Acknowledgements

The development of the Wildfire Mitigation Strategy and Preparedness Guide was made possible by a FireSmart grant received by the Association of Summer Villages of Alberta (ASVA). Sandy Beach, in collaboration with the ASVA, applied for the FireSmart grant which is distributed by the Forest Resource Improvement Association of Alberta (FRIAA). This grant was awarded to the ASVA to assess risks and hazards associated with wildfire/urban interface situations. The Wildfire Mitigation Strategy and Wildfire Preparedness Guide are the products of this grant. Environment and Sustainable Resource Development (ESRD), *Guidebook for Community Protection* (2013), and Partners in Protection, *Protecting your Community from Wildfire guide* (2003), were essential in the development and writing of the Wildfire Mitigation Strategy.

Association of
SUMMER VILLAGES
OF ALBERTA

The Summer Village of Sandy Beach

FOREST RESOURCE IMPROVEMENT ASSOCIATION OF ALBERTA (FRIAA)

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Executive Summary

Summer Villages are desirable places to live because of their sought-after environments; however, these environments come with a threat. This threat is wildfire. Wildfire is an important aspect of the natural ecological cycle. Living in such areas where structures such as cabins and houses are next to or near wildland is referred to as the wildland/urban interface (WUI). These WUIs increase the possible impact of wildfire to the community and to its societal values. As the possibility of wildfire increases, so do the consequences in terms of: economic, social and personal impacts. These impacts can be devastating and tend to take a long time to recover from.

The purpose of the Wildfire Mitigation Strategy is to inform people of a proactive approach to mitigating wildfire in the WUI. If a community encompasses a proactive FireSmart stance, the threat of wildfire will be reduced. This means that individuals within the community realize that they cannot merely rely on fire departments and that mitigating wildfire threat is a shared responsibility of the community. The Wildfire Mitigation Strategy will provide strategies and recommendations, which if implemented, will assist in reducing the losses from wildfires. The plan includes input from a variety of stakeholders.

Below is an overview of recommendations, according to WUI disciplines, for Sandy Beach to assist in addressing wildfire threats. With continuous efforts by the entire community to implement these recommendations wildfire threat will be reduced.

For the detailed recommendations please refer to section 5.0 of this document.

Type	Recommendation
Education	The Summer Village educates and encourages public engagement with FireSmart using newsletters, websites, and open house meetings.
	The Summer Village identifies a willing community leader to work with the community on FireSmart initiatives. This will lead to community recognition by FireSmart Canada. Contact: Stuart Kelm.
Development	The Summer Village take measures to develop an emergency access into Sandy Beach; specifically Lakeshore Drive and Huron Drive.
	The Summer Village meets with the local fire station for an orientation day to discuss emergency response issues associated with narrow side roads and dead end streets.
	The Summer Village acquires standard signage for each lot.
	The Summer Village acquires larger street signs for better visibility.
Vegetation Management	Hazard reduction burn of the Sandy Lake shoreline.
	Property owners mow and maintain grass, debris, and other combustible materials. Prune conifer trees to a height of 2 meters above ground level.
	Summer Village supplies a debris disposal service to assist residents with vegetation cleanup.
Legislation	Sandy Beach updates their Fire Bylaw. Review Sturgeon County Fire Bylaw for any discrepancies.

*Note: A glossary of terminology used in this paper can be found in **Appendix I**.*

Table of Contents

1.0 Introduction

A Wildfire Mitigation Strategy is designed to assist summer villages identify their level of susceptibility to wildfire, as well as to provide recommendations on how to mitigate against wildfire based on the risks and hazards within the village and surrounding area. The Wildfire Preparedness Guide (**Appendix II**) compliments the Mitigation Strategy to serve as a strategic document to assist emergency responders from Sturgeon County Fire Services during an incident within Sandy Beach. These two documents will assist Sandy Beach in reducing fire behaviour potential, fire occurrence risk, and exposure of values at risk to fire as well as increasing the fire suppression capabilities.

Initially the project began with a field assessment where data was gathered on the differing community attributes; specifically those that were vital to the development of both documents. Data from field assessments was analyzed and the results incorporated into developing the Wildfire Mitigation Strategy and its recommendations. Completed plans were sent to the Sandy Beach council for review. Attributes considered in the field assessments included:

- Community and landscape descriptions
- Forest fuel types
- Values at risk: standard, critical, dangerous goods, and special values
- Access
- Presence of utilities
- Emergency response characteristics
- Existing fuel management schemes

The process to construct the Wildfire Mitigation Strategy and the Wildfire Preparedness Guide was strategic and involved many stakeholders. Discussing the perceived risks and hazards with participating stakeholders is carried out with the intent to generate support for implementation of recommendations.

The Wildfire Mitigation Strategy is organized into four main sections: Planning Area and Stakeholders, Wildfire Threat Assessment, FireSmart Activities, and Summary of Recommendations. The Planning Area and Stakeholder section describes the eco-region the village lies within as well as the stakeholders involved with the plan. The Wildfire Threat Assessment for the planning area considers values at risk, wildfire behaviour, wildfire incidence and wildfire capabilities. Wildfire behaviour potential was determined by using the fire growth model, Prometheus. The FireSmart Activities section is an evaluation of risks and hazards found within Sandy Beach. The Summary of Recommendations section is primarily based on the issues that were recognized in the FireSmart Activities section.

1.1. Objectives

- Identify wildfire risks and hazards
- Develop strategies to help mitigate risks and hazards
- Educate community about FireSmart
- Develop strategies to help the continuing education about FireSmart
- Ensure procedures and practices are effective for managing fire risks and hazards (i.e. bylaw review)

2.0 Planning Area and Stakeholders

2.1 Planning Area

The Summer Village of Sandy Beach is located on the eastern shore of Sandy Lake, within Lac Ste. Anne County, approximately 60 km northwest of Edmonton, Alberta (**Figure 1**). The planning area includes Sandy Beach and adjacent lands up to 2 km from Sandy Beach's borders (**Appendix III**).

Sandy Beach and its planning area are situated within the County of Lac Ste. Anne. Although Sandy Beach lies within the County of Lac Ste. Anne, firefighting services come from Sturgeon County. The three closest communities are the Summer Village of Sunrise Beach to the south, Alexander First Nations bordering on the east and Belle Vista Estates to the northwest.

The Summer Village of Sandy Beach and its planning area lie within the Dry Mixedwood Sub-region of the Boreal Forest Natural Region. The Dry Mixedwood is transitional between the Central Parkland and Central Mixedwood Sub-regions and these three have common plant community types. The most common species of the three sub-regions is Trembling Aspen (*Populus tremuloides*).Typically, Balsam poplar is found with aspen especially in moist areas. Also common are coniferous species with widespread mixed stands of aspen and white spruce. Peatlands can be common throughout this sub-region with some areas being more extensive than others. The natural terrain can typically vary from level to gently rolling in the dry Mixedwood Sub-region. Typically agriculture dominates the landscape in this sub-region.[1]

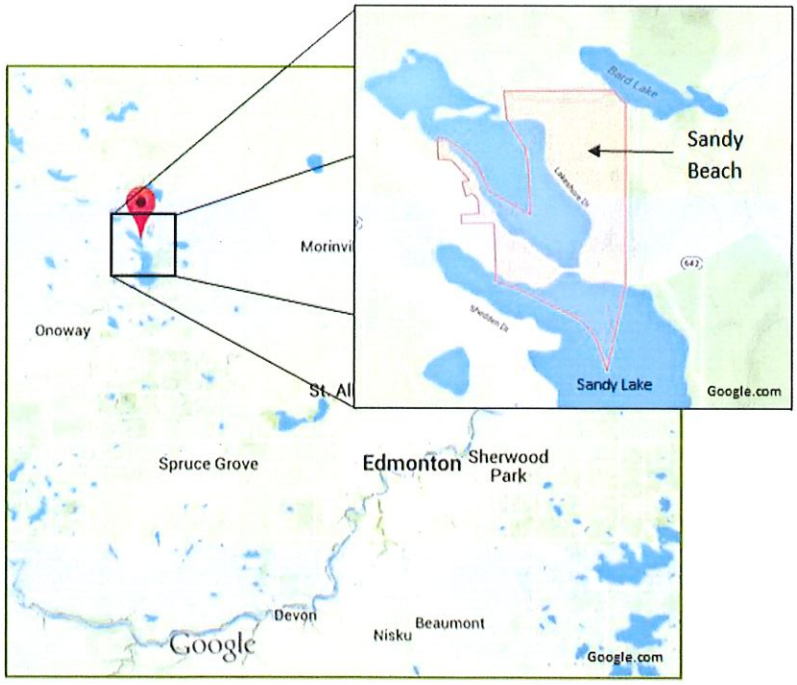

Figure 1. General location of Sandy Beach

[1] Natural Regions and Subregions of Alberta (2006) – Natural Regions Committee

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2.2 Stakeholders

The process to produce the Wildfire Mitigation Strategy and the Wildfire Preparedness Guide included speaking with various stakeholders to aid in addressing multiple disciplines. The beginning of the process started with general meetings with the Association of Summer Villages of Alberta (ASVA) to discuss the scope of plans for 25 villages. When the general meetings were completed, each village Chief Administration Officer was notified and consulted.

The Summer Village of Sandy Beach reviewed the Wildfire Mitigation Strategy, considered recommendations, approved the plan, and is responsible for implementing strategies. ASVA administered the project reporting and funding as well as acted as liaison and setting up stakeholder meetings. Sturgeon County Fire Services provided local knowledge, strategies, and tactics for fire suppression. Alberta Agriculture and Forestry (formerly Environment and Sustainable Resource Development) provided technical expertise and guidance throughout the process. Although Sandy Beach lies within Lac Ste. Anne County, currently Sturgeon County Fire Services are responsible for structural and wildland fire suppression within Sandy Beach.

Knowledge and assistance about the planning area was provided by several stakeholders. Key stakeholders involved in the planning are:

- The Summer Village of Sandy Beach
- The residents of Sandy Beach
- Sturgeon County Fire Services
- Association of Summer Villages of Alberta (ASVA)
- Alberta Agriculture and Forestry (AF)
- North Saskatchewan Watershed Alliance

3.0 Wildfire Threat Assessment

Wildfire threat is assessed by analyzing values at risk, wildfire behaviour potential, wildfire incidence, and firefighting capabilities within the planning area. Wildfire threat in Sandy Beach is high during the spring and fall while it is low during the summer. Wildfire Behaviour maps (**Appendix IV**), Wildfire Threat Rating maps (**Appendix V**), and the Prometheus Wildfire Model (**Appendix VIII**) were used to assist the wildfire threat. Wildfire Behaviour and Wildfire Threat Rating maps were acquired from FireWeb; which is operated by AF.

3.1 Values at Risk

Values at Risk is a term that encompasses four broad types of values: standard, critical, dangerous goods, and special values. Standard values are considered to be homes and other common structures found in communities. Critical values are the infrastructures that are vital to the wellbeing of those who reside in the planning area. Dangerous goods values are anything which may pose a safety threat to emergency responders or the public. Special values consist of areas that have natural, cultural, historical, or emotional importance to a community. Values at risk are identified in **Table 1** and on the operations map (**Appendix II).**

Table 1. Values at Risk

Values at Risk	Description	
	Within Sandy Beach	**Planning Area**
Standard	279 residences	N/A
Critical	None Identified	None Identified
Dangerous Goods	Waste Transfer Station Fuel Station	None Identified
Special	Nesting Habitat Girl Guide Camp Playground Silver Sage Centre	Nesting Habitat

Note: Alberta's electrical distribution system delivers low voltage electricity directly to consumers; these lines are not considered critical infrastructure. High voltage electrical transmission lines are considered critical infrastructure.

3.2 Wildfire Behaviour Potential

Wildfire behaviour is "the manner in which fuel ignites, flame develops, and fire spreads and exhibits other related phenomena as determined by the interaction of fuels, weather, and topography[2]."

3.2.1 Vegetation Fuel Types

The landscape, within 2 km of Sandy Beach, consists of deciduous (**Figure 2**) dominated forests with spruce (**Figure 3**) patches throughout (**Appendix VI**). Grass (**Figure 4**) surrounds the entire edge of Sandy Lake and other waterbodies. Agricultural lands (**Figure 5**) are common in the western part of the planning area. Agricultural lands were considered non-fuels because the Canadian Forest Fire Behaviour Prediction System (CFFBP) does not have data on how fires behave on agricultural lands; it is recognized that wildfires can be sustained on these lands. Anywhere that is less than 25% vegetated, such as within a community, is considered a non-fuel for the purposes of landscape fire prediction. Ground-truthing, satellite imagery and aerial photography were all used to identify forest fuel types, by a certified AVI photo interpreter, in accordance with CFFBP. **Table 2** shows common language corresponding to their CFFBP designation.

Table 2. CFFBP designation.

CFFBP Designation	Common language Equivalent
D1	Deciduous
O1	Grass
C2	Spruce
M1	Mixedwood

[2] The 2002 Glossary of Forest Fire Management Terms – Canadian Interagency Forest Fire Centre (2002)

Figure 2. Deciduous fuel type

Figure 3. Spruce fuel type

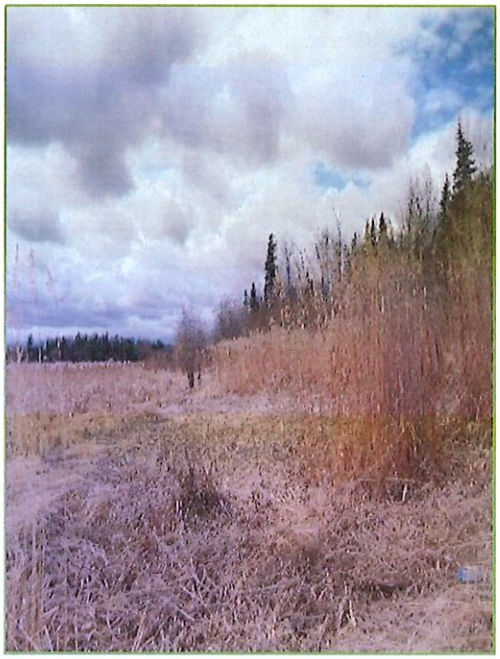

Figure 4. Grass fuel type

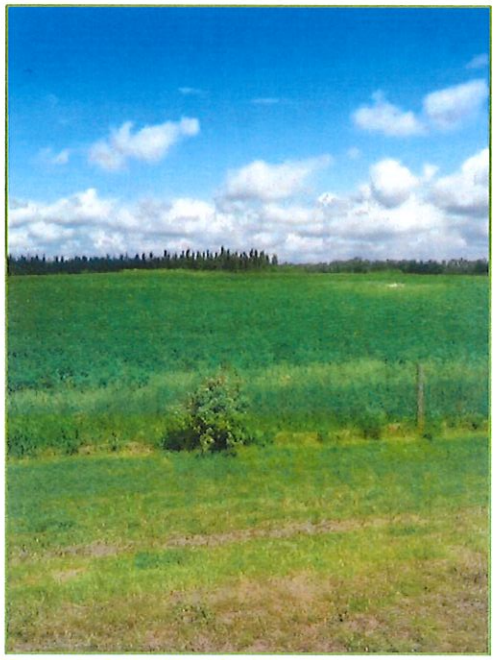

Figure 5. Agricultural fuel type

3.2.2 Fire Season Weather

Temperature, relative humidity, precipitation, and wind speed/direction were used to understand seasonal wildfire potential within, and surrounding, Sandy Beach. Historical weather (**Table 3**) was acquired from June 5, 2008 – October 31, 2014 from the Glenevis AGCM weather station (Climate ID 3012818), near Glenevis Alberta, 31 km west of Sandy Beach. Temperature, relative humidity and wind speed were averaged using daily noon actuals; values at 12:00 noon. Precipitation (**Figure 6**) was calculated using the monthly average. The Fire Weather Index (FWI) is a general index of fire danger throughout forested areas in Canada[3]. The 90th percentile FWI was calculated to better understand what months are at a higher risk of sustaining a wildfire in the Sandy Beach area. The 90th percentile was calculated (FWI 14.1) and all days equal to, or greater than, the 90th percentile are considered to be days where a fire could spread (**Figure 7**). Seasonal prevailing wind direction, in the form of wind roses, was generated using the "Canadian Wind Energy Atlas" website[4] (**Figure 8, Figure 9, and Figure 10**). Wind roses were generated seasonally using a height of 30 meters; 30 meters was the closest measurements to the ground.

Table 3. Weather data

Glenevis AGCM, Glenevis Alberta (Climate ID 3012818) (2008 – 2014)						
Season	**Month**	**Average Temperature (°C)**	**Average Relative Humidity (%)**	**Average Wind Speed (km/h)**	**Average Precipitation (mm)**	**90th Percentile FWI (average days/year)**
Spring	March	-2	55	14	12	2
	April	6	48	18	26	8
	May	13	42	16	43	12
Summer	June	17	52	14	65	4
	July	19	54	13	103	4
	August	20	56	13	48	5
Fall	September	16	53	15	27	7
	October	8	56	17	15	8

[3] Natural Resources Canada. *Canadian Wildfire Information System.* Accessed February 24, 2015

[4] http://www.windatlas.ca/en/maps.php

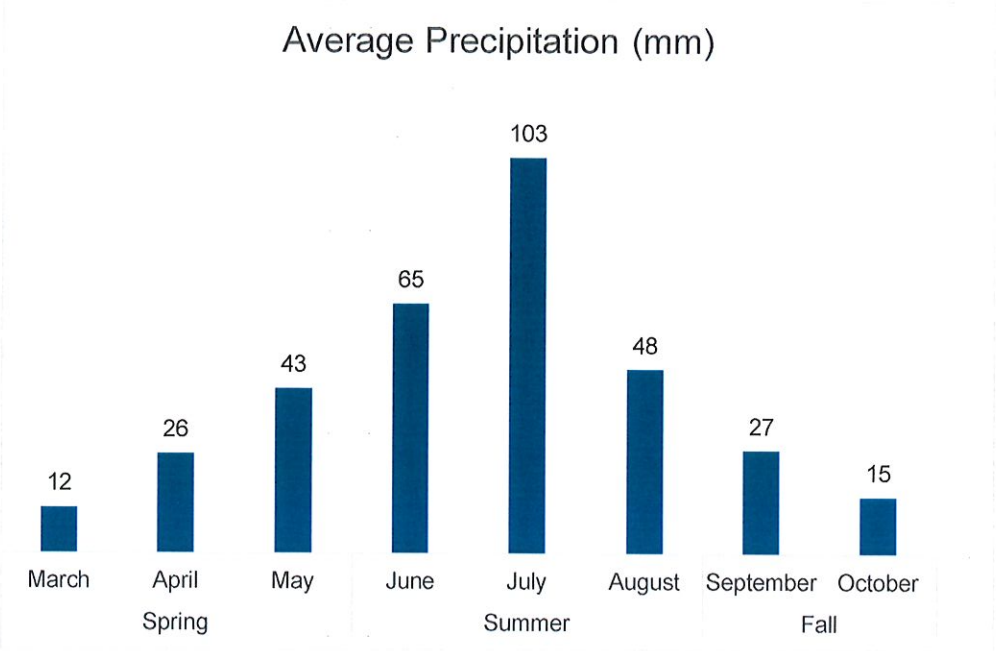

Figure 6. Average precipitation

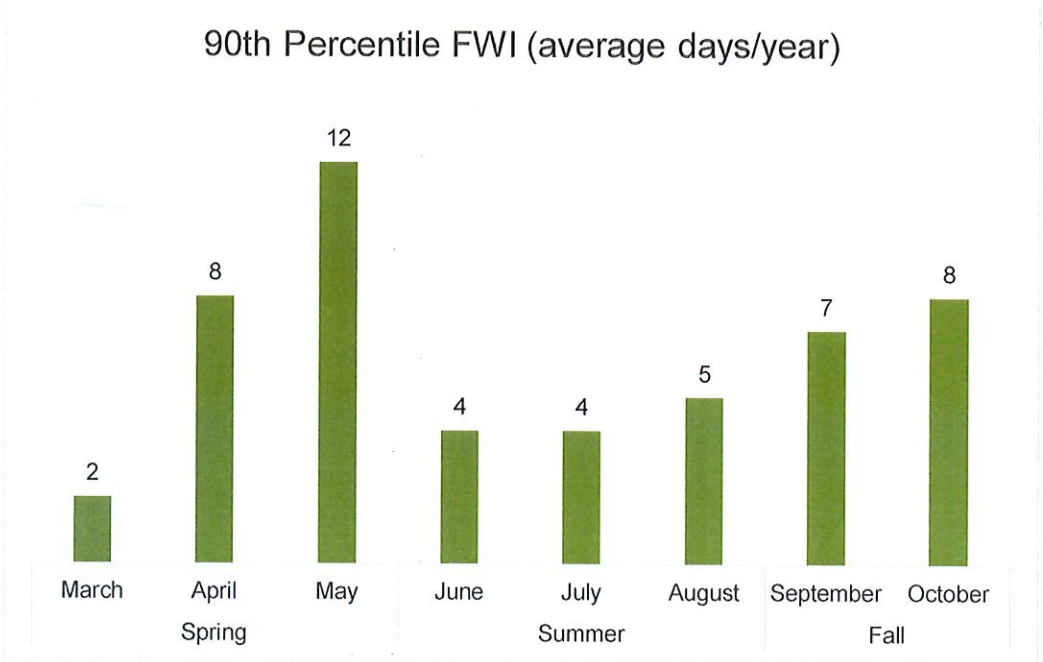

Figure 7. 90th percentile FWI

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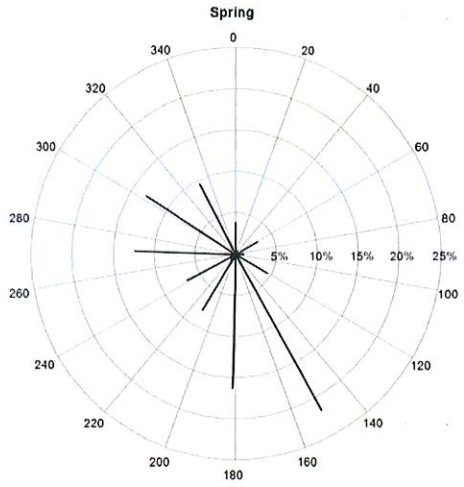

Figure 8. Spring prevailing wind

Spring winds are predominantly out of the southeast or northwest but ranges from southeast to northwest.

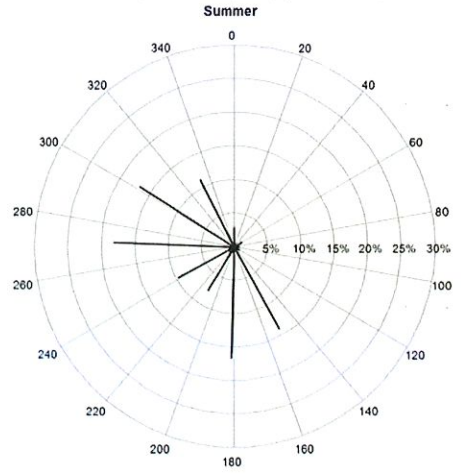

Figure 9. Summer prevailing wind

Summer winds predominantly come out of the northwest to west, with a range from northwest to southeast.

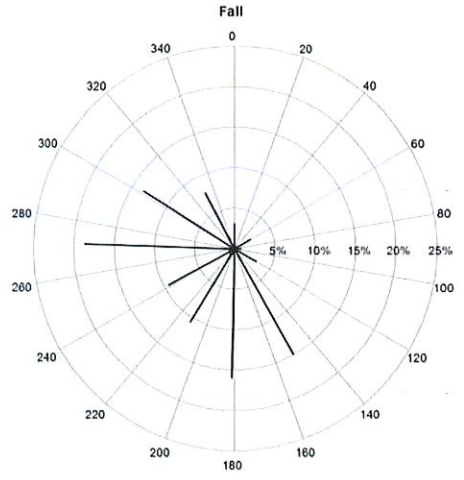

Figure 10. Fall prevailing wind

Fall winds are predominantly out of the west, with a range of northwest to southeast.

3.2.3 Topography

Topography influences fire behaviour similar to that of wind. As the slope of a hill increases so will a fire's rate of spread. It is important to identify slope to proper analyze potential fire behaviour. The topography in the planning area is generally flat (**Appendix VII**). The subtle elevation changes will have little effect on fire behaviour.

3.2.4 Wildfire Behaviour Analysis

Prometheus, a widely utilized wildfire growth model across Canada[5], is implemented in this strategy to better understand how a fire may be influenced by the vegetation fuels, weather and topography observed in the planning area. Prometheus simulations assist wildfire consultants in analyzing the possible intensity, size and consequences of a wildfire. Information gathered from simulations can then be applied to the seven wildfire disciplines (**Section 4.0**) to help mitigate against a destructive wildfire. As with all models, Prometheus has limitations and assumptions. The assumptions made in this model are listed in **Table 4**.

Table 4. Prometheus Assumptions

Prometheus Assumptions	
Model Assumption	**User Assumption**
No fire suppression	Grass 80% cured
Fuel types consistent	Scenarios start at 10:00
Only forest fuels considered	90th percentile weather will support fire growth
Barriers are effective if they are 1.5 times wider than flame lengths	Weather in Sandy Beach does not vary from Glenevis AGCM
Barriers include roads, waterbodies, and large areas of maintained or non-fuels	Topography is flat and not imperative to scenario
Does not consider spotting (**Figure 11**)	An area that is less than 25% vegetated is a non-fuel

Figure 11. Example of spotting

[5] Development and Structure of Prometheus: the Canadian Wildland Fire Growth Simulation Model (2010)

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With Prometheus, two scenarios, Scenario 1 and Scenario 2, were generated for Sandy Beach (**Appendix VIII**). Both scenarios used days where weather was above the 90th percentile FWI; days above the 90th percentile were assumed to sustain fire growth. Weather data from 10:00 – 22:00 was chosen from an actual date from Glenevis AGCM.

Scenario 1: May 11, 2011

Table 5. Summary of weather and fire data

Summary Weather on May 11, 2011				
Max Temperature	**Min Relative Humidity**	**Wind Direction**	**Average Wind Speed**	**Max FWI**
22°C	22%	Southeast	32 km/h	39
Summary Fire Data				
Ignition Point	**Time of Ignition**	**Fire Growth Stopped**	**Total Area Consumed**	**General Fire Behaviour**
HWY 642 (East of Sandy Beach)	13:00	22:00	276.97 ha	Moderate

During the first hour the fire grows to 2.6 hectares and has spread into the large municipal reserve on the eastern side of Sandy Beach. Two and a half hours after ignition, the fire reached Lakeshore Drive. The fire continues spreading northwest and within 4 hours reaches the waste transfer site road. By 18:00 all houses along Lakeshore Drive have been affected. The fire reaches a final size of 276.97 hectares, burning the majority of the municipal reserve and escaping the village boundary to the north.

Although this is an extreme simulation it illustrates areas of concern for Sandy Beach. Sandy Beach is susceptible to a wildfire from the east because of continuous fuels. With an average wind speed of 32 km/h, it can be speculated that there may be embers being carried into the community by the wind. All properties are susceptible to home ignitions if there is spotting. This fire simulation could overwhelm local resources if not contained within a reasonable amount of time. If a fire reached a similar size to this scenario mutual aid resources would be required. Special resources, such as helicopters and bulldozers, may be needed to suppress a fire in this area because of access issues on the eastern side. Man-power resources would be needed in the event that the fire spreads for more than one day. The large areas of vegetation to the east and north, if burnt, would make fully extinguishing the fire difficult. This example demonstrates the need for all community members to participate with FireSmart. If all properties along the eastern edge are FireSmart it will create a defensible barrier to the fire spreading into the community and decrease the potential of home ignitions.

Scenario 2: September 03, 2012

Table 6. Weather on September 3, 2012

Glenevis AGCM Weather on September 03, 2012				
Max Temperature	**Min Relative Humidity**	**Wind Direction**	**Average Wind Speed**	**Max FWI**
16^{0}C	32%	Northwest	27 km/h	34
Summary of Fire Data				
Ignition Point	**Time of Ignition**	**Fire Growth Stopped**	**Total Area Consumed**	**General Fire Behaviour**
East of RR 13 and north of Sandy Lake	12:00	18:30	165.52 ha	Moderate

At 13:00 the fire has breached the northern border of Sandy Beach (eastern section) and has burnt approximately 54 hectares. As the fire continues it burns down the east and west shoreline of Sandy Lake, affecting properties along Huron Drive and Lakeshore Drive. The fire reached its maximum size of 165.52 hectares at 18:30. Fire growth stopped because all available fuel had been burned.

Scenario 2 shows the volatility of cured grass in the fall. Lake levels have dropped in the last several years exposing more shore, which encourages growth of grass and reeds. If lake levels remain low these areas may transform into permanent grassy meadows. Large areas of grass are highly volatile in both the spring and fall. These areas are of concern because grass is easily ignited, when cured, and can spread at extremely fast rates. This scenario illustrates the importance for owners to FireSmart properties where large areas of grass are present.

3.3 Wildfire Incidence

Table 7.Sturgeon Fire Statistics

Sturgeon County 2014 Fire Statistics	
Fire Type	**Number of Incidences**
Controlled Burns	38
Structure and Vehicle Fires	147
Rubbish and or Grass Fires	86

3.4 Firefighting Capabilities

There are seven fire departments in Sturgeon County. Fire departments identified in **Table 8** are operated by Sturgeon County and rely mainly on volunteer firefighters. Sturgeon County's policy is to send out two departments on all calls. Most departments have bush trucks and mini-pumpers that are on pick-up truck chassis and tend to be better suited to action wildfires. Additionally, each department also has a water tender which will benefit remote firefighting by supplying water to areas where water sources may not be readily available. Specialized equipment, such as ATVs and side by sides can increase firefighter mobility during a wildfire situation by helping move equipment and small pumps.

Table 8. Fire department distance and resources

Fire Department	Distance from Sandy Beach	Manpower	Quick Response Bush Truck	Water Tender (Capacity)	Specialized Equipment
Morinville / Sturgeon County	28 km	44 (5 full-time Sturgeon County)	½ ton support pick-up truck	3 000 Gallon	- Air Bottle Truck(with 20 spare air bottles) -28' Command Trailer -Side By Side UTV -2 ATVs
Calahoo	20 km	17	1	3 000 Gallon	-Wildland Trailer -ATV
Namao	47 km	23	1	3 000 Gallon	-Wildland Trailer -ATV -Hazardous Material Trailer
Bon Accord	47 km	17	1	3 000 Gallon	
Legal District Fire	47 km	20		2 000 Gallon	
Gibbons	53 km	25	½ ton support pick-up truck	1 000 Gallon	
Redwater	77 km	19	1	3 000 Gallon	-Wildland Trailer -Side by Side UTV

4.0 FireSmart Activities

Recommendations were based on wildland/ urban interface disciplines while considering values at risk, wildfire behaviour potential, wildfire incidence, and firefighting capabilities. Wildland/urban interface disciplines, as identified by the *FireSmart Guidebook for Community Protection* (2013), are:

1. Public Education
2. Development
3. Vegetation Management
4. Legislation
5. Inter-Agency Cooperation
6. Cross-Training
7. Emergency Planning

4.1 Public Education

Proper public education will increase resident's understanding of recommendations created for wildfire mitigation. Newsletters, websites, and open house meetings are all important in the distribution of FireSmart information. The objectives of FireSmart must be highlighted and explained in the distribution medium to increase the success of resident education and engagement.

Recommendation 1

The Summer Village educates and encourages public engagement with FireSmart using newsletters, websites, and open house meetings

4.1.1 Information

Information distributed should include, but not be limited to, three fuel management approaches; fuel removal, reduction, and/or conversion. Zone 1, the area within a 10 m radius from structures, should be highlighted as the main priority area for Sandy Beach. This should have priority as maintenance of the area will reduce the risk of fire ignition and increase the defensibility of the structure. FireSmart Canada's Structure and Site Assessment form is attached in **Appendix X**.

4.1.2 Distribution

The council of Sandy Beach should ensure ongoing distribution and availability of FireSmart information in the spring and summer so that it is available during the seasons when property owners will most likely conduct vegetation management. Public notices should only be done with seasonal relevance; there should not be notices in the winter. Once the council establishes FireSmart procedures within Sandy Beach, word of mouth and public involvement will assist the education process. The goal of education is to develop engaged and dedicated landowners to create a community with a FireSmart culture.

4.1.3 Educational Resources Implementation

To assist the education process Sandy Beach should consider becoming a part of the FireSmart Canada Community Recognition Program (FCCRP)[6]. This process has already started with the Wildfire Mitigation Strategy and Preparedness Guide documents. A member of council, employee or a community leader of Sandy Beach would attend a Local FireSmart Representative workshop to learn how to acquire and maintain FCCRP for Sandy Beach.

Recommendation 2

Summer Village identify a community leader to assist with FireSmart education

[6] FireSmart Canada, *FireSmart Community Champion Workshops* – Accessed August 14, 2014

Having a community leader take on this responsibility will increase the success of the implementation of recommendations on private property.

Resource Contacts:

- Provincial FireSmart Representative Stuart Kelm
  - Email: stuart.kelm@gov.ab.ca
  - Phone: (780) 422 4452

Resource Links:

- FireSmart Canada - https://www.firesmartcanada.ca/
- Alberta Agriculture - http://agriculture.alberta.ca/acis/climate-maps.jsp

4.2 Development

4.2.1 Access

Sandy Beach only has one access into Lakeshore Drive and Huron Drive. Although roads and ditches are in fair condition for two way traffic (**Figure 12**), one access is a concern when considering access/egress of emergency responders during a disaster situation. It is recommended that Sandy Beach attempts to establish a secondary access along both Lakeshore Drive and Huron Drive. Lakeshore Drive's loop turnaround, at the north end of Lakeshore drive, is not suitable for a large apparatus to turnaround without back up procedures (**Figure 13**). To mitigate against such issues it is recommended that Sandy Beach meet with the local Fire Department to discuss access issues and other possible limitations to safe access/egress.

NOTE: An emergency access does not require that a road be built; only a path or clearing that would accommodate a vehicle to pass through.

Recommendation 3

Summer Village develop emergency access for Lakeshore Drive and Huron Drive

Recommendation 4

Summer Village meet with Fire Departments to discuss issues and strategies

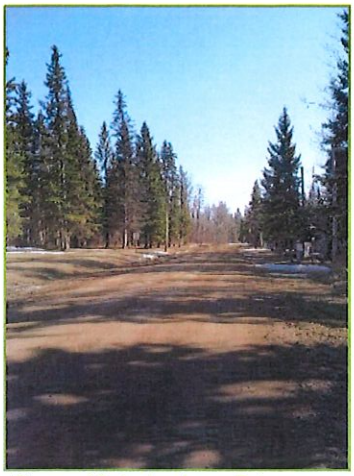


Figure 12. Lakeshore Drive

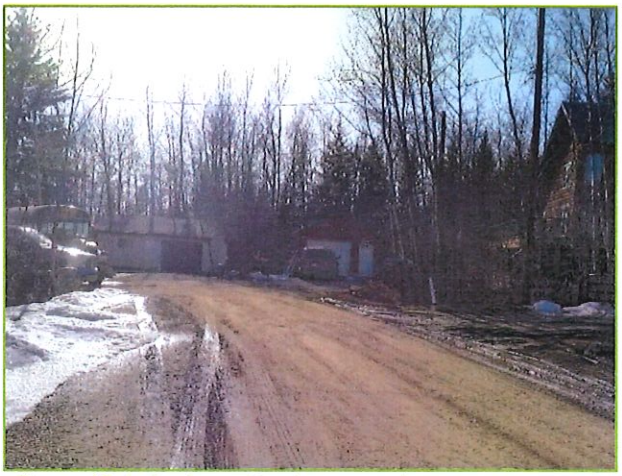


Figure 13. Lakeshore drive turnaround

4.2.2 Water Availability

Sturgeon County Fire Department, which is the primary responder in Sandy Beach, primarily uses water tenders to suppress fires in the area. Additional water during wildfire season is accessible through catchments (**Figure 14**) at the Sandy and Sunrise Public Works building. Sandy Beach does have a boat launch (**Figure 15**) however shallow lake levels would make drafting difficult.

Figure 14. Catchment

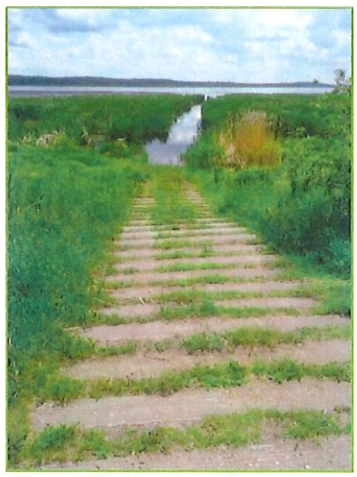


Figure 15. Boat launch

4.2.3 Signage

Signage of individual lots within Sandy Beach varies among properties. Standard signage should be established on each property at the end of the driveway, clearly identifying the lot number so it can be seen from the road (**Figure 16**). This will assist emergency responders in finding properties quickly. Community signage (**Figure 17**) is small and hard to see when travelling at the posted speed limit. Sandy Beach should acquire larger signage to assist emergency responders finding the correct drive.

Recommendation 5

Summer Village acquires standard signage for each lot.

Recommendation 6

Summer Village acquire larger community street signs

Figure 16. Example of proposed signage.

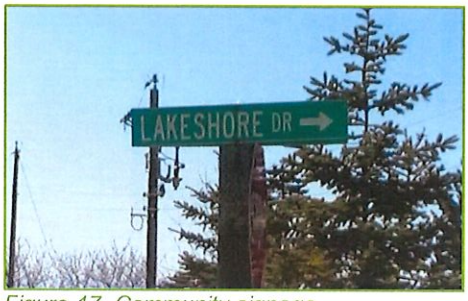


Figure 17. Community signage.

4.2.4 Utilities

The powerlines in Sandy Beach appeared in good standing, with no vegetation interference by non-insulated lines (**Figure 18**). The maintenance program by the electrical provider appears to be sufficient to prevent unnecessary ignition potentials. Natural gas residential distribution lines (**Figure 19**) supply most households. Some residents use propane to fuel their houses; see **Section 4.2.7** for information on how to FireSmart around propane.

Figure 18. Powerlines.

Figure 19. Gas line signage

4.2.5 Staging Areas

The clearing east of the fuel station (**Figure 20**), along Hwy 642 could be utilized as an operational staging area, by Fire Departments. If residents needed to be evacuated the Sandy and Sunrise Public Works building would be an ideal muster point for residents (**Figure 21**).

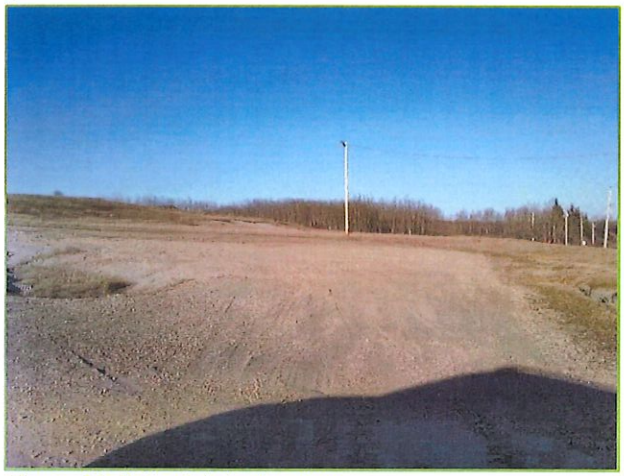


Figure 20. Potential staging area

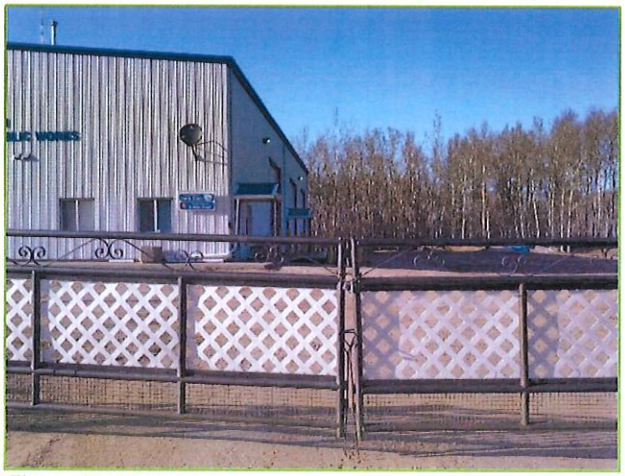


Figure 21. Muster point

4.2.6 Building Materials

The different materials used to build houses; the structure around them, as well as the condition of those materials will affect fire behaviour. The assessment of building materials in Sandy Beach was only based on what was visible from the road.

4.2.6.1 Roofing

Roofing in Sandy Beach tends to be a mix of asphalt shingles, tin or wooden shakes. Asphalt shingles, tin roofing and treated wooden shakes are fire resistant. It is important to make the distinction between treated and untreated wooden shakes as the untreated wooden shakes burn easily when exposed to

radiant heat or direct contact of firebrands (embers)[7]. Several roofs within Sandy Beach were seen to have debris buildup (**Figure 22**). Debris buildup decreases the fire resistance of asphalt shingles, tin, and treated wooden shakes. Roofing should be clear of debris (**Figure 23**) to maximize fire resistance.

Figure 22. Roof with debris buildup

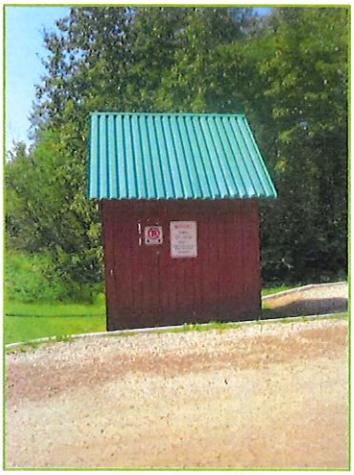


Figure 23. Example of tin roofing

4.2.6.2 Siding

Siding materials within Sandy Beach are a mix of vinyl (**Figure 24**) and wood siding (**Figure 25**). Vinyl siding and wood siding are not fire resistant. Vinyl will melt when subjected to heat, exposing flammable materials underneath. Wood siding offers very little fire resistance; however logs or heavy timber exteriors are more fire resistant when compared to wooden siding.

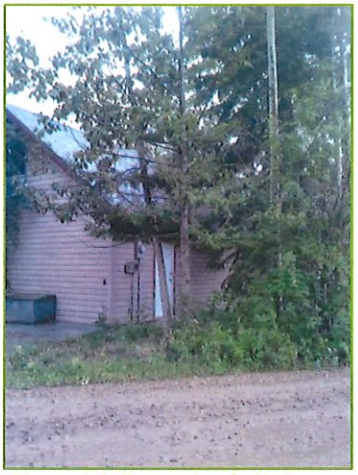


Figure 24. Example of vinyl siding

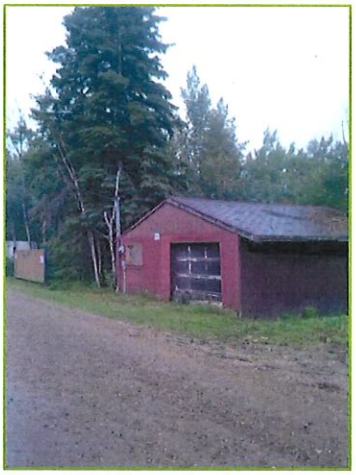


Figure 25. Example of wood siding

[7] FireSmart Protecting Your Community From Wildfire – 2003

4.2.6.3 Decks

Decks, if they are not sheathed, or if the deck is slotted can be a concern. If the structure is slotted, such as lattice (**Figure 26**), litter can accumulate underneath the structure, which increases hazards.

Figure 26. Example of lattice sheathing

4.2.7 Storage of Flammable Materials

Combustible debris piles (**Figure 27**), such as firewood or building materials, are hazards. Residents should be encouraged to remove or relocate these materials no less than 10 meters from buildings. Propane tanks (**Figure 28**) should be located 10 meters away from the building; however this may not be feasible for some properties. Propane tanks need to have vegetation maintained within a 3 meter radius.

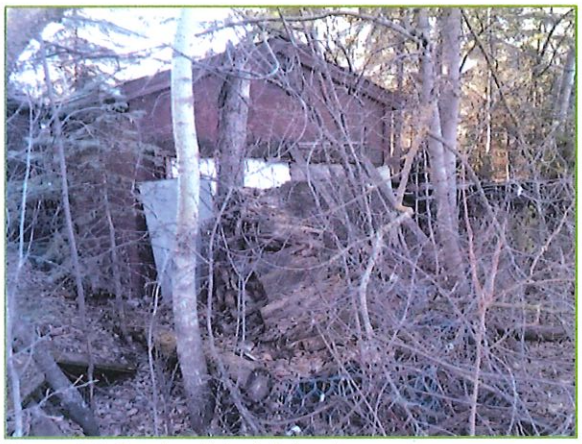


Figure 27. Combustible debris pile

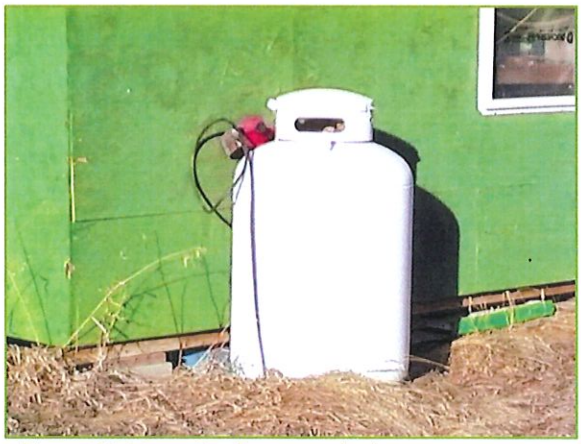


Figure 28. Example of propane tank

4.3 Vegetation Management

Application of FireSmart's three priority zones of vegetation management does not guarantee that fire will not affect a property or community. Vegetation management will reduce hazards and improve the defensibility of a structure or area. It must be noted that we do not advocate the removal of vegetation in riparian, or other sensitive areas. Riparian areas are ecologically, socially, and economically important and should not be treated with FireSmart prescriptions.

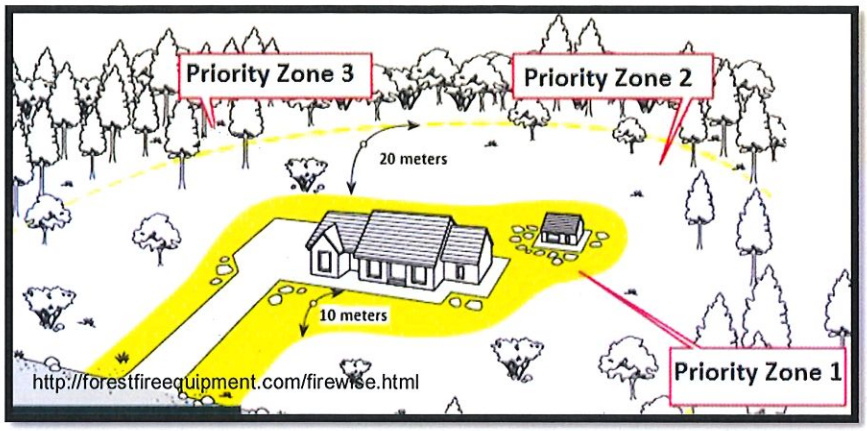


Figure 29. Priority zones around structures

Zone 1, 0 meters to 10 meters, also known as the first priority, is the most critical area to consider. Keeping this area clear of flammable vegetation and debris reduces the risk of homes igniting during a wildfire, increases defensibility of the structure and is essential to the FireSmart process.

Zone 2 is the area extending from 10 meters to a 30 meter radius from a building. Maintenance of priority Zone 2 acts to lower the intensity and the rate of spread of a wildfire. If Zone 2 is on the owner's property and interferes with a riparian zone, vegetation should not be modified, reduced, or removed[8].

Zone 3 extends out from 30 meters. Zone 3 could be necessary if there are high hazard levels due to heavy continuous forest vegetation and steep topography that are not reduced sufficiently by fuel management in Zone 2[9]. This zone will typically apply to the community or county.

Table 9. Zone 1, 2, and 3 Fuel Management

Zone 1	Zone 2 & 3
Mow grass (10 centimeters or less)	**Thinning understory**
Remove ground litter and downed trees	**Pruning lower branches (within 2 meters from the ground)**
Remove over mature, dead and dying trees	***Zone 2 and 3 are effective when conifer trees are present***
Plant fire resistant vegetation	
Thin and/or prune existing vegetation	
Remove piled debris	

[8] Fisheries Act and/or Public Lands Act authority is required within riparian zones and the bed and shore of waterbodies prior to any disturbance to the vegetation or land.
[9] FireSmart Protecting Your Community from Wildfire – 2003

CPP ENVIRONMENTAL

Landowners tend to be concerned about pruning conifer trees. Not all spruce and pine trees need to be pruned. **Figure 30** shows a spruce tree that does not require pruning. The lawn surrounding the tree is well maintained and there are no structures or other trees nearby. Only prune trees that could support fire spreading in the tops of the trees, also known as a crown fire, or ignite from a ground fire approaching (**Figure 31).**

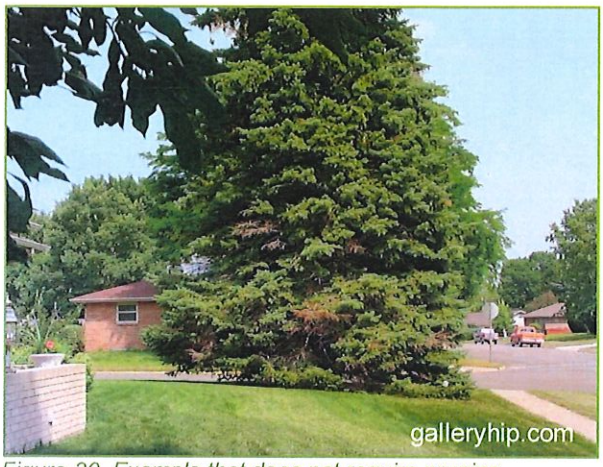


Figure 30. Example that does not require pruning

Figure 31. Example of spruce trees that require pruning

Resource and Education Links:

- Information on Riparian Areas of Alberta http://cowsandfish.org/
- FireSmart Guide to Landscaping - https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Guide-to-Lanscaping.pdf
- FireSmart Protecting Your Community - https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Protecting-Your-Community.pdf (Chapter 3 pages 3 -13)
- Tree Help Pruning Trees: a step-by-step guide - http://tree-pruning.com/index.html

4.3.1 Community Vegetation Management

The Sandy Beach community has done an excellent job along Lakeshore Drive, Blue Heron Drive, and West Cove Drive as they have had the ditches widened adjacent to forest areas, the vegetation was mulched (**Figure 32**) and spruce trees were pruned (**Figure 33**) in these areas.

Figure 32. Mulched Ditches

Figure 33. Pruned spruce trees

Sandy Beach uses the waste transfer station to pile and burn debris (**Figure 34 and Figure 35**). Burning debris is a cheap and easy way to dispose of vegetation from private properties. Debris piles should only be ignited during low hazard, with notifying the local fire departments.

Figure 34. Debris pile near the Waste Treatment center

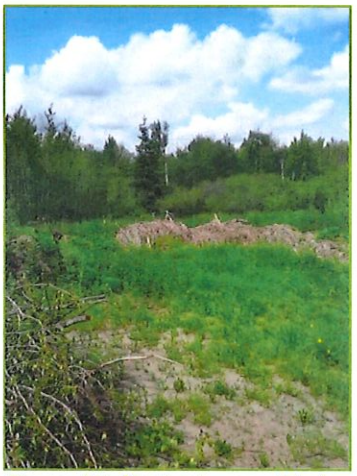


Figure 35. Slash pile near Waste Treatment center

Hazard reduction burning of the grass along the shoreline of Sandy Lake (**Figure 36**) will decrease the fire hazard by reducing the amount of fuel available to burn (**Appendix IX**). There are multiple ecological benefits to fire such as the recycling of nutrients and increasing habitat availability. Hazard reduction burning should be done when possible, depending on the fuel conditions, availability of resources, and while following the restrictions of the Migratory Birds

Recommendation 7

Summer Village initiates a hazard reduction burn of the grassy areas around the shores of Sandy Lake

Convention Act[10]. Hazard reduction burns need to be well planned out and should only be attempted during calm, favourable winds and with human and community safety as key priorities.

Agriculture and Forestry (AF) Lac La Biche Wildfire Management Area has stated that they would be interested in an operational role under Sturgeon County which would be the lead agency. Sturgeon County also expressed interest, but has stated that the council of Sunrise Beach and Sandy Beach would need to initiate the process. This would be an opportunity for AF, Sturgeon Department of Protective Services, and the Summer Villages of Sunrise Beach and Sandy Beach to demonstrate the many benefits of reintroducing fire onto the landscape.

Figure 36. Potential hazard reduction burn area

4.3.2 Residential Vegetation Management

There are lots within Sandy Beach that have significant amounts of vegetation (**Figure 37**) or debris buildup (**Figure 38**). It is recommended that residents implement Zone1 and Zone 2 FireSmart treatment areas on all private property within the summer village. To assist residents, it is recommended that Sandy Beach offers a vegetation debris disposal service. This service encourages property cleanup of wildfire hazards by supplying a means for property owners to dispose of debris. These initiatives illustrate the importance of FireSmart and the dedication of Sandy Beach to achieve a FireSmart Community.

Recommendation 8

Residents maintain Zone 1 and Zone 2 on private property, or up to the riparian zone; no vegetation management should happen in any riparian zone.

Recommendation 9

Summer Village supply a debris disposal service to assist residents with vegetation management on private property

[10] Government of Canada, Migratory Birds Convention Act – Accessed February 9, 2015

Figure 37.Lot requiring vegetation fuel management.

Figure 38. Lot requiring debris disposal.

4.4 Legislation

4.4.1 Fire Bylaw

The "Open Burning Bylaw", "Nuisance Unsightly bylaw" and the "Off Road Vehicle bylaw" are a comprehensive set of legislations that have elements to support a FireSmart community. The Open Burning Bylaw clearly distinguishes between fires that are allowed and fires that need a permit. It is recommended to update the bylaw to state that Sturgeon County is now the "Fire Department". Additionally as Sandy Beach is now under Sturgeon County Fire Services it would be advisable to review Sturgeon County's Fire Burning bylaw and ensure that they are not contradictory in any way.

Recommendation 10

Summer Village review Open Burning Bylaw to ensure compatibility with Sturgeon County

Sturgeon Fire Burning Bylaw link:

- http://www.sturgeoncounty.ca/Portals/0/PDFs/Bylaws/1309_Burning%20Bylaw_2013.pdf

4.4.2 Development Bylaw

As per the community FireSmart protection guide, the suggested building development materials should be considered for inclusion in the bylaws.

Development Resource and Education Link:

- FireSmart Protecting Your Community - https://www.firesmartcanada.ca/images/uploads/resources/FireSmart-Protecting-Your-Community.pdf (Chapter 3 pages 28 -36)

4.5 Interagency Cooperation

Sturgeon County Fire Services provides primary emergency response services for Sandy Beach. To ensure the proper protective services are provided to the communities, the fire department has set up mutual aid agreements with several surrounding municipalities and agencies. **Table 10,** is a list of all mutual aid agreements in place.

Table 10. Mutual Aid Agreements

Adjacent Municipality / Agency	Mutual Aid Agreement
City of Edmonton	Yes
City of St. Albert	Yes
City of Fort Saskatchewan	Yes
Strathcona County	Yes
Lac St. Anne County	Yes
Westlock County	Yes
Barrhead County	Yes
Thorhild County	Yes
Lamont County	Yes
Northeast Region Community Awareness Emergency Response	Yes
Capital Region Emergency Preparedness Partnership	Yes
AF Lac La Biche Wildfire Management Area	Yes

Wildland/urban interface fires can at times exceed the capabilities of the local emergency responders. When mutual aid agreements are in place an understanding is confirmed that additional resources of personnel and equipment are identified and are available. They can also be beneficial to share specialized equipment as this will alleviate some of the cost and allow equipment to be shared. As an example if the local fire department is in need of a sprinkler kit, but does not have one, they can put in a request to AF to obtain one. These agreements can include neighboring municipalities and in some cases industry. Annual reviews should be carried out; this ensures opportunities for fire protection officials to discuss and review any changes or updates.

4.6 Cross-Training

AF Lac La Biche Wildfire Management Area have stated that if any of the local fire departments have any interest in joint exercises they would welcome the opportunity. These exercises should emphasize scenarios of mutual aid. This could be coordinated with a hazard reduction burn of grass fires. Having multiple agencies participate in these training exercises will benefit all parties by illustrating key differences in strategies, tactics, and equipment.

4.7 Emergency Planning

Sandy Beach developed an Emergency Management Policy and Procedures Manual that was approved on May 12, 2009. The call out list in this manual was updated in 2013, but no other changes have been made. The Summer Village of Sandy Beach is currently in the process of developing a regional emergency plan with Alberta Beach, Mayerthorpe, Onoway and11 other Summer Villages within Lac Ste. Anne County.

5.0 Summary of Recommendations

The risk assessment tool, included in **Appendix XI**, shows that if the suggested recommendations are implemented the fire hazard rating score will drop from 481 to 403. Each of the recommendations is ordered upon urgency and effort to assist each of the communities in making a working plan. Urgency and effort levels were set using the following criteria:

Urgency is a measure of timeliness and is rated as high, medium and low meaning:

High	The recommendation is critical and should be commenced as soon as possible.
Moderate	Recommendation is important and may be worked on as a staged approach to program improvement.
Low	The recommendation may be completed as resources become available.

Effort is a measure of resources required over a period of time and is measured as high, medium low, meaning:

High	Requires direct project funding (for contracted services), possibly a multi-year project, preferably managed through dedicated government resources for the term of the project, involves significant external stakeholder involvement.
Moderate	May require direct project funding (for contracted services), generally completed can be within one business year, managed with assigned government resources and possibly involves external stakeholder input.
Low	Generally will not require direct project funding, managed through existing government resources as routine business, often can be completed within one or two business quarters and generally does not involve external stakeholders.

Note: The following tables contain the recommendations, indicating their respective urgency and level of effort required for implementation.

5.1 Education Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Moderate	Moderate	**1. Recommendation Action:** The Summer Village educates and encourages public engagement with FireSmart using newsletters, websites, and open house meetings. **Project Lead:** Summer Village Council **Benefits:** Community Education and involvement.	Annually	4.1
Moderate	Low	**2. Recommendation Action:** The Summer Village identifies a willing community leader to work with the community on FireSmart initiatives. This will lead to community recognition by FireSmart Canada. Contact Stuart Kelm **Project Lead:** Summer Village Council **Benefits:** Community involvement and ownership of FireSmart; more resources for council to utilize.	One Time	4.1.3

5.2 Development Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Low	High	**3. Recommended Action:** The Summer Village take measures to develop a second emergency access/egress for Lakeshore Drive and Huron Drive. **Project Lead:** Summer Village Council **Benefits:** Increase evacuation capability	One Time	4.2.1
High	Low	**4. Recommended Action:** The Summer Village meets with the local fire station for an orientation day to discuss emergency response issues associated with narrow side roads and dead end drives. **Project Lead:** Summer Village Council **Benefits:** Clear communication between community and fire department.	When needed	4.2.1
High	Moderate	**5. Recommended Action:** The Summer Village acquires standard signage for each lot. **Project Lead:** Summer Village Council **Benefits:** Faster response times for emergency services.	One Time	4.2.3

Moderate	Moderate	6. **Recommended Action:** The Summer Village acquire larger street signs **Project Lead:** Summer Village Council **Benefits:** Faster response times for emergency services.	One Time	4.2.3

5.3 Vegetation Management Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Moderate	High	7. **Recommendation Action:** Hazard reduction burning of the Sandy Lake shoreline. **Project Lead:** Sturgeon County **Benefits:** Hazard reduction burning will decrease the fire hazard around Sandy Lake by reducing the amount of fuel available to burn	Annually pending weather conditions	4.3.1
High	Low	8. **Recommendation Action:** Property owners mow and maintain grass, debris, and other combustible materials. Prune conifer trees on land 2 meters from the ground (Priority Zone 1 and/or Zone 2 depending where property line ends). **Project Lead:** Property owners **Benefits:** Protecting property by removing points of ignition.	Annually/ When needed	4.3.2
High	Moderate	9. **Recommendation Action:** Summer Village supply a debris disposal service to assist residents with Zone 1 and Zone 2 treatments on private property **Project Lead:** Summer Village Council **Benefits:** Encourages residents to clear flammable debris from property	Annually/ Semi-Annually	4.3.2

5.4 Legislation Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Moderate	Moderate	10. **Recommendation Action:** Sandy Beach updates their Fire Bylaw. Review Sturgeon County Fire Bylaw for any discrepancies. **Project Lead:** Summer Village Council **Benefits:** Ensure that Sandy Beach's Bylaw is inclusive and has no discrepancies with primary fire responders.	One Time	4.4.1

Appendices

Glossary

Barriers to Spread – A fire barrier is an area that cannot burn, or burns slowly, which emergency responders may use as a staging point, anchor point, safety zone, or evacuation route.

Buildup Index (BUI) – Total amount of fuel available for combustion.

Combustible Material – These materials must usually be heated before they will catch on fire at temperatures above normal (between 37.8 and 93.3 ^{0}C or 100 and 200 ^{0}F).

Coniferous – Plants that do not shed leaves in the fall. In this report coniferous is synonymous with spruce or pine trees.

Continuous Fuels – Patches of forest or grass fuels that do not have any barriers to spread. These areas may have the ability to support fire over longer distances.

Crossover – Occurs when the value of the RH is equal to, or lower than, the value of the temperature and is an indicator of potential extreme fire behaviour.

Cured or Curing – Dried or drying grass. Grass cures in the fall and remains cured until green up in the spring.

Danger Tree – A live or dead tree whose trunk, root system or branches have deteriorated or been damaged to such an extent as to be a potential danger to human safety.

Deciduous – Plants that shed leaves in the fall. In this report deciduous tends to mean aspen or poplar trees.

Drafting Water – The use of suction to move a liquid such as water from a vessel or body of water below the intake of the suction tank.

Dry Hydrant – A fire hydrant that is not pressurized. A dry hydrant is a pipe that goes out to a water body so that a pumper truck can draw water from water body.

Effort – A measure of resources required over a period of time.

Emergency Landing Spot – A possible site that is open and clear enough so that a helicopter, in a state of emergency, could land.

Fine Fuel Moisture Code (FFMC) – A numerical indicator of the ease of ignition of litter and other cured fine fuels such as small twigs, needles and grasses.

Fire Behavior – The manner in which fuel ignites, flame develops, fire spreads and exhibits other related phenomena.

Fire Hazard – The fire threat potential.

FireSmart – Actions taken to minimize the unwanted effects of wildfire.

Fire Resistant – Material that is designed to resist burning and withstand heat.

Fire Weather Index (FWI) – This is a numeric rating of fire intensity. It is suitable as a general index of fire danger throughout the forested areas of Canada.

Flammable – The material will burn or catch on fire easily at normal temperatures (below 37.8 degrees C or 100 and 200 deg F).

Flank Fire – A fire that is burning at an angle approximately 90^0 to the wind.

Fuels – Combustible materials. In this report fuels tends to describe trees, plant debris (such as dead branches, leaves, etc.) but may also include man made materials.

Head Fire Intensity (HFI) – The energy that a fire generates. HFI is separated into six classes, one being low fire behaviour and six being extreme fire behaviour. See **table below** for more information:

Head Fire Intensity Class Description & Firefighting Methods		
Head Fire Intensity	**Fire Behaviour**	**Firefighting Methods**
1	Very low vigour, smouldering ground or creeping surface fire, low intensity	Self-extinguishing unless high drought code and/or build-up index values prevail, in which case mop-up is generally extensive.
2	Low vigour surface fire	Direct attack by firefighters with hand tools and water is possible. Constructed fireguard should hold.
3	Moderately vigorous surface fire	Hand-constructed fireguards are likely to be challenged. Heavy equipment is generally successful in controlling such fires. Indirect attack suggested.
4	Highly vigorous surface fire, may be torching trees or intermittent crown fire	Control efforts at the fire's head may fail. Indirect attack only by firefighting personnel.
5	Very high vigorous surface fire or crown fire	Very difficult to control. Suppression action must be restricted to the fire's flanks. Indirect attack with aerial ignition may be effective.
6	Extreme disastrous fire	Suppression actions should not be attempted until burning conditions improve.

Heat Transfer – Exchange of thermal energy, between physical systems depending on the temperature and pressure by dissipating heat.

> **Conduction**: when heat (energy) is transferred through solid matter.
>
> **Convection**: when heat (energy) is transferred between objects that are in physical contact.
>
> **Radiation**: When heat (energy) is transferred from warmer surfaces to cooler surroundings. (eg. The heat from the sun)

Incinerator Fires – Burning of house hold waste in an approved container with proper screening and venting.

Inherent Risk – A fire hazard based on an evaluation of the current state of the community.

Initial Spread Index (ISI) – A numerical rating of the expected rate of fire spread.

Intensity – Measures of energy output. Amount of energy released during a fire.

Ladder Fuels – Fuels that provide a vertical continuity between surface fuels and crown fuels. (eg. tall grasses, shrubs, branches)

Mixedwood – A mixture of both coniferous and deciduous trees. Typically spruce and aspen.

Mutual Aid Agreement – Allows municipalities to prepare for emergency events that exceed that exceed their local resource capabilities.

Ninetieth Percentile (90th) – A measure of statistical distribution. The 90th percentile is the value for which 90% of the data points are smaller and 10% are bigger.

Points of Ignition – The point on the landscape where the fire was started.

Prevailing Winds – The predominant winds in that area.

Rate of Spread (ROS) – The distance a fire will spread in a given period, measured in meters per minute.

Relative Humidity (RH) – It is the ratio of moisture in the air (water vapor) to the amount that the air can hold at the same temperature and pressure if it were saturated.

Residual Risk – A risk based on an evaluation demonstrating the change in risk with the implementation of recommendations and the community proactively participating in FireSmart.

Right of Way (ROW) – A strip of land that is managed specifically for access to streets, roads and highways.

Riparian Zone – An area of land adjacent to a stream, lake, or wetland that contains vegetation that, due to the presence of water, is distinctly different from the vegetation of adjacent upland areas.

Risk – The probability of an undesirable event occurring.

Safety Zone – Please refer to Staging Area.

Severity – A loss or change in organic matter both above and belowground.

Spotting – when a fire creates embers that travel through the air and can ignite fuels or structures (**Figure 11**).

Staging Area – An area where resources can be stationed while waiting assignment.

Stand(s) – A group of trees.

Stakeholder – The range of groups and individuals who have a formal or informal stake in planning and management decisions.

Urgency – A measure of timeliness.

Wildland/Urban interface – The area where buildings are adjacent to, or within, forests, grasslands, scrublands, or other combustible vegetation.

Zone 1 – The area extending 0 to 10 meters from a structure.

Zone 2 – The area beyond Zone 1 that begins at 10 meters from a structure and extends to 30 meters from the structure.

Zone 3 – The area beyond Zone 2 that begins at 30 meters from a structure and extends to 100 meters from a structure.

WILDFIRE PREPAREDNESS GUIDE

Sandy Beach & Sunrise Beach

June 2015
CPP Environmental

Key Contacts

County of Sturgeon	(780) 939-9303
(after hours)	(780) 498-9847
Fire Chief/Manager Protective Services –	
Pat Mahoney	Work (780) 939-6900
	Cell (780) 818-5066
Deputy Fire Chief – Steve Douglas	
	Work (780) 939-0606
	Cell (780) 777-4132
Administration Assistant –	
Kandis Boddez	Work (780) 939-0624
County of Lac Ste. Anne	(780) 785-3411
SRD Whitecourt	(780) 778-7265
Alexander First Nations	(780) 939-5887
Girl Guides Camp	(780) 967-2028
Silver Sage Centre	(780) 967-2997
Utilities	
Ste. Anne Gas Coop (Gas)	(780) 967-2246
Epcor (power)	310-4300
RCMP (24hr emergencies)	**911**
Mornville Office	(780) 939-4520
Alberta Emergency Management Agency (AEMA)	1-866-618-2362
Village Administration Office	
Wendy (CAO)	(780) 819-3681

Fire Behaviour Factors

Forest Fuel– Grass (O1), Deciduous (D1), Coniferous (C2) and mixedwood (M1) in & around planning area.

Topography—Fairly flat with some rolling terrain primarily in Sandy Beach.

Values At Risk

Critical— None Identified
Dangerous Goods— Waste Transfer Station/Fuel station.
Special— Girl Guides Camp, Sandy Playground, Silver Sage Centre

Staging Areas

1. Corner of Shedden Drive and Leisure Ln.
2. Northeast of the Fuel Station off HWY 642

Roads & Turnarounds

Signage– No standard lot signage present
Access— Sandy Beach– Has 1 means of access/egress. Sunrise Beach– Has 2 means of access/egress in the north and 1 means of access egress in the southern portion.
Roads— Roads are 6.5 meters in width
Loop Turnarounds– Require backup maneuvers for large apparatuses.
Ditches—suitable for two-way travel
Private Driveways— Width is ~4meters; length ~15meters (gravel)

Water Supply

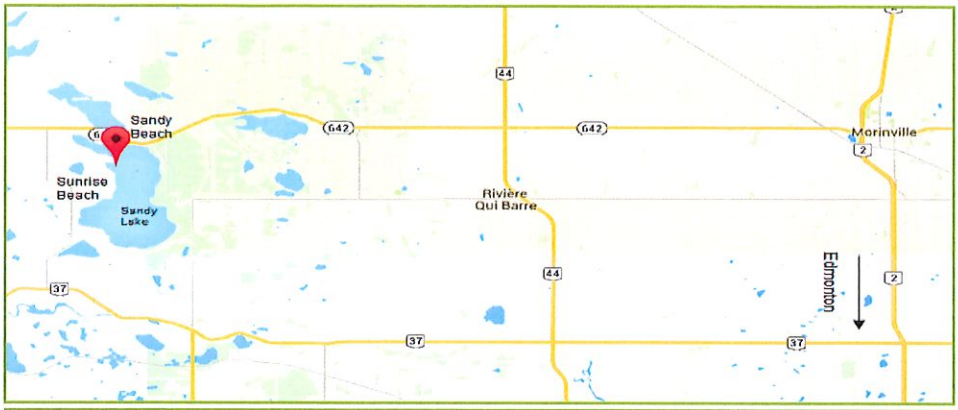
Sandy Beach– 2 Boat Launches, 1 catchment
Sunrise Beach –Boat Launch, 1 catchment

Communications

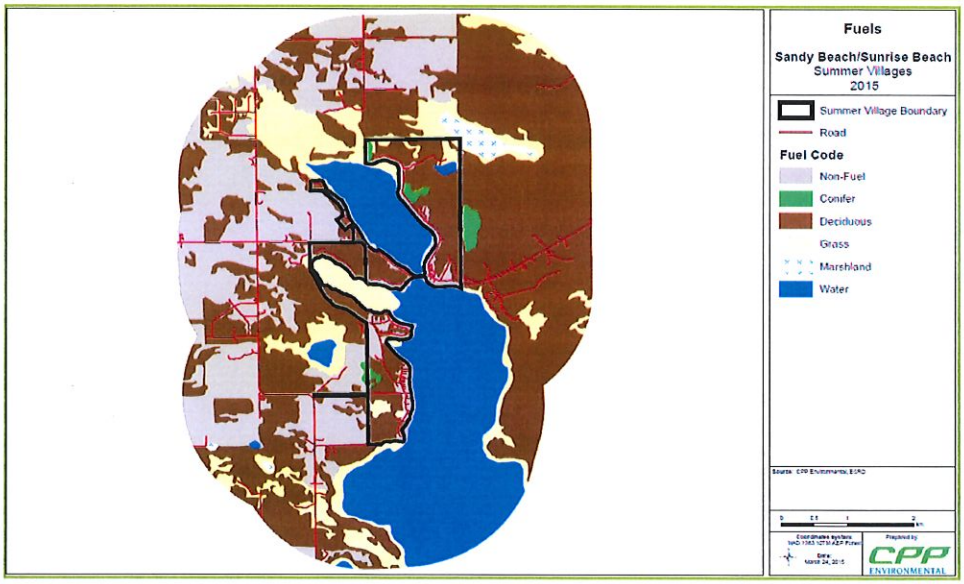
Fire Talk Around– 154.055 (RFTF), 162.2 (Tone)
County Talk Around—155.220 (RFTF), CSQ (Tone)
County Repeater—155.220 (RF), 156.210 (TF), CSQ (Tone)
Alberta Ambulance-158.760 (RFTF), CSQ (Tone)
Alberta Disaster– 156.855 (RFTF), CSQ (Tone)

Area Description

Number of residences: Sandy Beach (279) and Sunrise Beach (145).
Main accesses are good, side roads are narrow. Sandy Beach, east portion is most susceptible to wildfire. Sunrise Beach, very north and south are most susceptible to wildfire.



The two villages are approx. 27km west of Mornville on Hwy 642.



Fire Department Resources

Mornville Fire Department— 28km E

44 – Manpower

1 - 100' Aerial

2 - Engines ((1250 GPM with 1,000 Gal on board water tank)

1 - Tender (3,000 gallons)

1 - Heavy Rescue

1 - Air Bottle Truck with 20 spare air bottles

1 - ½ ton Support Pick-Up truck

District of Calahoo Fire Department— 20km SE

17 - Manpower

1 - Engine (1250 GPM with 1,000 Gal on board water tank)

1 - Tender (3,000 Imperial gallons)

1 - Rapid (Ford F550 with a 250 Gal water tank)

1 - Wildland Trailer

1 - ATV

Evacuation Protocol

Sandy Beach

Evacuation Routes

Eastern Portion– South on Lakeshore drive to Hwy 642

Western Portion– South on Blue Herron Drive to HWY 642

Muster point for Residents—Sandy Administration Building

Sunrise Beach

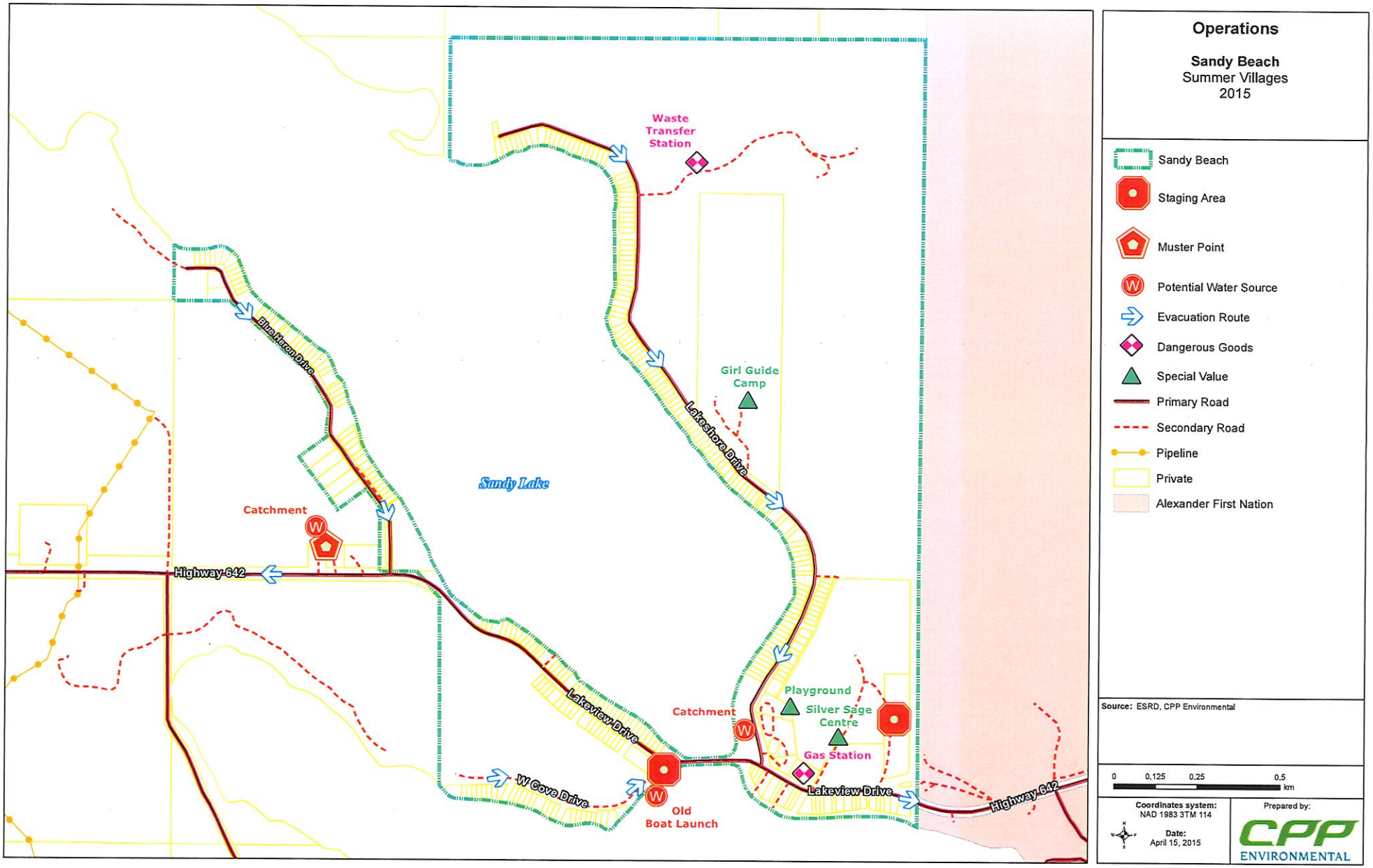
Evacuation Routes

Northern Portion– North on Shedden Dr to HWY 642

-South on Shedden Dr , west on Victory road.

Southern Portion– North on Shedden Dr., west of Victory Rd

Muster point for Residents—Sandy Administration Building



Operations

Sandy Beach
Summer Villages
2015

- Sandy Beach
- Staging Area
- Muster Point
- Potential Water Source
- Evacuation Route
- Dangerous Goods
- Special Value
- Primary Road
- Secondary Road
- Pipeline
- Private
- Alexander First Nation

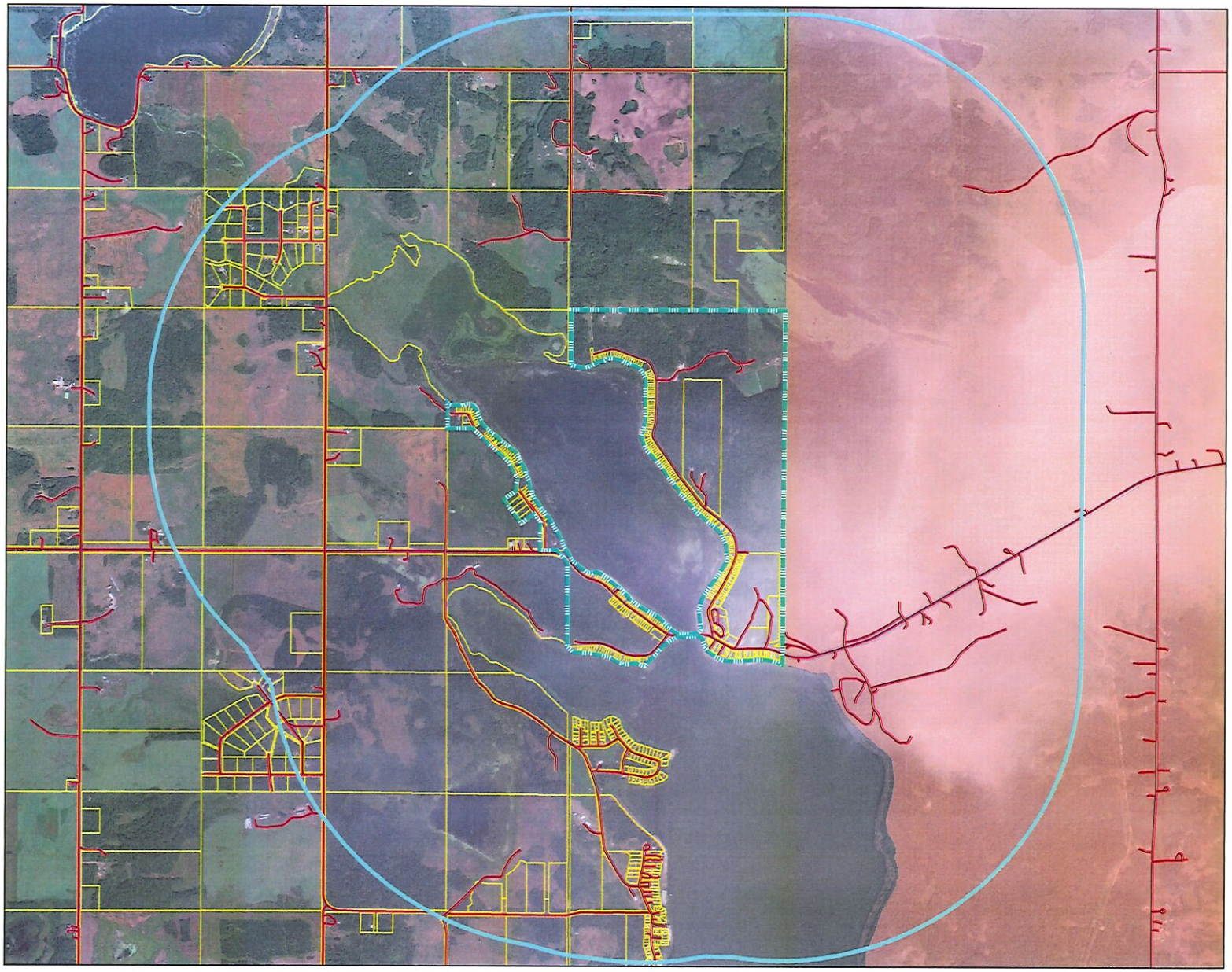
Source: ESRD, CPP Environmental

0 0.125 0.25 0.5 km

Coordinates system: NAD 1983 3TM 114

Date: April 15, 2015

Prepared by: CPP ENVIRONMENTAL



Planning Area

Sandy Beach
Summer Villages
2015

- Planning Area
- Sandy Beach
- Road
- Private
- First Nations Reserve

Source: ESRD, CPP Environmental

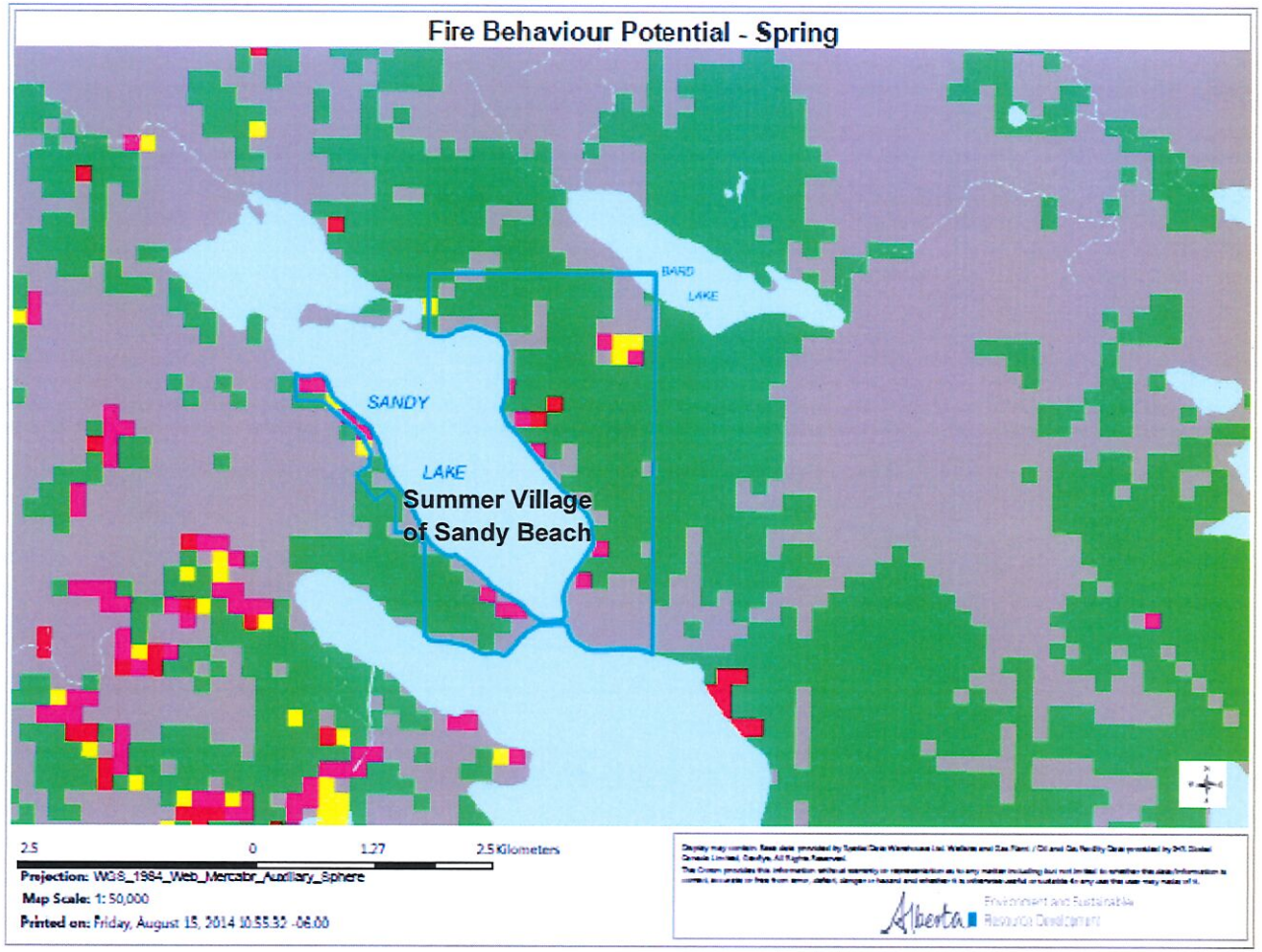
0 0.25 0.5 1 km

Coordinates system:
NAD 1983 3TM 114

Date:
May 26, 2015

Prepared by:
CPP ENVIRONMENTAL

Wildfire Behaviour Potential Maps

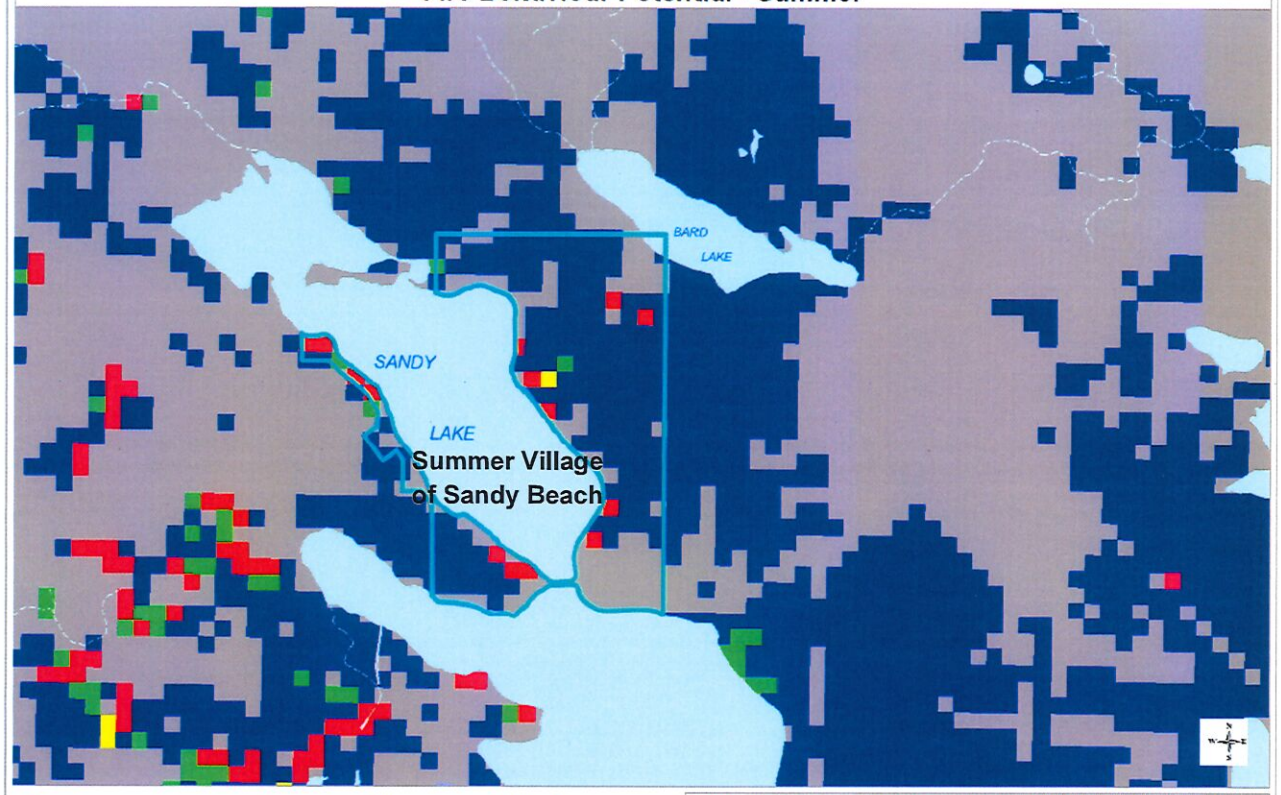


Legend

Fire Behaviour Potential

- Non - Fuel
- Low Fire Behaviour Potential
- Moderate Fire Behaviour Potential
- High Fire Behaviour Potential
- Very High Fire Behaviour Potential
- Extreme Fire Behaviour Potential

Fire Behaviour Potential - Summer



Legend

Fire Behaviour Potential

- Non - Fuel
- Low Fire Behaviour Potential
- Moderate Fire Behaviour Potential
- High Fire Behaviour Potential
- Very High Fire Behaviour Potential
- Extreme Fire Behaviour Potential

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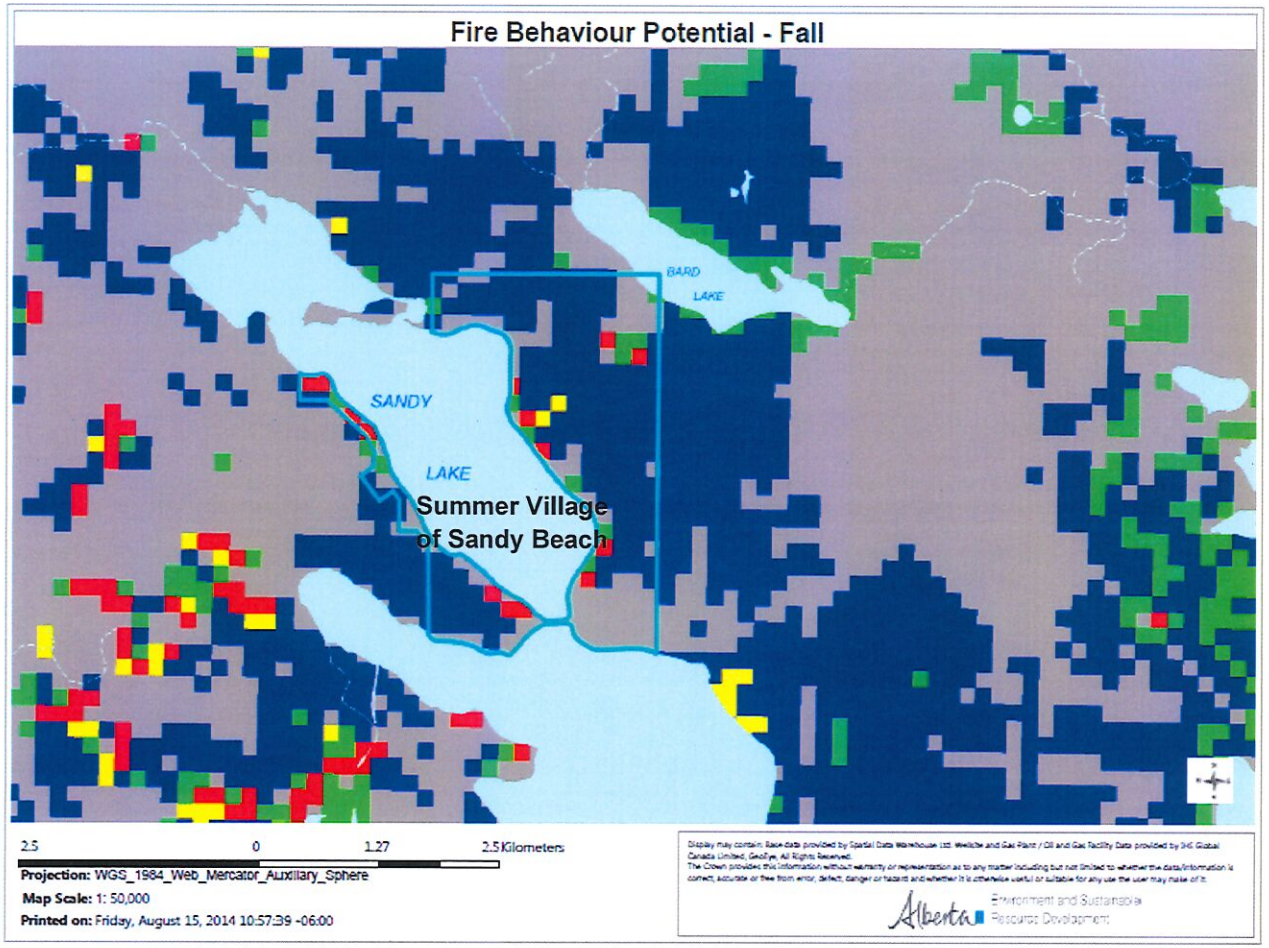

Legend

Fire Behaviour Potential

- Non - Fuel
- Low Fire Behaviour Potential
- Moderate Fire Behaviour Potential
- High Fire Behaviour Potential
- Very High Fire Behaviour Potential
- Extreme Fire Behaviour Potential

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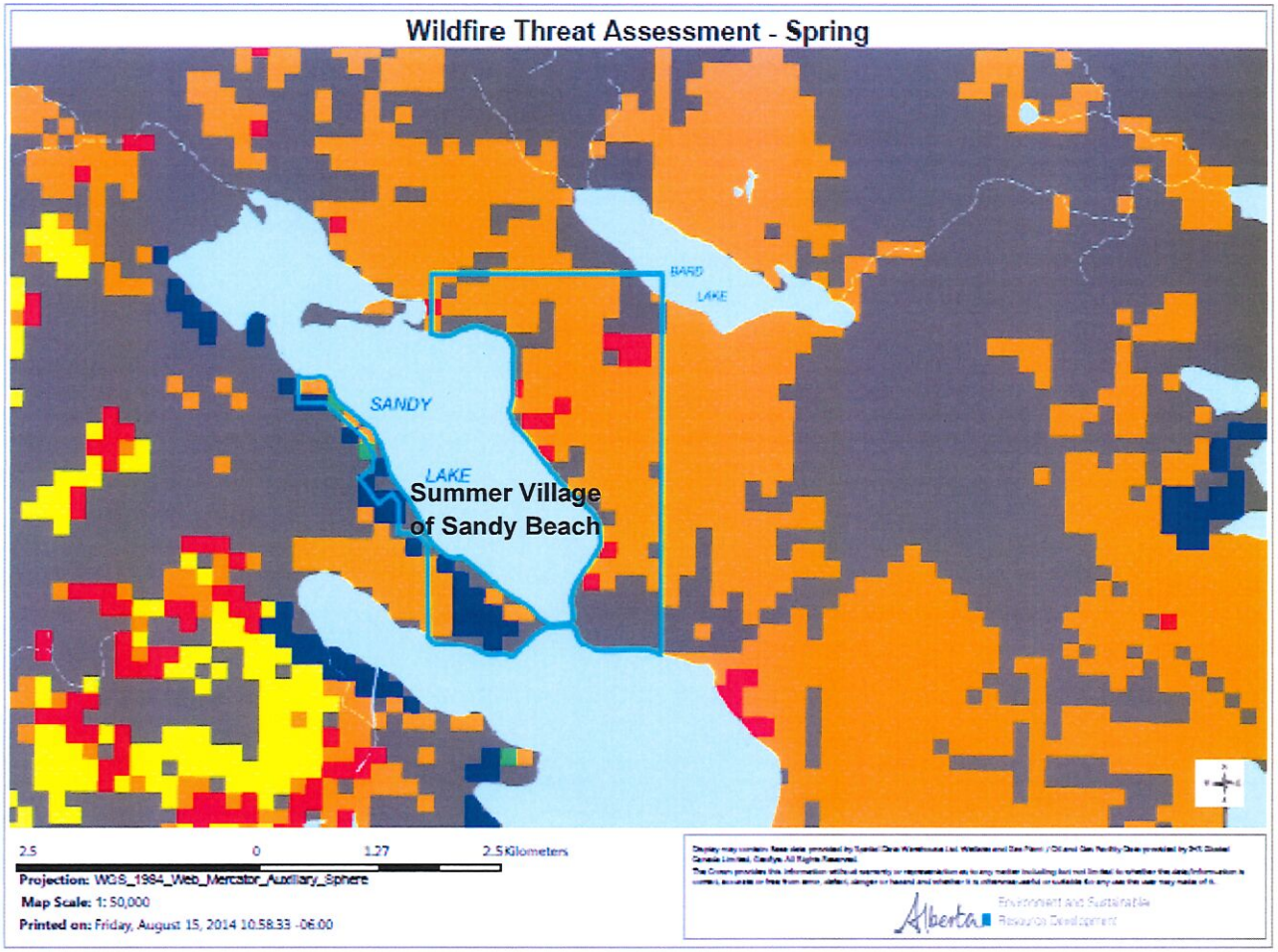
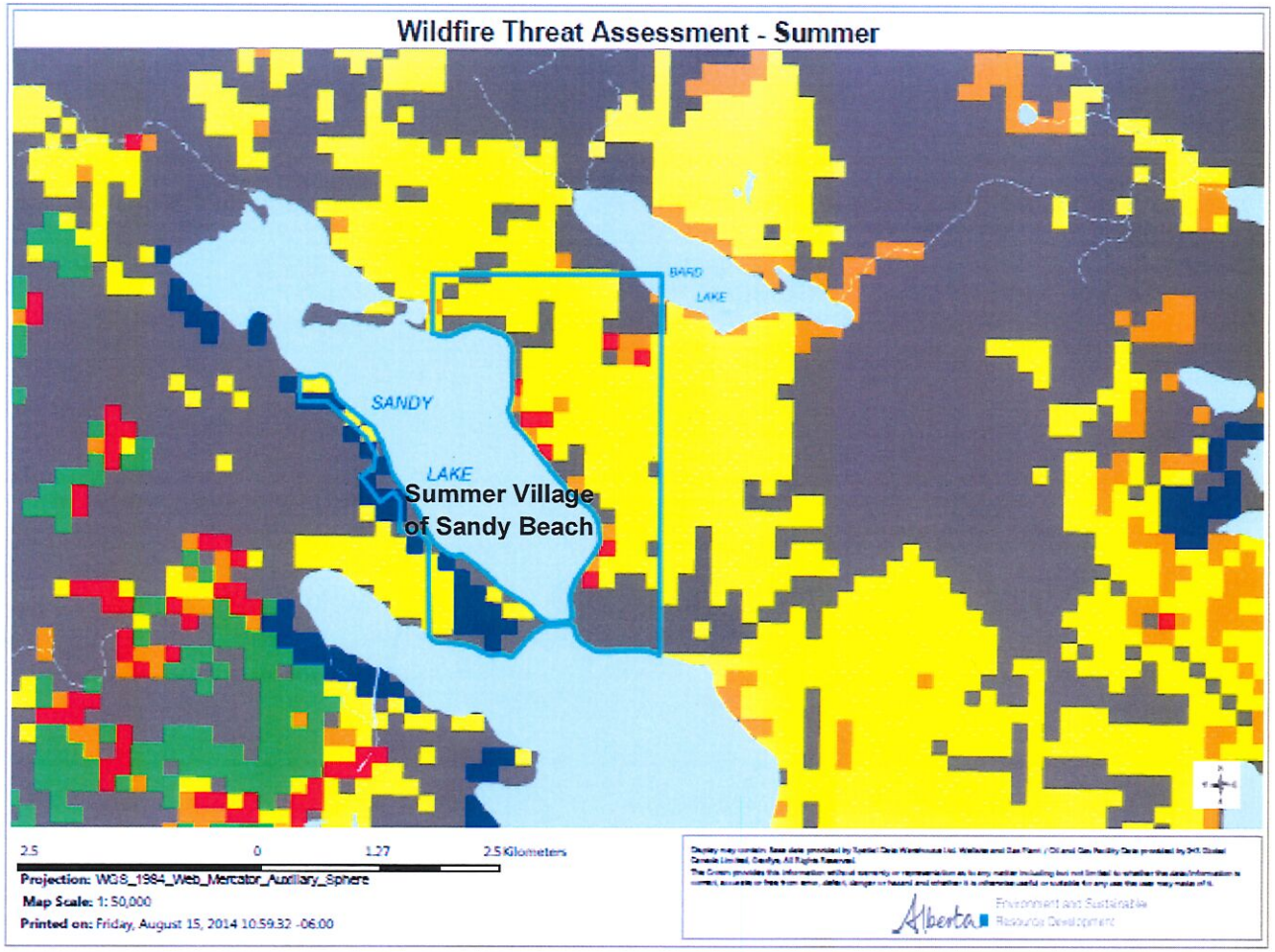
Wildfire Threat Maps



Legend

Wildfire Threat Rating

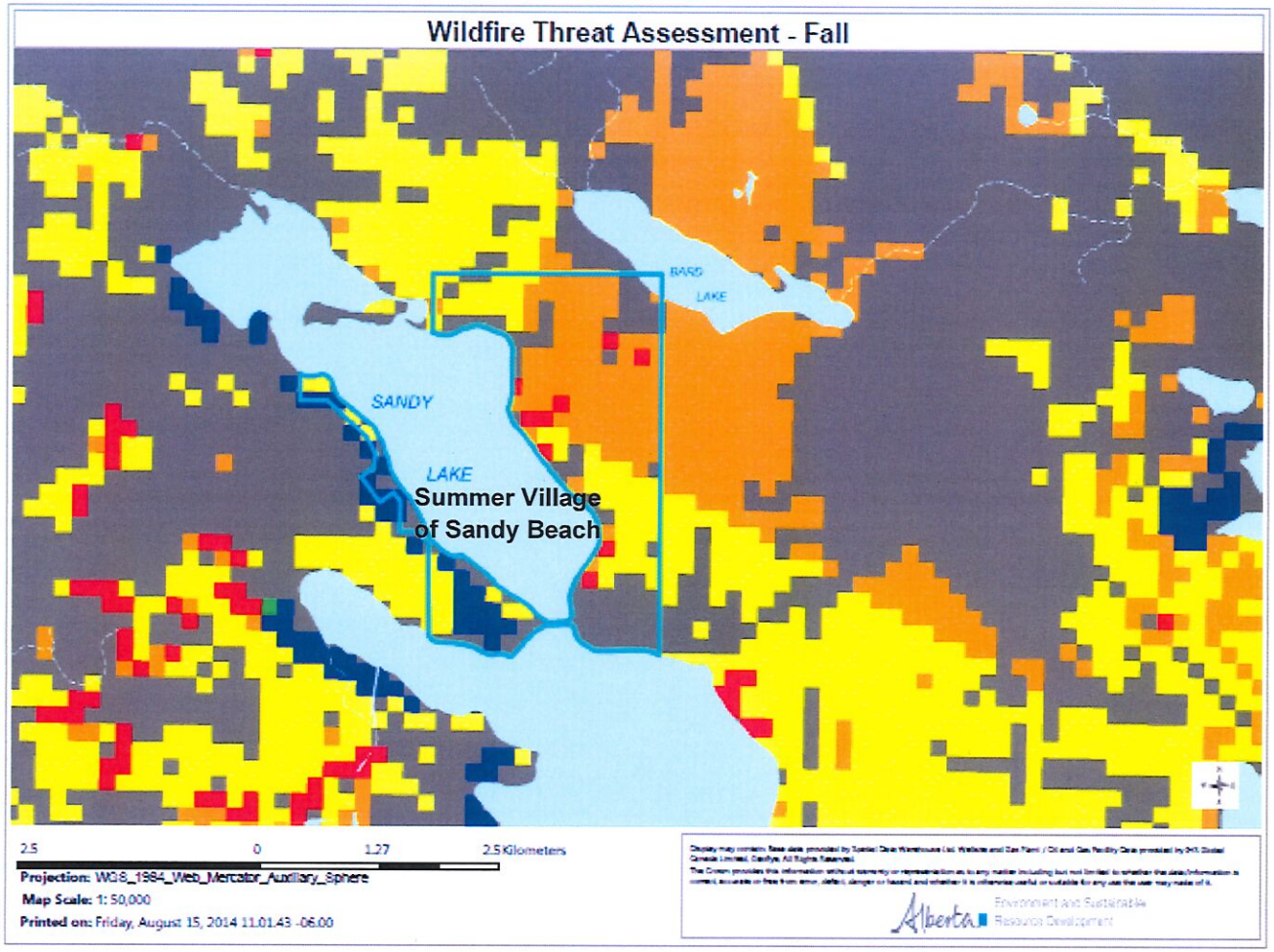
- Non-Fuel
- Low Wildfire Threat Potential
- Moderate Wildfire Threat Potential
- High Wildfire Threat Potential
- Very High Wildfire Threat Potential
- Extreme Wildfire Threat Potential



Legend

Wildfire Threat Rating

- Non-Fuel
- Low Wildfire Threat Potential
- Moderate Wildfire Threat Potential
- High Wildfire Threat Potential
- Very High Wildfire Threat Potential
- Extreme Wildfire Threat Potential



Legend

Wildfire Threat Rating

- Non-Fuel
- Low Wildfire Threat Potential
- Moderate Wildfire Threat Potential
- High Wildfire Threat Potential
- Very High Wildfire Threat Potential
- Extreme Wildfire Threat Potential

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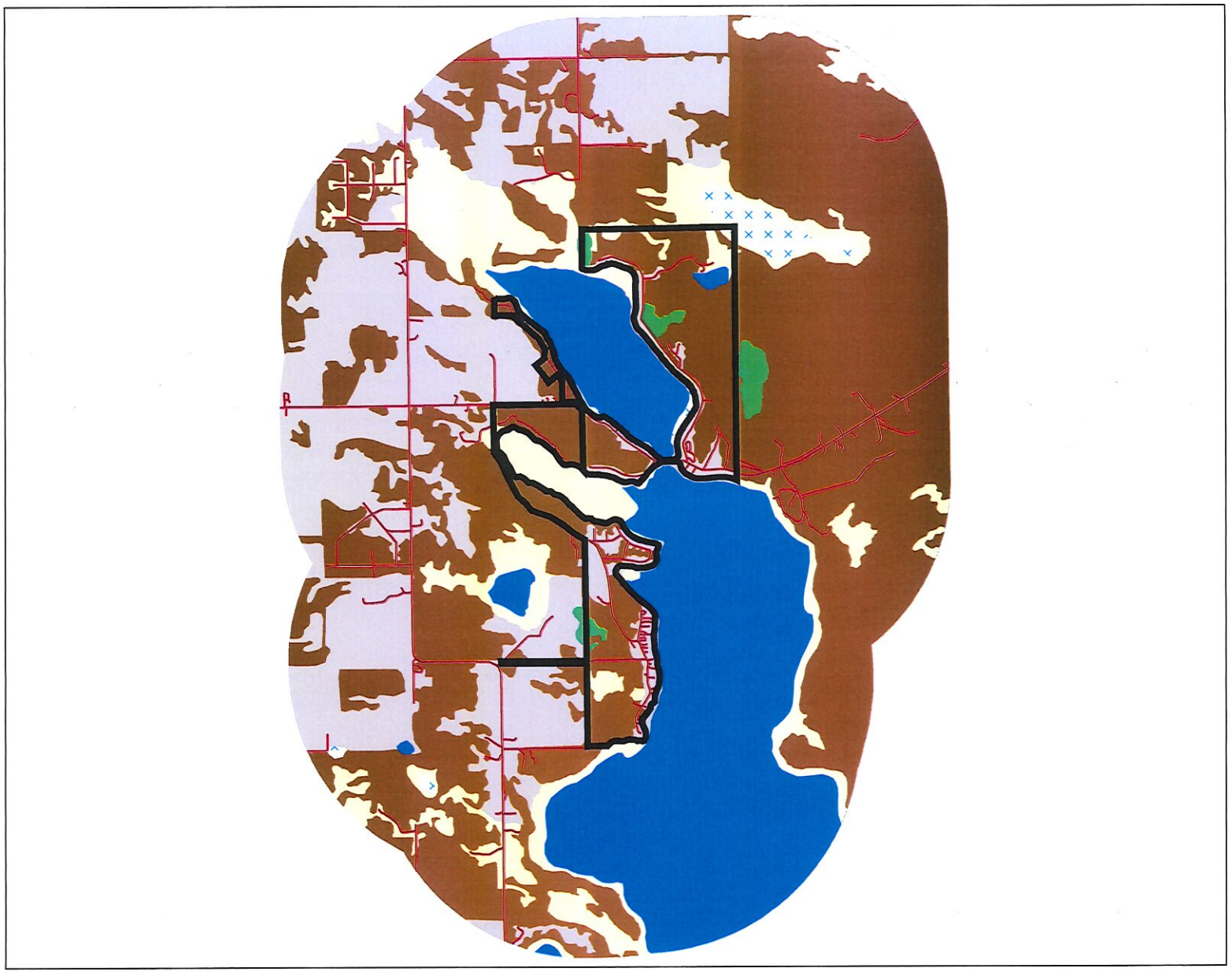


Fuels

Sandy Beach/Sunrise Beach
Summer Villages
2015

Summer Village Boundary

Road

Fuel Code

- Non-Fuel
- Conifer
- Deciduous
- Grass
- Marshland
- Water

Source: CPP Environmental, ESRD

0 0.5 1 2 km

Coordinates system:
NAD 1983 10TM AEP Forest

Date:
March 24, 2015

Prepared by:
CPP ENVIRONMENTAL

Topography

Sandy Beach
Sunrise Beach
Summer Villages
2015

Sandy Beach

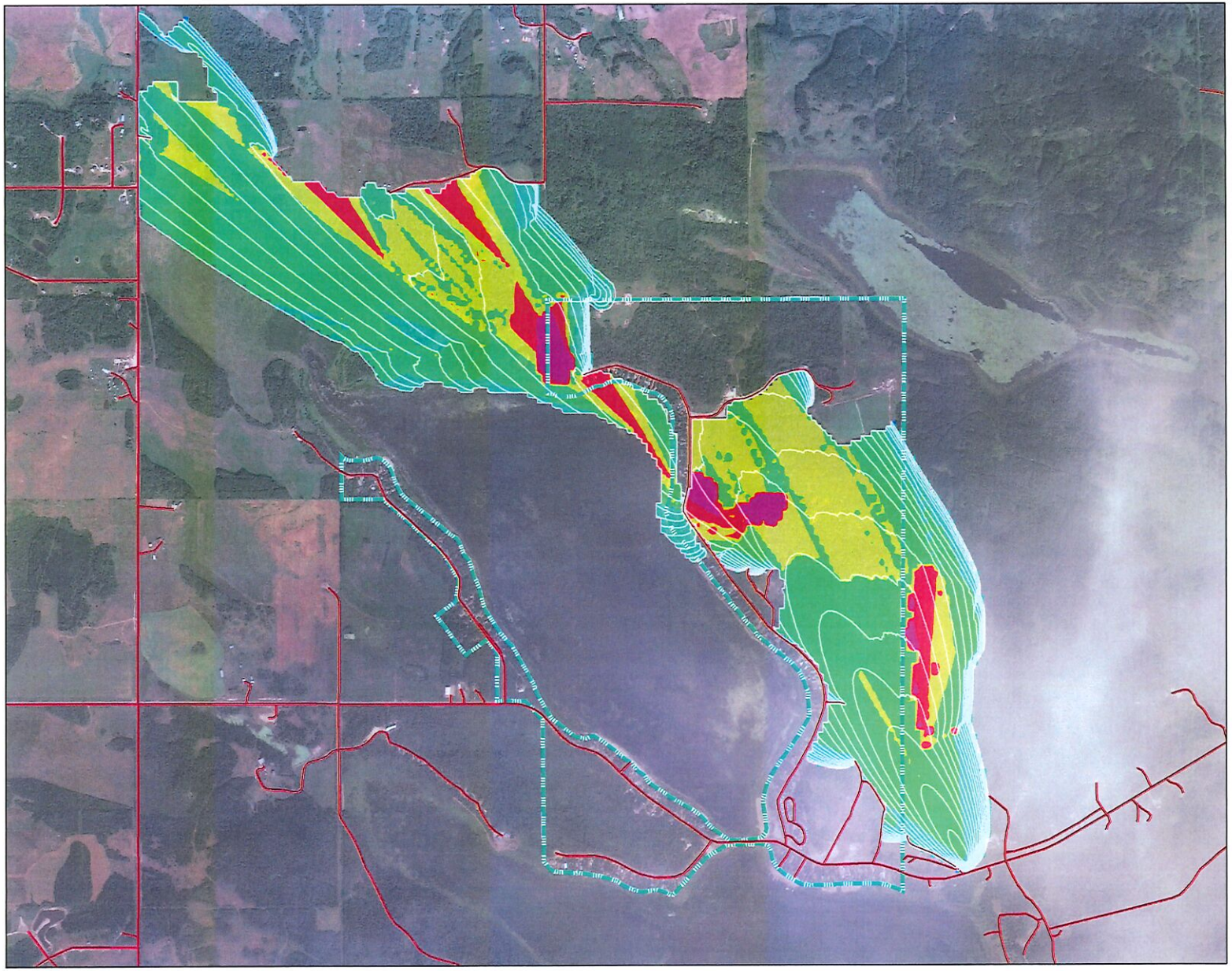
Source: CPP Environmental, ESRD

0 0.25 0.5 1 km

Coordinates system:
NAD 1983 10TM AEP Forest

Date:
July 28, 2015

Prepared by:
CPP ENVIRONMENTAL



Scenario 1

Sandy Beach
Summer Villages
2015

Sandy Beach
Road

Fire Behavior

Very Low
Low
Moderate
High
Very High
Extreme

Source: ESRD, CPP Environmental

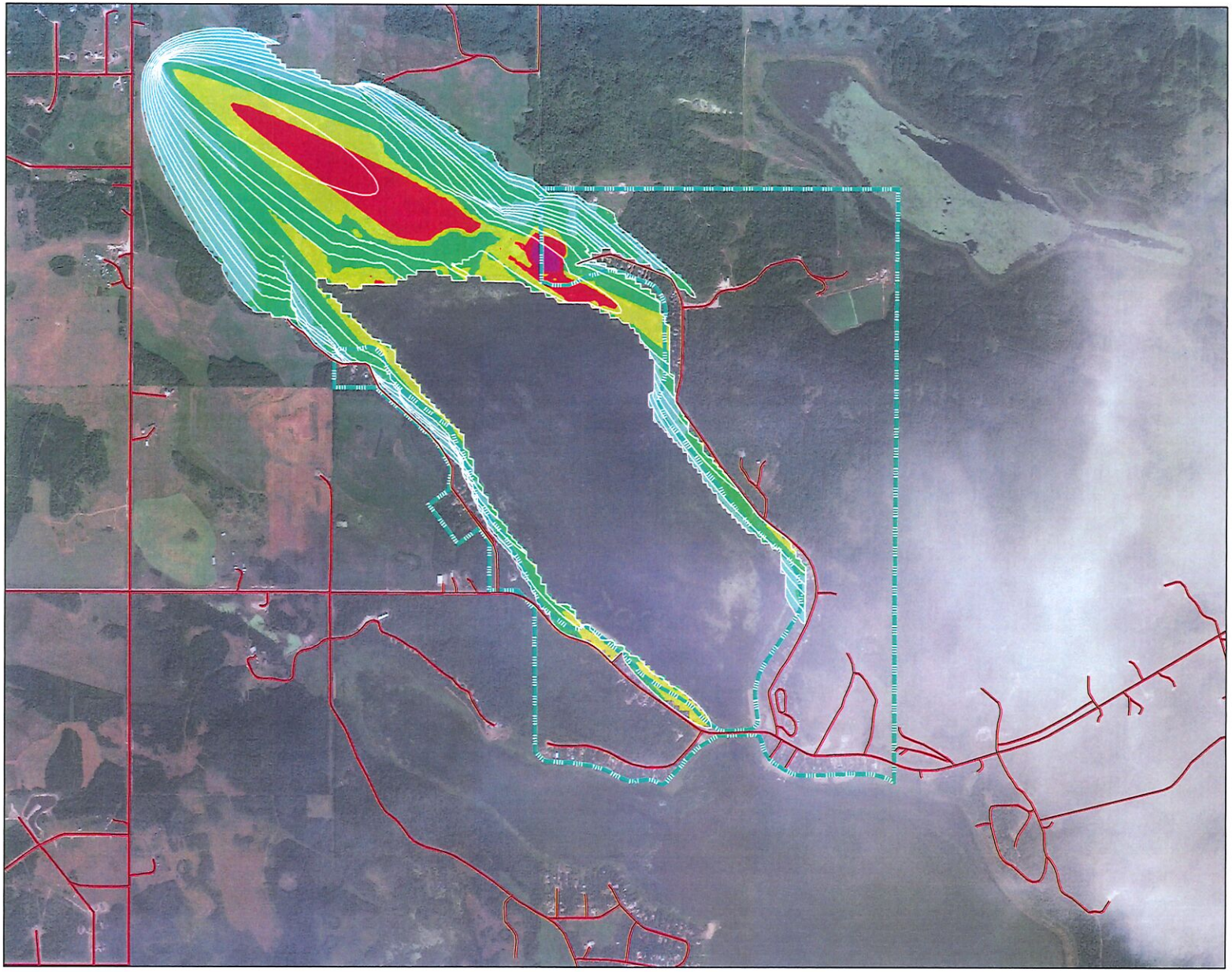
0 0.125 0.25 0.5
km

Coordinates system:
NAD 1983 3TM 114

Date:
May 27, 2015

Prepared by:
CPP ENVIRONMENTAL

Scenario 1																		
	Weather Factors				Fire Weather Indices						Area Consumed		% HFI					
Date and Time	Temperature (deg C)	Relative Humidity (%)	Wind Direction (deg)	Wind Speed (Km/h)	Hourly FFMC	Hourly ISI	Hourly FWI	DMC	DC	BUI	Time Step Area (ha)	Area (ha)	< 10 (kW/m)	10 - 500 (kW/m)	500 - 2000 (kW/m)	2000 - 4000 (kW/m)	4000 - 10000 (kW/m)	> 10000 (kW/m)
5/11/2011 9:00	15.7	32	150	28	82.5	6.2	13.4	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 9:30	15.7	32	150	28	82.5	6.2	13.4	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 10:00	17.8	30	150	30	85.4	10.1	19.4	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 10:30	17.8	30	150	30	85.4	10.1	19.4	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 11:00	18.7	26	150	35	88.4	20	31.2	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 11:30	18.7	26	150	35	88.4	20	31.2	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 12:00	19.8	26	150	32	90.9	24.6	35.9	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 12:30	19.8	26	150	32	90.9	24.6	35.9	19.6	217.2	32	0	0	0	0	0	0	0	0
5/11/2011 13:00	20.3	25	150	33	89.8	22	33.3	23.8	223.3	37.6	0	0	100	0	0	0	0	0
5/11/2011 13:30	20.3	25	150	33	89.8	22	33.3	23.8	223.3	37.6	0.48	0.48	0	34.62	65.38	0	0	0
5/11/2011 14:00	20.8	24	150	35	90.5	26.9	38	23.8	223.3	37.6	2.12	2.6	0	27.78	70.37	1.85	0	0
5/11/2011 14:30	20.8	24	150	35	90.5	26.9	38	23.8	223.3	37.6	4.97	7.57	0	26.09	71.74	2.17	0	0
5/11/2011 15:00	21.3	23	150	33	91.1	26.5	37.7	23.8	223.3	37.6	8.36	15.94	0	22.16	66.48	3.41	6.82	1.14
5/11/2011 15:30	21.3	23	150	33	91.1	26.5	37.7	23.8	223.3	37.6	13.34	29.28	0	20.96	65.5	5.24	5.68	2.62
5/11/2011 16:00	21.4	23	150	33	91.6	28.4	39.4	23.8	223.3	37.6	17.8	47.08	0	21.29	40.32	31.29	7.1	0
5/11/2011 16:30	21.4	23	150	33	91.6	28.4	39.4	23.8	223.3	37.6	22.71	69.79	0	19.64	36.99	35.2	6.12	2.04
5/11/2011 17:00	21.6	22	140	32	92.2	29.4	40.3	23.8	223.3	37.6	24.71	94.5	0	18.73	48.61	25.7	1.59	5.38
5/11/2011 17:30	21.6	22	140	32	92.2	29.4	40.3	23.8	223.3	37.6	20.87	115.37	0	32.8	44.27	18.93	3.73	0.27
5/11/2011 18:00	21.1	23	140	33	91.6	28.4	39.4	23.8	223.3	37.6	28.65	144.02	0	33.75	47.22	17.59	1.44	0
5/11/2011 18:30	21.1	23	140	33	91.6	28.4	39.4	23.8	223.3	37.6	21.12	165.14	0	43.08	39.83	14.87	2.22	0
5/11/2011 19:00	20.2	24	140	28	91	20.3	31.5	23.8	223.3	37.6	24.48	189.62	0	53.09	44.74	2.17	0	0
5/11/2011 19:30	20.2	24	140	28	91	20.3	31.5	23.8	223.3	37.6	19.51	209.13	0	60.19	37.74	1.89	0.19	0
5/11/2011 20:00	19	25	130	28	89.6	16.6	27.5	23.8	223.3	37.6	17.73	226.85	0	69.98	22.42	7.59	0	0
5/11/2011 20:30	19	25	130	28	89.6	16.6	27.5	23.8	223.3	37.6	17.63	244.48	0	65.22	34.14	0.64	0	0
5/11/2011 21:00	17.5	27	130	30	88.3	15.2	26	23.8	223.3	37.6	14.46	258.94	0	78.99	20.83	0.18	0	0
5/11/2011 21:30	17.5	27	130	30	88.3	15.2	26	23.8	223.3	37.6	9.43	268.37	0	82.32	17.68	0	0	0
5/11/2011 22:00	16.2	30	130	30	86.9	12.5	22.6	23.8	223.3	37.6	8.6	276.97	4.08	79.61	16.31	0	0	0



Scenario 2

Sandy Beach
Summer Villages
2015

- Sandy Beach
- Road
- Low
- Moderate
- High
- Very High
- Extreme

Source: ESRD, CPP Environmental

0 0.125 0.25 0.5
km

Coordinates system:
NAD 1983 3TM 114

Date:
July 28, 2015

Prepared by:
CPP ENVIRONMENTAL

Scenario 2 Data																		
	Weather Factors					Fire Weather Indices					Area Burnt		Percent HFI					
Date and Time	Temperature (°C)	Relative Humidity (%)	Wind Direction (deg)	Wind Speed (km/h)	Precipitation (mm)	Hourly FFMC	Hourly ISI	Hourly FWI	FFMC	BUI	Time Step Area (ha)	Area (ha)	< 10 (kW/m)	10 - 500 (kW/m)	500 - 2000 (kW/m)	2000 - 4000 (kW/m)	4000 - 10000 (kW/m)	> 10000 (kW/m)
9/3/2012 10:00	13.1	53	300	24	0	79.3	3.6	7.9	87	31.1	0	0	0	0	0	0	0	0
9/3/2012 10:30	13.1	53	300	24	0	79.3	3.6	7.9	87	31.1	0	0	0	0	0	0	0	0
9/3/2012 11:00	14.2	49	300	35	0	82.7	9.1	16.9	87	31.1	0	0	0	0	0	0	0	0
9/3/2012 11:30	14.2	49	300	35	0	82.7	9.1	16.9	87	31.1	0	0	0	0	0	0	0	0
9/3/2012 12:00	15	39	300	41	0	86.5	20.4	30.1	87	31.1	0	0	100	0	0	0	0	0
9/3/2012 12:30	15	39	300	41	0	86.5	20.4	30.1	87	31.1	15.9	15.9	0	14.38	27.4	34.93	23.29	0
9/3/2012 13:00	15.4	40	300	37	0	85.4	14.4	23.6	88.2	33.6	37.74	53.63	0.15	21.08	66.57	9.94	2.26	0
9/3/2012 13:30	15.4	40	300	37	0	85.4	14.4	23.6	88.2	33.6	18.53	72.17	0.2	31.1	66.34	2.17	0.2	0
9/3/2012 14:00	15.8	35	310	39	0	86.2	17.8	27.4	88.2	33.6	10.65	82.82	0.43	39.61	50.87	8.87	0.22	0
9/3/2012 14:30	15.8	35	310	39	0	86.2	17.8	27.4	88.2	33.6	12.91	95.73	0.62	51.55	46.89	0.62	0.31	0
9/3/2012 15:00	16.3	35	310	32	0	87	14	23.2	88.2	33.6	11.01	106.74	0.23	64.25	33.18	2.34	0	0
9/3/2012 15:30	16.3	35	310	32	0	87	14	23.2	88.2	33.6	10.04	116.78	0	70.04	29.57	0.39	0	0
9/3/2012 16:00	16.4	33	300	30	0	87.6	13.8	22.9	88.2	33.6	10.49	127.27	0	73.01	26.8	0.19	0	0
9/3/2012 16:30	16.4	33	300	30	0	87.6	13.8	22.9	88.2	33.6	8.77	136.04	0	71.15	27.99	0.85	0	0
9/3/2012 17:00	16.1	32	310	30	0	88.2	15	24.3	88.2	33.6	7.95	143.98	0	76.94	21.59	1.47	0	0
9/3/2012 17:30	16.1	32	310	30	0	88.2	15	24.3	88.2	33.6	9.57	153.55	0	82.14	16.21	1.66	0	0
9/3/2012 18:00	15.2	38	310	24	0	87.7	10.3	18.6	88.2	33.6	11.97	165.52	0	90.58	9.04	0.38	0	0
9/3/2012 18:30	15.2	38	310	24	0	87.7	10.3	18.6	88.2	33.6	0	165.52	0	90.58	9.04	0.38	0	0
9/3/2012 19:00	12.7	48	300	13	0	87.1	5.4	11.4	88.2	33.6	0	165.52	0	95.29	4.71	0	0	0
9/3/2012 19:30	12.7	48	300	13	0	87.1	5.4	11.4	88.2	33.6	0	165.52	0	95.29	4.71	0	0	0
9/3/2012 20:00	10.6	54	260	13	0	85.8	4.5	9.8	88.2	33.6	0	165.52	0	84.18	15.82	0	0	0
9/3/2012 20:30	10.6	54	260	13	0	85.8	4.5	9.8	88.2	33.6	0	165.52	0	84.18	15.82	0	0	0
9/3/2012 21:00	10	58	280	13	0	84.5	3.8	8.4	88.2	33.6	0	165.52	0	96.42	3.58	0	0	0
9/3/2012 21:30	10	58	280	13	0	84.5	3.8	8.4	88.2	33.6	0	165.52	0	96.42	3.58	0	0	0
9/3/2012 22:00	9.7	61	270	17	0	83	3.8	8.4	88.2	33.6	0	165.52	10.36	84.37	5.27	0	0	0

Alberta Environment and Sustainable Resource Development

FireSmart Canada

Name		Date	
Address		Phone	

Qtr		Sec		Twp		Rge		West		Meridian	GPS	

STRUCTURE AND SITE HAZARD ASSESSMENT FORM

	Factor	Page	Characteristics and Point Ratings					Score
1	Roofing Materials	2~5	Metal, tile, asphalt, ULC-rated shakes or non-combustible material			Unrated wood shakes		
			0			30		
2	Roofing Cleanliness	2~6	No combustible material	Scattered combustible Materials, <1cm in depth		Clogged gutter, combustible material > 1cm 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 3mm mesh and accessible	Closed eaves, vents not screened with 3mm mesh		Open eaves, vents not screened, debris accumulation		
			0	1		6		
5	Balcony, desk, 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/Med	Large	Small/Med	Large	
			0	1	2	2	4	
7	Location of nearby combustibles	2~11	None or > 10 m from structure			< 10 m from structure		
			0			6		
8	Setback from edge of slope	2~12	Adequate			Inadequate		
			0			6		
9	Forestry Vegetation (overstory)	2~14	Deciduous	Mixed Wood		Coniferous		
						Separated	Continuous	
	< 10 meters		0	30		30	30	
	10 - 30 meters		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 meters		0	30		30	30	
	10 - 30 meters		0	5		5	30	
11	Ladder fuels 10-30 meters	2~17	Absent	Scattered		Abundant		
			0	5		10		
	Hazard Level		Low < 21 points	Moderate 21 -29 points		**Total Score for Factors 1-11**		0
			High 30-35 points	Extreme >35 points		**Structure and Site Hazard Level**		

AREA HAZARD ASSESMENT FORM

12	Forestry Vegetation (overstory)	2~18	Deciduous	Mixed Wood		Coniferous		
						Separated	Continuous	
			0	15		15	30	
13	Surface vegetation	2~18	Lawn or non-combustible material	Wild grass or shrubs		Dead and down woody material		
						Scattered	Abundant	
			0	5		5	15	
14	Ladder fuels	2~18	Absent	Scattered		Continuous		
			0	5		10		
15	Slope	2~19	0 - 10%	10 - 25%		>25%		
				Even	Gullied	Even	Gullied	
			0	4	5	8	10	
16	Position on slope	2~20	Valley bottom or lower slope	Mid-slope		Upper-slope		
			0	3		5		
	Hazard Level		Low < 21 points	Moderate 21 -29 points		**Total Score for Factors 12-16**		0
			High 30-35 points	Extreme >35 points		**Area Hazard Level**		

Remarks

Copy - WMB Copy - Home Owner

Wildfire Risk Assessment For Rural Communities

COMMUNITY:	Sandy Beach	INHERENT Rating	INHERENT Scores	STRATEGIES TO OBTAIN RESIDUAL RISK	RESIDUAL Rating	RESIDUAL Scores
ACCESS TO SAFE ZONES	A Lake	0 or 3	0	No Change	0 or 3	0
	B Large Non-Fuel Surface	0 or 3	3		0 or 3	3
	C Cleared Area (Vegetation Maintained)	0 or 3	0		0 or 3	0
	D County Road	0 or 3	0		0 or 3	0
	E Subdivision Road	0 or 3	0		0 or 3	0
		/15	3		/15	3
NUMBER OF HOMES	A 0 to 30	1		No Change	1	
	B 31 to 60	2			2	
	C 61 to 90	3			3	
	D 91 to 120	4			4	
	E >120	5	5		5	5
		/5	5		/5	5
ECONOMIC RISK	Average Property Value:					
	A $0 - $300 000	1	1	No Change	1	1
	B $300 001 - $500 000	2			2	
	C $500 001 - $750 000	3			3	
	D >$750 000	4			4	
	Avg Home Cost: $ 135 098					
		/4	1		/4	1
VALUES AT RISK	Presence of:					
	A Critical Infrastructure	0 or 3	0	No Change	0 or 3	0
	B Dangerous Goods Infrastructure	0 or 3	3		0 or 3	3
	C Special Values	0 or 3	3		0 or 3	3
		/9	6		/9	6
POLITICAL RISK	A Local media involvement and no structural impact to Emergency Services or programs	1		Community finishes the Regional Emergency plan, update Fire Bylaws, and continue working on becoming a FireSmart community.	1	1
	B Local media involvement and internal structural changes to Emergency Services or programs	2	2		2	
	C Regional media involvement, lack of public confidence, and external changes to Emergency Services or county	3			3	
		/3	2		/3	1

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DEFENSIBILITY OF COMMUNITY	DENSITY OF STRUCTURES	A < 20 m between homes B 21 - 40 m between homes C 41 - 100 m between homes D > 100m between homes	3 2 1 0	2	No Change	3 2 1 0	2
			/3	2		/3	2
	BARRIERS TO FIRE SPREAD	A East w/ Barrier within 200m B West w/ Barrier within 200m C South w/ Barrier within 200m D North w/ Barrier within 200m	0 or 2 0 or 4 0 or 4 0 or 2	0 0 4 2	No Change	0 or 2 0 or 4 0 or 4 0 or 2	0 0 4 2
			/12	6		/12	6
	FOREST FUEL PATCH SIZE	A No forest patch present within community B Patch 0.1 - 0.9 ha within community boundary C Patch 1 - 2.9 ha within community boundary D Patch > 3 ha within community boundary	0 1 3 5	5	No Change	0 1 3 5	5
			/5	5		/5	5
	RESIDENTIAL FIRESMART	A 0-20 % B 21-40 % C 41-60 % D 61-80 % E 81-100 %	4 3 2 1 0	4	Zone 1 & 2 vegetation management.	4 3 2 1 0	0
			/4	4		/4	0
	FUEL MAIN-TENANCE REQUIRED	A Utility ROW maintenance B Fuel maintenance required - other agency C Fuel maintenance required - municipality	0 or 1 0 or 1 0 or 1	0 0 0	No Change	0 or 1 0 or 1 0 or 1	0 0 0
			/3	0		/3	0
	ACCESS	A Loop turnarounds/ cul-de-sacs are suitable for large fire apparatus without back-up maneuvers B 2 or more means of egress C Standard visible lot signage	0 or 1 0 or 1 0 or 1	1 1 1	Summer Village aquire standard signage for every lot. And invite local fire department to discuss access limitations in the Village.	0 or 1 0 or 1 0 or 1	1 1 0
			/3	3		/3	2
	SUPPRESSION CAPABILITY	A Responding Fire Department has proper equipment for bush fires B Fire fighters have basic wildfire fighting training C Mutual Aid Agreements are present	0 or 1 0 or 1 0 or 1	0 0 0	No Change	0 or 1 0 or 1 0 or 1	0 0 0
			/3	0		/3	0
			TOTAL:	37		TOTAL:	31

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Wildfire Risk Assessment For Rural Communities

COMMUNITY:		Sandy Beach	INHERENT Rating	INHERENT Scores	STRATEGIES TO OBTAIN RESIDUAL RISK	RESIDUAL Rating	RESIDUAL Scores
LIKELIHOOD OF OCCURRENCE	FUEL TYPES	A D Fuels - Deciduous	0 or 1	1	No Change	0 or 1	1
		B O Fuels - Grasses	0 or 2	2		0 or 2	2
		C M Fuels - Mixedwood	0 or 3	3		0 or 3	3
		D C Fuels - Patchy conifer	0 or 2	0		0 or 2	0
		E C Fuels - Conifer	0 or 4	0		0 or 4	0
			/10	6		/10	6
	SLOPE & FUEL TYPE	VAR on or within 100 m of the top crest of a sustained slope Fuel Type: M1 Slope %: <10%	0 to 6	0	No Change	0 to 6	0
			/6	0		/6	0
	FUEL STRUCTURE - DEAD & DOWN	A Absent- No dead or down material	0	1	No Change	0	1
		B Scattered- 3-5m separating logs, branches & twigs	1			1	
		C Abundant-Continuous logs, branches & twigs	3			3	
			/3	1		/3	1
	FUEL STRUCTURE - LADDER FUEL	A Absent- <25% of trees have ladder fuels	0	0	No Change	0	0
		B Scattered- 25% - 75% of trees have ladder fuels	3			3	
		C Abundant- > 75% of trees have ladder fuels	5			5	
			/5	0		/5	0
	PRESENT LANDSCAPE IGNITION SOURCES	A Recreation (Presence)	0 or 1	1	No Change	0 or 1	1
		B Overhead Utility Line adjacent to forest	0 or 1	1		0 or 1	1
		C < 1 km from primary/secondary roadway	0 or 1	1		0 or 1	1
		D < 1km from railway	0 or 1	0		0 or 1	0
			/4	3		/4	3
	RESIDENTIAL BURNING TYPES	A Incinerator Fires	0 or 1	0	No Change	0 or 1	0
		B Open Fires	0 or 1	0		0 or 1	0
		C Backyard Fire Pits - Standard Design	0 or 1	1		0 or 1	1
			/3	1		/3	1
	PROBABILITY OF EXTREME FIRE	A 90th Percentile of FWI > 30	4	2	No Change	4	2
		B 90th Percentile of FWI > 17	3			3	
		C 90th Percentile of FWI > 9	2			2	
		D 90th Percentile of FWI < 9	1			1	
			/4	2		/4	2
	Consequence x Likelihood = INHERENT RISK	481	TOTAL:	13		TOTAL:	13
	Consequence x Likelihood = RESIDUAL RISK	403					

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		Wildfire Risk Matrix																	
		Likelihood																	
		1	3	5	7	9	11	13	15	17	19	21	23	25	27	29	31	33	35
Consequence	3	3	9	15	21	27	33	39	45	51	57	63	69	75	81	87	93	99	105
	6	6	18	30	42	54	66	78	90	102	114	126	138	150	162	174	186	198	210
	9	9	27	45	63	81	99	117	135	153	171	189	207	225	243	261	279	297	315
	12	12	36	60	84	108	132	156	180	204	228	252	276	300	324	348	372	396	420
	15	15	45	75	105	135	165	195	225	255	285	315	345	375	405	435	465	495	525
	18	18	54	90	126	162	198	234	270	306	342	378	414	450	486	522	558	594	630
	21	21	63	105	147	189	231	273	315	357	399	441	483	525	567	609	651	693	735
	24	24	72	120	168	216	264	312	360	408	456	504	552	600	648	696	744	792	840
	27	27	81	135	189	243	297	351	405	459	513	567	621	675	729	783	837	891	945
	30	30	90	150	210	270	330	390	450	510	570	630	690	750	810	870	930	990	1050
	33	33	99	165	231	297	363	429	495	561	627	693	759	825	891	957	1023	1089	1155
	36	36	108	180	252	324	396	468	540	612	684	756	828	900	972	1044	1116	1188	1260
	39	39	117	195	273	351	429	507	585	663	741	819	897	975	1053	1131	1209	1287	1365
	42	42	126	210	294	378	462	546	630	714	798	882	966	1050	1134	1218	1302	1386	1470
	45	45	135	225	315	405	495	585	675	765	855	945	1035	1125	1215	1305	1395	1485	1575
	48	48	144	240	336	432	528	624	720	816	912	1008	1104	1200	1296	1392	1488	1584	1680
	51	51	153	255	357	459	561	663	765	867	969	1071	1173	1275	1377	1479	1581	1683	1785
	54	54	162	270	378	486	594	702	810	918	1026	1134	1242	1350	1458	1566	1674	1782	1890
	57	57	171	285	399	513	627	741	855	969	1083	1197	1311	1425	1539	1653	1767	1881	1995
	60	60	180	300	420	540	660	780	900	1020	1140	1260	1380	1500	1620	1740	1860	1980	2100
	63	63	189	315	441	567	693	819	945	1071	1197	1323	1449	1575	1701	1827	1953	2079	2205
	66	66	198	330	462	594	726	858	990	1122	1254	1386	1518	1650	1782	1914	2046	2178	2310
	69	69	207	345	483	621	759	897	1035	1173	1311	1449	1587	1725	1863	2001	2139	2277	2415
	70	70	210	350	490	630	770	910	1050	1190	1330	1470	1610	1750	1890	2030	2170	2310	2450

Hazard Rating	
Low	
Moderate	
High	
Extreme	

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