest of Canada. When considering FBP fuel types for a particular fuel complex, the actual species composition is of less importance than the overall stand structure characteristics. The FBP fuel types referenced below specify certain species not found in BC (e.g. red pine and eastern white pine, etc.), however the overall structural characteristics of the fuel types share similarities with the Missezula site conditions. Herein lies the challenge of classifying certain BC forest types into a handful of FBP fuel types. In the Missezula area, the most appropriate FBP fuel types are;

C3 - Mature Jack or Lodgepole Pine - This fuel type is characterized by pure, fully stocked (1000–2000 stems/ha) jack pine (*Pinus banksiana* Lamb.) or lodgepole pine (*Pinus contorta* Dougl. ex Loud.) stands that have matured at least to the stage of complete crown closure. The base of live crown is well above the ground. Dead surface fuels are light and scattered. Ground cover is feather moss (*Pleurozium schreberi*) over a moderately deep (approximately 10 cm), compacted organic layer. A sparse conifer understory may be present.

C5 - Red and White Pine - This fuel type is characterized by mature stands of red pine (*Pinus resinosa* Ait.) and eastern white pine (*Pinus strobus* L.) in various proportions, sometimes with small components of white spruce (*Picea glauca* (Moench) Voss) and old white birch (*Betula papyrifera*Marsh.) or aspen (*Populus* spp.). The understory is of moderate density, usually red maple (*Acer rubrum* L.) or balsam fir (*Abies balsamea* (L.) Mill.). A shrub layer, usually beaked hazel (*Corylus cornuta* Marsh.), may be present in moderate proportions. The ground surface cover is a combination of herbs and pine litter. The organic layer is usually 5–10 cm deep.

C7 - Ponderosa Pine–Douglas-Fir - This fuel type is characterized by uneven-aged stands of ponderosa pine (*Pinus ponderosa* Laws.) and Douglas-fir (*Pseudotsuga menziesii* (Mirb.) Franco) in various proportions. Western larch (*Larix occidentalis* Nutt.) and lodgepole pine (*Pinus contorta* Dougl. ex Loud.) may be significant stand components on some sites and at some elevations. Stands are open, with occasional clumpy thickets of multi-aged Douglas-fir and/or larch as a discontinuous understory. Canopy closure is less than 50% overall, although thickets are closed and often dense. Woody surface fuel accumulations are light and scattered. Except within Douglas-fir thickets, the forest floor is dominated by perennial grasses, herbs, and scattered shrubs. Within tree thickets, needle litter is the predominant surface fuel. Duff layers are nonexistent to shallow (<3 cm).

3.4.2 Fire Weather

The climatic conditions of the southern interior of British Columbia are broadly characterized by warm, dry summers and cool winters. The south Okanagan - Similkameen 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.

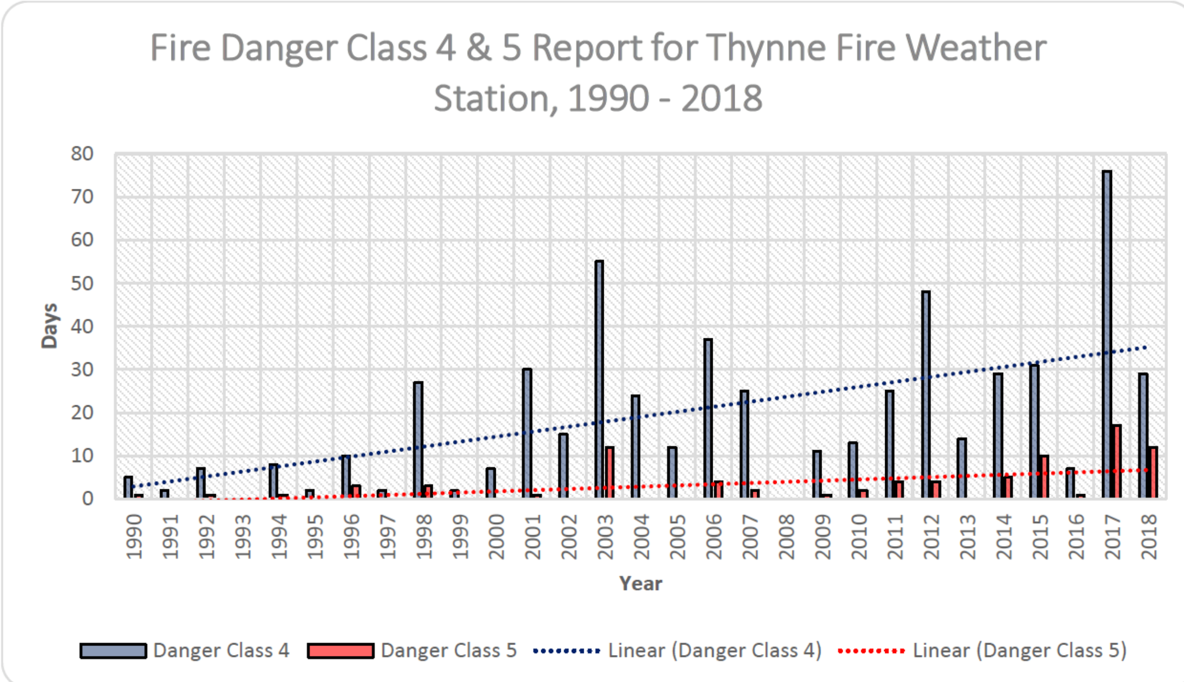

Figure 4 Danger Class 4 & 5 report for the Thynne fire weather station, 1990 to 2018. The 2017 fire season recorded the most Danger Class 4 and 5 days.

In BC, fire weather conditions are often summarized in terms of the *Fire Danger Class.* Fire Danger Class is defined in the Wildfire Regulation and is a rating derived from outputs of the Canadian Forest Fire Weather Index (FWI) System. Although the sole intent of the Fire Danger Class rating scheme is to restrict high risk activities (primarily industrial) occurring on or about forest and grassland areas, the use of Fire Danger Class has been extended to the community wildfire planning field as a straightforward means of characterizing fire weather conditions in an area represented by a weather station. The classification scheme is arranged so that Fire Danger Class 1 is Low, and Fire Danger Class 5 is Extreme.

The report (Figure 4) indicates that the annual occurrence Danger Class 4 and 5 days are increasing and that 2017 saw the greatest number of Danger Class 4 and 5 days.

3.4.3 Topography

Missezula is generally valley bottom at the south end of Missezula Lake and Homes along the upper portion of Prospect Drive are near the top of a small knoll. Homes along the northern end of Summer's Creek Road are situated below the road on ground that slopes down into the lake. Overall Missezula Lake community is in a good position in relation to the topography of the surrounding area, but portions of the micro topography may present site specific fire behaviour influences.

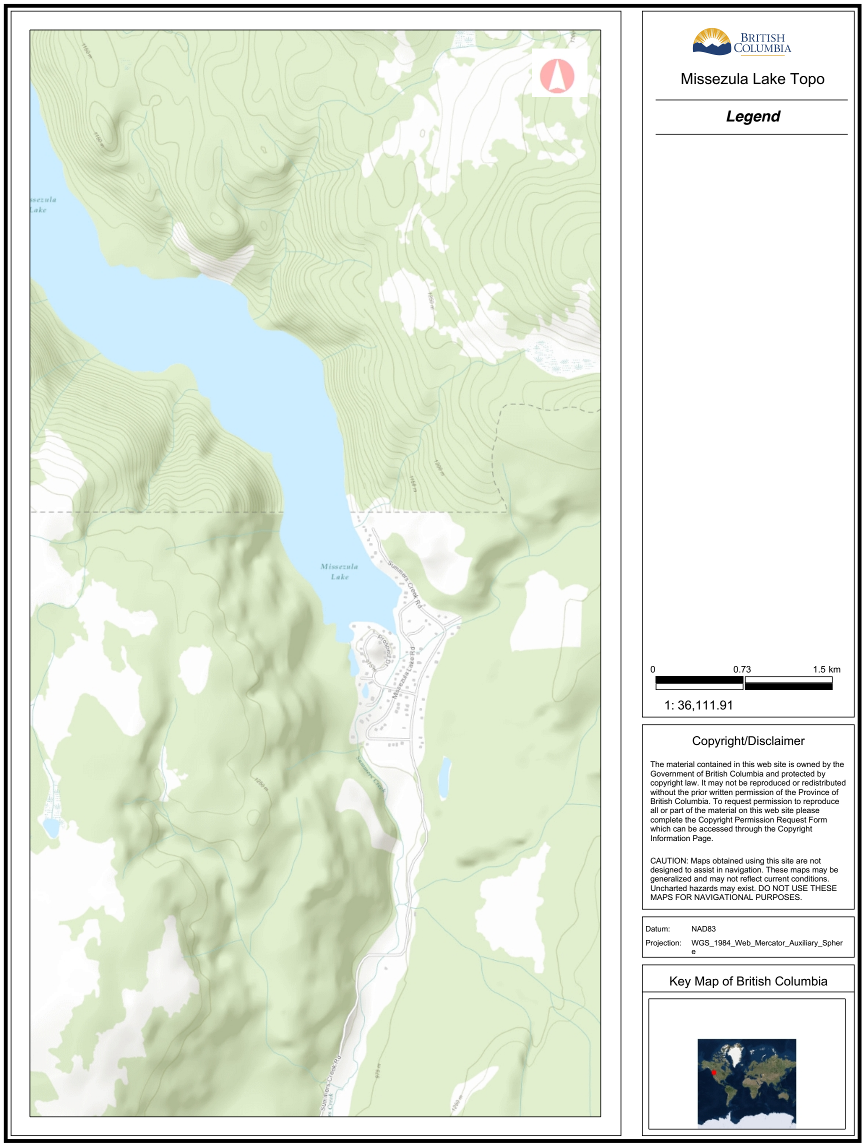

Figure 5 Contour map of the Missezula area.

4.0 Site Description

Missezula is predominantly comprised of seasonal and recreational properties with only a handful of permanent residents. The community of approximately 190 homes, cabins & lots is located at the south end of Missezula Lake. Access to the community is from the town of Princeton about 45 minutes away on a maintained gravel road, or via a network of 4x4 roads from Hwy 5A or Hwy 97C. There are several hundred square miles of central highlands in the region on a myriad of logging roads and trails. It is accessed by Summer's Creek Road. There is a community water system with standpipes throughout the residential area.

Each standpipe has fire hose and a warning device to call for help. Although there is no fire service, the home owner's association has a supply of wildland firefighting equipment: pumps, hose, tools, tanks. The level of preparedness is impressive.

4.1 Fire History

Fire history data from the provincial government indicates that wildfires have been a frequent occurrence in the Missezula area (Appendix 3) since contemporary fire record-keeping began in the early 1900s. The ecology of the area is typical of landscapes that experienced frequent low-intensity natural and anthropogenic fires. At the landscape scale, numerous areas have burned multiple times over the past century alone (Figure 6). Over thousands of years, wildfire would have been a regular occurrence throughout the area. In the 1950s detailed wildfire record-keeping was standardized and is available from the province for analysis. This dataset indicates that a few smaller fires (< 3 ha) have occurred in close proximity to the Missezula FireSmart area since that time.

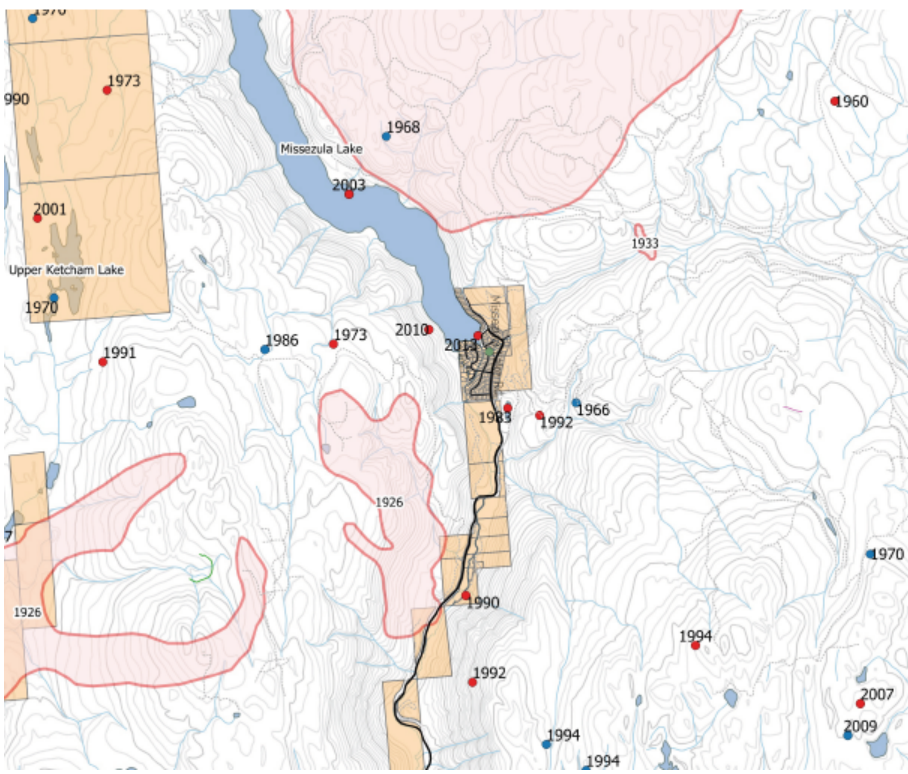

Figure 6 A fire history analysis of the region around Missezula Lake indicates that several large fires occurred in the area in the 1920s. A full fire history map has been created for Missezula Lake owners as an attachment to this assessment report.

5.0 Assessment Process

An initial reconnaissance of the project area was conducted in July 2018 by the author to gain familiarity with the neighbourhood in the context of FireSmart guidelines. The assessment process follows the three-phased approach of the FireSmart Canada Community Recognition Program (FCCRP).

An email was sent out to residents and word spread through residents in the Missezula area, inviting them to the initial FireSmart community event, held on July 1, 2018 at the public beach area. The event was an opportunity to learn about the FireSmart Communities Program and explain the community recognition process and was well attended with over 30 residents. The event was also an opportunity to demonstrate the structure and site hazard assessment process on a volunteer's property.

6.0 Observations and Issues

Full 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 Missezula a mix of roofing materials are in use. Roofing materials observed were predominantly ULC rated materials (Figure 7). Several roofs observed had varying amounts of accumulated combustible debris. The fire resistance of most roofing materials is reduced when accumulated debris burns on the roof surface.

Figure 7 Roofs with a ULC rating, such as this metal roof, provide a high degree of fire resistance able to withstand ember ignition.

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 (e.g. 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 8).

Figure 8 The presence of nearby vegetation and combustibles that can ignite with relative ease and burn with high-intensity can present a fuel hazard to a building's exterior.

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. More recently Zone 1a has been added to distinguish the importance of the first 1.5 m from a structure. The quantity and condition of canopy, ladder and surface fuels are the key factors assessed.

At Missezula, some homes have lawns and others have natural grasses. The majority of ladder fuels in PZ-1 are attributed to juvenile conifers and unpruned Douglas-fir (Fd). The overstory in the PZ-1 its predominantly Douglas-fir (Fd).

Figure 9 The conifer trees in this photograph have ladder fuels extending down to the ground. This is an example of Zone 1 conifers presenting a hazard to the adjacent structure.

One vegetation feature that is very popular and pervasive in suburban landscaping is the use of arborvitaes (cedar) and juniper shrubs and hedges. The presence of these conifers in Zone 1 needs to be carefully considered, as they are extremely volatile from a fire behavior 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. Fortunately, cedar and juniper are rare in Missezula and new owners coming to the area should be discouraged from introducing them onto their properties (deer will also do a fine job of this).

Another popular, low maintenance landscaping strategy that unfortunately presents a home ignition hazard is the use of bark mulch as a ground cover. 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 (e.g. Figure 11). Fortunately, Missezula has very few examples of bark mulch used in landscaping.

Most homes in Missezula 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 firewood, wood fences, sheds etc. One such fuel in this category is firewood stacked within 10 m (or directly adjacent) of the structure. (Figure 8) Firewood stacked against the house, in a carport or under an open deck space, during the summer, is a bad combination. A stack of firewood has ample gaps and surface area where embers could deposit and ignite, and if the stack is situated too close to the house, ignition of the structure is likely. Avoid this possibility during the summer by storing firewood well away from the home (a minimum of 10 m), so that if the firewood stack does ignite during a wildfire, the house won't follow suit. If firewood is stored in a woodshed within 10 m of the house, and the shed can't be relocated further away from the house, the woodshed should be retrofitted to prevent embers from entering the shed and igniting the firewood. This retrofit can be accomplished through a combination of 12 mm exterior-grade plywood sheathing and 3 mm non-corrosive screening, and still provide adequate airflow to season the stored firewood.

Wood fences, particularly those that attach to the house (e.g. Figure 10), 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.

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 10 This wood fence bisects a bark mulch bed and connects to the house. Embers could ignite the bark mulch, leading to the fence catching on fire and posing a threat to the attached house. Note: this photo is not from Missezula.

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 effects of wind-driven embers.

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

- remove or at least space (3-5 m from other trees) conifers within 10 m of a structure;
- prune retained conifers within 10 m of a structure up to a height of 2-3 m. Where pruning will remove >2/3 of the tree canopy, consider simply removing the tree.
- Remove flammable material from under deck spaces. 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.
- maintain a higher degree of roof cleanliness;
- carefully assess the ignition potential of wood fences and sheds, 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 neighbourhood can be both FireSmart and compatible with the area's ecosystem. The FireSmart Communities Program is designed to enable neighbourhoods 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 small 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 Missezula 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. 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. The majority of structures at Missezula Lake have non-combustible roofs, including steep-pitched metal roofs to facilitate shedding snow loads (Figure 11). An added benefit of this type of roof design is that tree debris also tends to shed easily.

Figure 11 Steep-pitched metal roofs are common at Missezula Lake. This property is also a good example of a fuel-managed Zone 1 with occasional well-pruned and spaced large diameter conifers.

8.2 Landscaping

Residents of Missezula can strive to establish less-flammable vegetation and landscaping solutions in their respective Zone 1 areas. The use of landscape rock and less-flammable vegetation is one such example. Keep the understory around your home relatively clean by raking up fire fuels and having rock or a clean lawn (Figure 12). Maintaining a green lawn and placing walkways and patios are also examples of landscape design that serve to disconnect the home from direct flame contact from adjacent fuel. Landscaping employed according to FireSmart principles 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 12 An example of the removal and/or thinning of conifers in Zones 1 and 2. Note the standpipe and hose box in the lower right of the photo.

8.3 Community Preparedness

Missezula Lake owners have established an impressive wildfire response capability. Although the community is not within a fire protection area, the community water system has a network of standpipes equipped with hose and warning devices (Figure 13). As well, the community has acquired several fire pumps, additional hose and a number of portable water tanks for additional fire response capabilities (Figure 14). These measures help to increase the resiliency of the community and are a prime example of a motivated group of owners taking steps to protect themselves from wildfire.

Figure 13 One of a number of standpipes equipped with a hose box and warning alarm located throughout the Missezula Lake community.

Figure 14 Missezula Lake owners have several portable water tanks and various firefighting equipment staged at the water treatment plant.

9.0 Next Steps

The Missezula FireSmart Board was established at the beginning of this project and the goal from the outset has been to pursue FireSmart Community recognition status. As the Local FireSmart Representatives retained to complete this project on behalf of the neighbourhood and the RDOS, the authors have prepared all deliverables needed for application.

In addition to this assessment report, the authors have drafted the initial FireSmart Community Plan for Missezula. This plan is intended to be the first iteration of the annual operating plan for the Missezula FireSmart Board as they strive to maintain their community recognition. Subsequent annual FireSmart Community Plans will be drafted by the Missezula FireSmart Board, with the initial template providing a solid starting point.

To ensure initial and ongoing community recognition, the following standards have been incorporated into the Missezula FireSmart Community Plan:

- Support the Missezula FireSmart Board in their goal to maintain the Missezula 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.

Figure 15 The inaugural Missezula Lake FireSmart event was help on July 1, 2018 and was well-attended by owners. An information booth, video, presentation and group demonstration of the structure and site hazard assessment process were included, as well as a barbeque.

10.0 Signature of Local FireSmart Representative

Signed:	Date signed: January 25, 2019	Andrew K. Low, RPF Davies Wildfire Management andy@davieswildfire.com
Signed:	Date signed: January 25, 2019	Brandy Maslowski, FLSE Davies Wildfire Management brandy@davieswildfire.com

APPENDIX 1:

Community Wildfire Hazard Assessment Form for Missezula, June 28th and November 12, 2018

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: RDOS – Missezula Lake		**Date: June 28 and November 12, 2018**
Assessor Name: A. Low		**Accompanying Community Member(s): N/A**
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	A mix of roofing materials in use. Roofing materials observed were predominantly ULC rated materials (mainly metal) and a few with wood shakes.
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	Most roofs observed had accumulated combustible debris. 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	A broad range of siding materials were observed, including wood, cement board and log. Eave conditions were not observed.

	2-9	
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, deck board surfaces and firewood. 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 firewood. During fire season, store firewood at least 10m from the building. Or, store firewood in an enclosure that prevents embers from landing on the firewood.

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 its predominantly Douglas-fir (Fd).
b. Ladder fuels (treated vs untreated)	2-17	Majority of ladder fuels in PZ-1 are attributed to juvenile conifers and unpruned Fd.

c. Surface fuels - includes landscaping mulches and flammable plants (treated vs untreated)	2-16	Variable. Some properties have lawn, others have natural grasses.
3.2 **PZ-2:** Vegetation - 10 - 30m from structures **Page Reference 3-9**		
a. Forest vegetation (overstory) treated vs untreated	2-14	Primarily Douglas-fir component within overlapping priority zones.
b. Ladder fuels treated vs untreated	2-17	Majority of ladder fuels in PZ-1 are attributed to juvenile conifers and unpruned Fd.
c. Surface fuels treated vs untreated	2-16	PZ-2 transitions to native plants (e.g. pinegrass). Needle litter accumulations present. 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. pinegrass). Needle litter accumulations present.

Hazard Factor	**Ref**	**Mitigation Comments**
b. Moderate fuel - mixed wood – light to moderate surface and ladder fuels, shrubs	2-17	Sparse to scattered. Mainly understory Douglas-fir and occasional deciduous shrubs.

c. Heavy fuel - coniferous - moderate to heavy surface and ladder fuels, shrubs	2-14	C7 fuel types tend to be characterized by an open stand structure when managed for typical condition.
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 significant forest health factors observed.
f. Fuel islands <u>within</u> community - treated vs untreated		This is more along the lines of a classic interface.
4. Topography		
4.1 Slope (within 100m of structures)		
a. Slope - Flat or < 10 %, 10 – 30% or >30%	2-19	Mainly flat, smaller areas with slopes up to 30%.
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	Building sites are generally valley bottom or lower 1/3 slope. There are examples of homes on the lower slopes that have minimal setback.

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	Mainly looped roads. The main access route into the community is via Summers Creek Rd. There are alternate access routes to HWY 5A and HWY 97C but these are rough and require local knowledge and suitable pickup.
5.2 Roads- width, grade, curves, bridges and turnarounds		
a. To FireSmart Recommended Guideline?	3-30	Roads are wide, unpaved with the community. Summers Creek Rd is a maintained public road with some tight spots and sharp curves, but overall in reasonably good shape.
5.4 Fire Service Access / Driveways - Grade, Width/Length, Turnarounds		
a. To FireSmart Recommended Guideline?	3-30	Inconsequential for fire response.
5.5 Street Signs / House Numbers		
a. To FireSmart Recommended Guideline?	3-30	Yes.
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	Community water system with standpipes throughout the residential area. Each standpipe has fire hose and a warning device to call for help.

6.2 Fire Service		
a. Fire Service < 10 minutes or > 10 minutes, no fire service	2-25	No fire service other than wildfire.
6.3 Homeowners Suppression Equipment		
a. Shovel, grubbing tool, water supply, sprinklers, roof-top access ladder	3-28	The homeowners association has a supply of wildland firefighting equipment: pumps, hose, tools, tanks. The level of preparedness is impressive.

Hazard Factor	Ref	Mitigation Comments
7. Fire Ignition and Prevention – Utilities, Chimneys, Burn Barrel / Fire Pit, Ignition Potential		
7.1 Utilities		
a. To FireSmart Recommended Guideline?	2-24	Overhead, wood pole powerlines.
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. Generally favourable. Most structures are on flat ground. b. Normal lightning probability. Abundance of motorized recreation so likely an elevated potential for mechanical ignition sources. c. The area typically experiences periods of extreme fire weather each summer. d. Very proactive community.

General Comments

Missezula Lake is primarily a recreational community with only a handful of year-round residents. There is good recognition in the community of the threat of wildfire and the steps that should be taken. Relatively high level of preparedness with community fire fighting equipment. Owners have formed a FireSmart Board and are making progress on building community awareness and momentum.

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**	2-6	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**	2-16	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:

Missezula Fire History