Summer Village of Sunrise Beach

Wildfire Mitigation Strategy

Prepared By: Ryan Archibald, FIT and
Mike Poscente, MBA, RPFT

CPP ENVIRONMENTAL
Charette
Pell
Poscente

Acknowledgements

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Association of
SUMMER VILLAGES
OF ALBERTA

Summer Village of Sunrise Beach

FOREST RESOURCE IMPROVEMENT ASSOCIATION OF ALBERTA (FRIAA)

FOREST RESOURCE
IMPROVEMENT
ASSOCIATION OF ALBERTA

CPP ENVIRONMENTAL | Charette Pell Poscente

Alberta

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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 potential threat. This threat is wildfire. Wildfire has been and still 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 is built to provide strategies and recommendations to implement that will assist in reducing the risks, of both structural fires and wildfires. The plan includes input from key stakeholders such as the Chief Administration Officer and the Fire Departments.

Below is an overview of recommendations, according to WUI disciplines, for Sunrise 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.
Development	The Summer Village meets with the local fire station for an orientation day to discuss emergency response issues associated with narrow side roads and one main access/ egress point for the southern end of Shedden Dr.
	The Summer Village acquires standard signage for each lot.
Vegetation Management	Prescribed burning of the Sandy Lake shoreline.
	Property owners mow and maintain grass, debris, and other combustible materials. Prune conifer trees on land 2 meters from ground.
	Summer Village supplies a debris disposal service to assist residents with vegetation removal
	Monitor burn pile during seasons of high hazard. Extinguish if necessary
	Southern municipal reserve of Sunrise Beach should be pruned 2m from the ground, and dead and down fuel be cleared.
Legislation	Sunrise Beach considers adding a hazard section to the Fire Bylaw. Review Sturgeon County Fire Bylaw for any discrepancies.
Emergency Planning	The Summer Sunrise Beach collaborates with Sandy Beach to develop an Emergency Management Plan.

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 Sunrise Beach. These two documents will assist Sunrise Beach in reducing fire behaviour potential, fire occurrence risk, and exposure of values of 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 Sunrise 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.

This strategy below 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 section is an assessment of the overall landscape including the village itself. The FireSmart Activities section is an evaluation of risks and hazards found within Sunrise 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 Sunrise Beach is located on the western shore of Sandy Lake, within Lac Ste. Anne County, approximately 60 km northwest of Edmonton, Alberta (**Figure 1**). The planning area includes Sunrise Beach and adjacent lands up to 2 km from Sunrise Beach's borders (**Appendix III**).

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

The Summer Village of Sunrise 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.

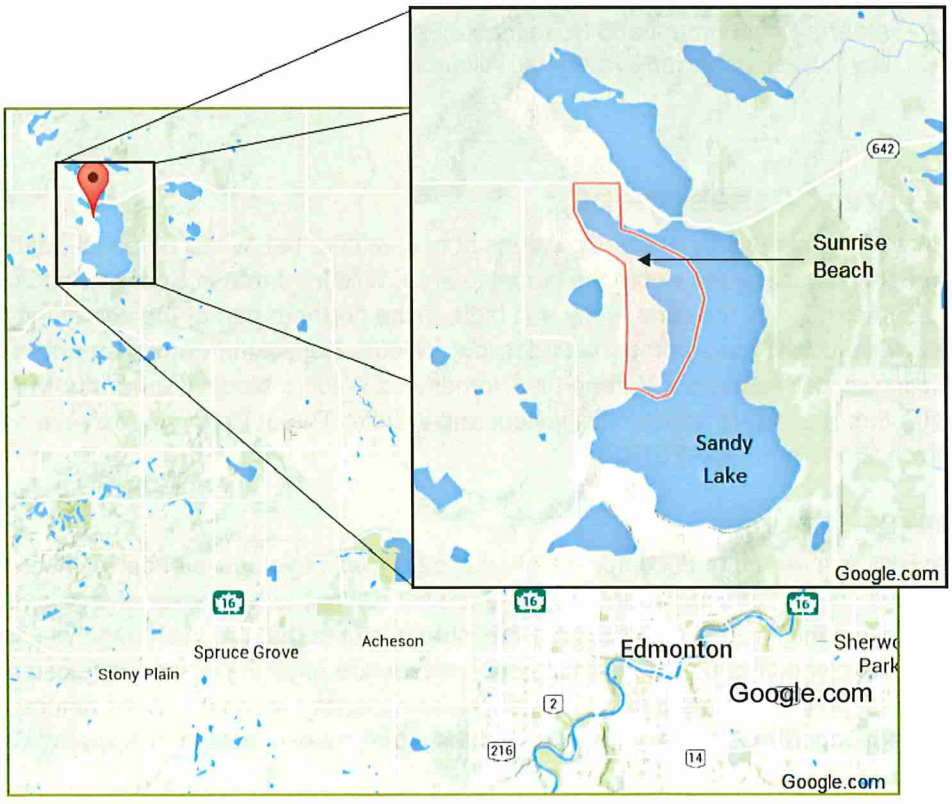

Figure 1. General location of Sunrise Beach

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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 Sunrise Beach was responsible for reviewing the Wildfire Mitigation Strategy, considering recommendations, approving the plan, and 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 Environment and Sustainable Resource Development provided technical expertise and guidance throughout the process. Although Sunrise Beach lies within Lac Ste. Anne County, currently Sturgeon County Fire Services are responsible for structural and wildland fire suppression within Sunrise Beach.

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

- The Summer Village of Sunrise Beach
- The residents of Sunrise Beach
- Sturgeon County Fire Services
- Association of Summer Villages of Alberta (ASVA)
- Alberta Environment and Sustainable Resource Development (AESRD)
- 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 Sunrise Beach is moderate, in the southern part of the community and high, in the northern part of the community, during the spring and fall, while during the summer hazard is low. Wildfire Behaviour maps (**Appendix IV**), Wildfire Threat Rating maps (**Appendix V**), and the Prometheus Wildfire Model (**Appendix IX**) were used to assist the wildfire threat analysis. Wildfire Behaviour and Wildfire Threat Rating maps were acquired from FireWeb; which is operated by AESRD.

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 map is located in **Appendix VI.**

Table 1. Values at Risk

Values at Risk	Description	
	Within Sunrise Beach	**Within Planning Area**
Standard	145 residences	N/A
Critical	None identified	None identified
Dangerous Goods	Fuel Station	Fuel Station
Special	Nesting Habitat on the shoreline	Nesting Habitat on the shoreline

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[1]."

3.2.1 Vegetation Fuel Types

3.2.1.1 Planning Area Fuel Types

The majority of the fuel types within the planning area (**Appendix VII**) consist of agricultural crops (Figure 2) and grazing areas to the west. On the western border patches of spruce can be found (Figure 3). Grass and cattails can be found around the entire edge of Sandy Lake (Figure 4). Agricultural lands and grazing areas are considered non-fuels because of the annual cutting or grazing reduces vegetation during seasons of concern; it is recognized that wildfires can still start and spread on these lands however generally fires are of low concern on this vegetation type. Forest types on the landscape generally consist of mature to over-mature aspen and poplar with shrubby understories. Over-mature stands have a buildup of dead and down woody material. An accumulation of dead and down material increases the hazards on the landscape and my influence fire behaviour. Ground-truthing, satellite imagery and aerial photography were all used to identify forest fuel types, by a certified AVI photo interpreter, in accordance with the Canadian Forest Fire Behaviour Prediction System (CFFBP).

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

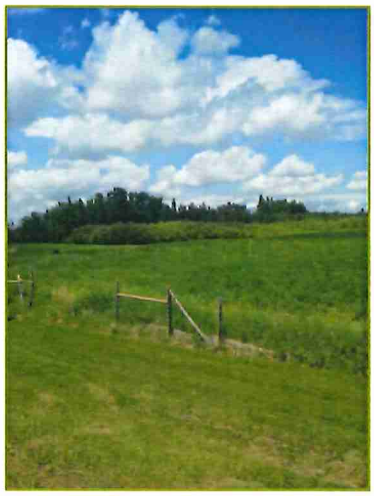


Figure 2. Agricultural Non-fuel type

Figure 3. Spruce fuel type

Figure 4. Grass fuel type

3.2.1.2 Community Fuel Types

Within Sunrise Beach there are patches of mixedwood (**Figure 5**), and deciduous (**Figure 6**). The mixedwood consists of spruce and aspen/poplar with high deciduous shrub content in the understory. Grass and cattails can be found around the entire edge of Sandy Lake (**Figure 7**).

Figure 5. Mixedwood fuel type

Figure 6. Deciduous fuel type

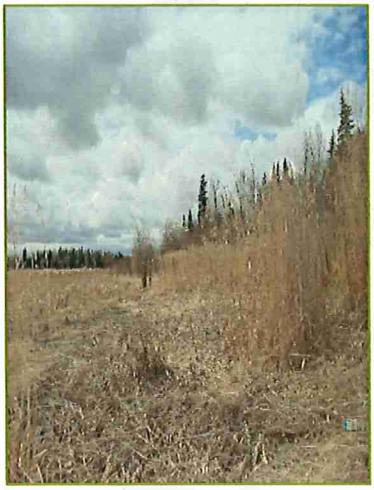


Figure 7. Grass Fuel type

3.2.2 Fire Season Weather

Weather trends such as temperature, relative humidity, precipitation, and wind speed/direction are important in understanding seasonal wildfire potential within, and surrounding, Sunrise Beach. Weather was acquired for the fire season from June 5, 2008 – October 31, 2014 from the Glenevis AGCM weather station (Climate ID 3012818), near Glenevis Alberta, 23 km northwest of Sunrise Beach. Temperature, relative humidity and wind speed were averaged using daily noon actuals; values at 12:00 noon. Precipitation was calculated using the monthly average. The Fire Weather Index (FWI) is a general index of fire danger throughout forested areas in Canada[2]. The 90th percentile FWI was calculated to better understand what months are at a higher risk of sustaining a wildfire in the Sunrise Beach area. The

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

90th percentile was calculated (FWI 14.1) and all days equal to, or greater than, the 90th percentile were totaled and averaged.

Table 2. 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 (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

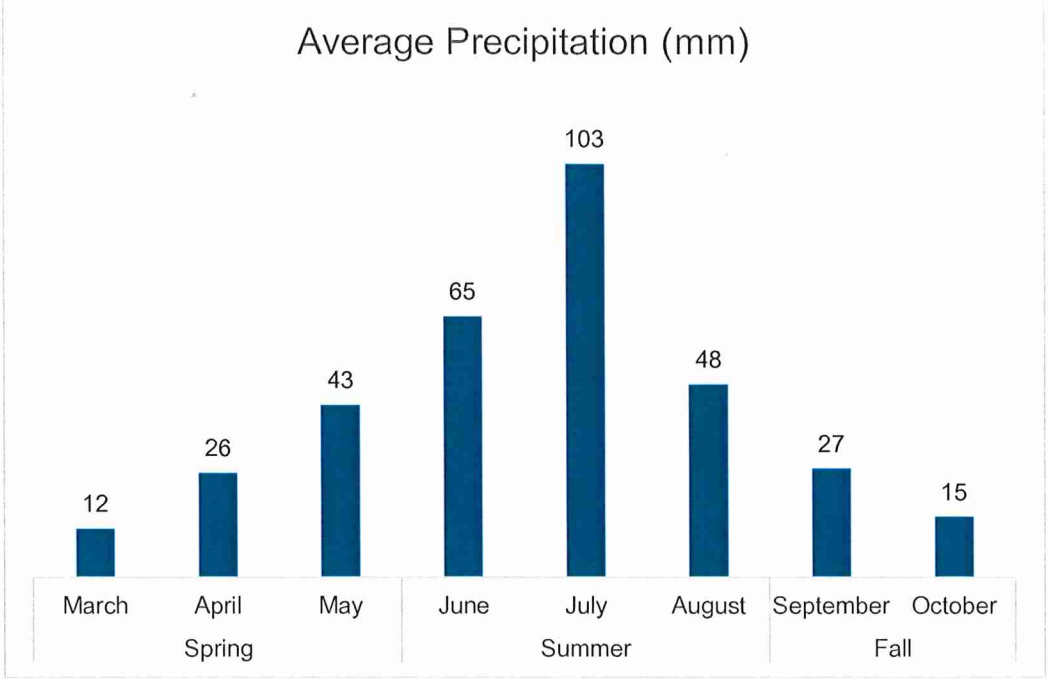


Figure 8. Average precipitation

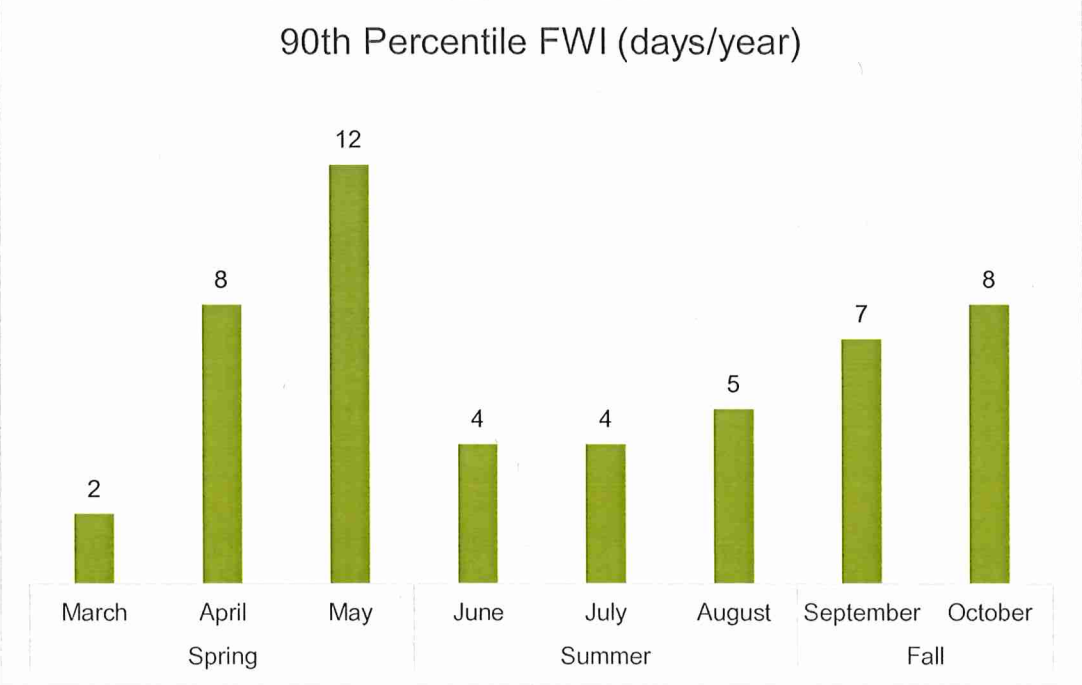


Figure 9. 90th percentile FWI

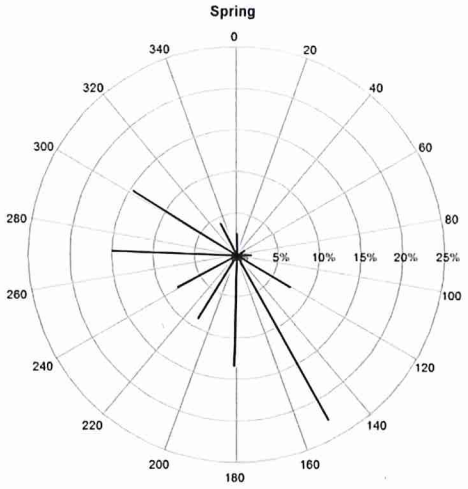


Figure 10. Spring wind rose

Spring winds are predominantly out of the southeast or northwest at the Glenevis weather station, but ranges from southeast to northwest.

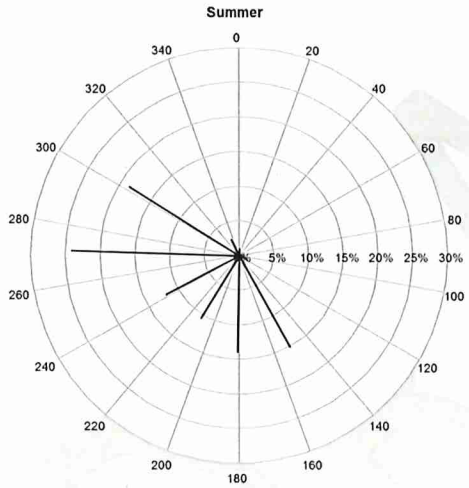


Figure 11. Summer wind rose

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

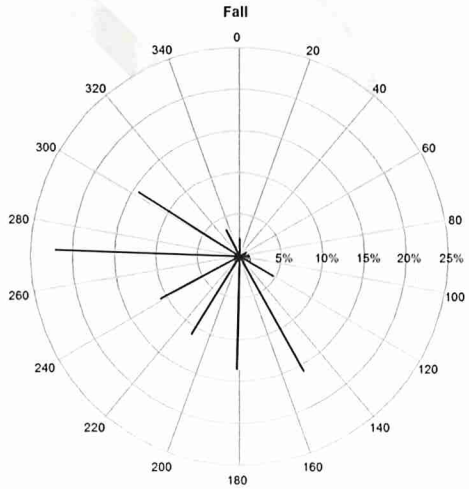


Figure 12. Fall wind rose

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 fire spread. It is important to identify slope to proper analyze potential fire behaviour. The topography in the planning area is generally flat (**Appendix VIII**). The subtle elevation changes will have little to no effect on fire behaviour.

3.2.3 Wildfire Behaviour Analysis

Prometheus, a widely utilized wildfire growth model across Canada[3], is implemented in this strategy to better understand the wildfire potential of the planning area. This model is utilized to demonstrate how a fire may be influenced by vegetation fuels, weather and topography. As with all models, Prometheus has limitations and assumptions. The assumptions made in this model are listed in **Table 3**.

Table 3. Assumptions

Assumptions	
Model Assumption	**User Assumption**
No Fire Suppression	Grass 80% cured
Fuel types consistent	Scenarios start at 12:00
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 Sunrise 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	An area that is less than 25% vegetated is a non-fuel

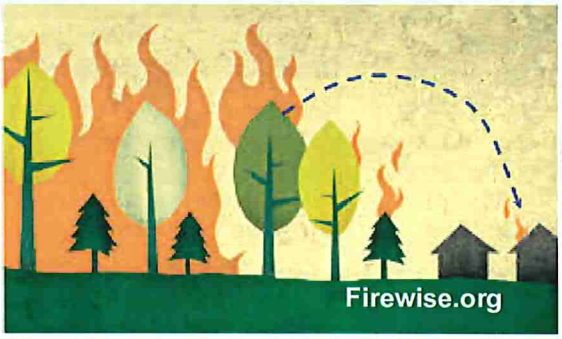


Figure 13. Example of spotting

With Prometheus, two scenarios, Scenario 1 and Scenario 2, were generated for Sunrise Beach (**Appendix IX**). Both scenarios used days where weather was above the 90th percentile FWI; days above

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

the 90th percentile were assumed to sustain fire growth. Weather data from 10:00 – 22:00 was chosen from an actual date from Breton AGCM.

Scenario 1: May 11, 2011

Table 4. 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	40
Summary Fire Data				
Ignition Point	**Time of Ignition**	**Fire Growth Stopped**	**Total Area Consumed**	**General Fire Behaviour**
East of Twn Rd. 554. Near the grass shoreline.	12:00	22:00	70 ha	Moderate

Two hours after ignition, the fire had reached the Victory Rd, just east of Sunrise Beach and at that point forward progression stopped. From 14:30 on, there were only flanking fires, on the east and west sides and by 16:00 the southern tip of the Sunrise Beach had been burned.

Scenario 2: September 03, 2012

Table 5. Summary of weather and fire data

Glenevis AGCM Weather on September 03, 2012				
Max Temperature	**Min Relative Humidity**	**Wind Direction**	**Average Wind Speed**	**Max FWI**
16°C	32%	Northwest	27 km/h	30
Summary of Fire Data				
Ignition Point	**Time of Ignition**	**Fire Growth Stopped**	**Total Area Consumed**	**General Fire Behaviour**
Northwest Grass finger in Sunrise Beach	12:00	19:00	76 ha	Moderate-Very High

At 13:00 the fire had fire burnt approximately eight hectares and had reached the shoreline of Sandy Lake .

3.3 Wildfire Incidence

Grass fires are the most common type of wildfire in Lac Ste. Anne County. The cause of wildfire is almost exclusively human; however, lightning has started fires in the county. The average number of wildfires per year is highly variable and dependent on ignition sources, time of year, and fuel types.[4]

3.4 Firefighting Capabilities

There are seven fire departments in the area of Sunrise Beach. Fire departments identified in **Table 2** are operated by Sturgeon and Lac Ste. Anne County. All departments rely mainly on volunteer firefighters. Bush trucks and mini-pumpers are on pick-up truck chassis and tend to be better suited to action wildfires. Each department has a water tenders which will benefit remote firefighting by supplying water to areas where water sources may not be readily available. Specialized equipment, such as ATVs can increase firefighter mobility during a wildfire situation by helping move equipment and small pumps.

Table 6. Fire department distance and resources

Fire Department	Distance from Sunrise Beach	Manpower	Quick Response Bush Truck	Water Tender (Capacity)	Specialized Equipment
Mornville (**Primary Responder**)	28 km			11,000 L	
Onoway	23 km	20	1	7 000 L	
Rich Valley	28 km	15	1	11 600 L	
Stoney Plain	40 km	46		1 (L)	1 ATV, 1 Rescue Boat
Alberta Beach	42 km	20	1	7 000 L	
St Albert (#1)	43 km			1 (L)	
Bon Accord	46 km			1 (L)	

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

[4] Conversation with Lac Ste. Anne County Interim Fire Chief – June 3, 2014

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.

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 Sunrise Beach. This should have priority as maintenance of the area will reduce the risk of fire ignition and increase the defensibility of the structure.

4.1.2 Distribution

The council of Sunrise 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 Sunrise 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 Sunrise Beach should consider becoming a part of the FireSmart Canada Community Recognition Program (FCCRP)[5]. This process has already started with the Wildfire Mitigation Strategy and Preparedness Guide documents. A member of council, employee or a community leader of Sunrise Beach would attend a Local FireSmart Representative workshop to learn how to acquire and maintain FCCRP for Sunrise Beach. 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:

- https://www.firesmartcanada.ca/
- http://agriculture.alberta.ca/acis/climate-maps.jsp

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

4.2 Development

4.2.1 Infrastructure

4.2.1.1 Access

Access is generally good for Sunrise Beach with two means of access/egress for most residences. However, residences south of Victory Rd (Township Rd. 554A) on Shedden Drive only have one means of access/egress. Shedden Drive ends in a loop turnaround that will require fire engine operators to perform backup maneuvers. One means of access or egress is a concern in an emergency situation because if the access is blocked, residents can become trapped. Ideally a second access point would be constructed, and the loop turnaround would be widened to accommodate a large fire apparatus. This is a large undertaking and may not be economically feasible for Sunrise Beach because of the costs associated with either construction option. Access into this area should be addressed in the Municipal Emergency Plan so that Emergency Responders have a complete understanding of the challenges of evacuating this area.

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.

Figure 14. Roads average 6.5 meters

Figure 15. Possible Emergency Landing Spot

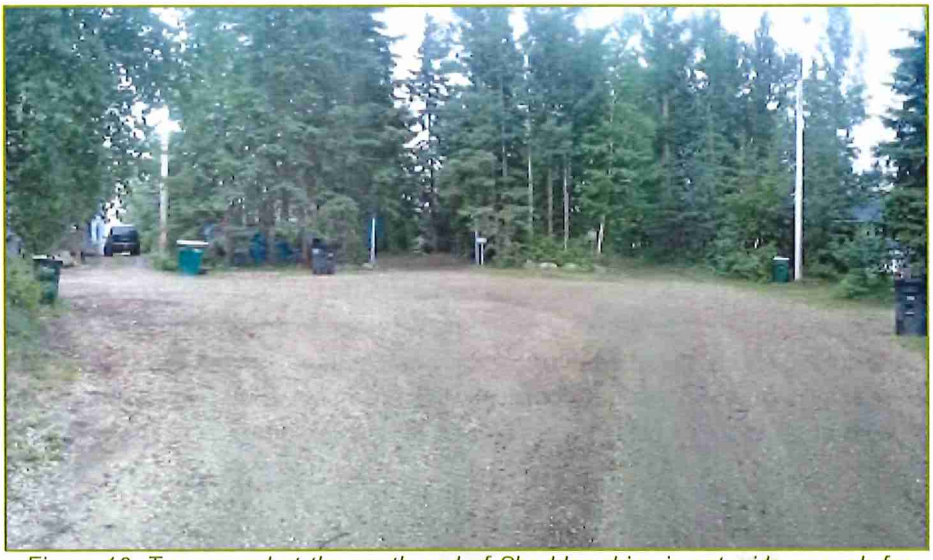


Figure 16. Turnaround at the south end of Shedden drive is not wide enough for large fire apparatuses.

4.2.1.2 Water Availability

Mornville 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 easily accessible with a boat launch for drafting.

NOTE: Due to falling lake levels drafting may be too shallow for safe access.

Figure 17. Access to water at the community boat launch

Figure 18. Cement footing allows a large fire apparatus the ability to back down the boat launch

4.2.1.3 Signage

Signage, within Sunrise Beach varies among properties and thus, is not easily identifiable. Figure 19 shows an example of lot signage from another community. This type of sign will decrease emergency response times by making the identification of lots straightforward.

Note: Standard signage does not prevent residents from putting up their own individual signage.

Figure 19. Example of proposed lot signage.

Figure 20.Example of community signage.

4.2.1.4 Utilities

The powerlines within Sunrise Beach are well maintained. Figure 21 shows the grass mowed and trees well back of the powerlines. Figure 22 shows the presence of natural gas residential distribution lines.

Figure 21. Powerlines into the community have been maintained by the utility company

Figure 22. Gas line sign within the Sunrise Beach

4.2.1.5 Staging Areas

The corner of Shedden Drive and Leisure Lane could be utilized as an operational staging area, by the Lac Ste. Anne Fire Department, during a wildfire (**Appendix II**). However if the community needed to be evacuated, corner of Shedden Drive and Leisure Lane would not be appropriate.

Figure 23. Example of a staging area

Figure 24. Example of a staging area

4.2.2 Building Construction

4.2.2.1 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 Sunrise Beach was only based on what was visible from the road.

4.2.2.1.1 Roofing

Roofing in Sunrise Beach tends to be a primarily asphalt shingles. 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)[6].

[6] FireSmart Protecting Your Community From Wildfire – 2003

Figure 25. Asphalt shingles are fire resistant, however the buildup of debris shown above hinders fire resistance

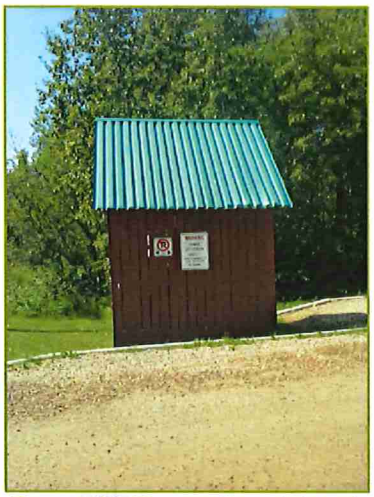


Figure 26.Tin roofing (above), asphalt shingles and treated wooden shakes are fire resistant when clean and clear of debris

4.2.2.2.2 Siding

Siding materials within Sunrise Beach are a mix of vinyl and wood siding. 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 27. Example of siding

Figure 28. Example of type of siding found in Sunrise Beach

4.2.2.2.3 Deck, Balcony and/or Porch

These structures can be of concern if they are built of combustible materials, if they are not sheathed and if the deck is slotted. If the structure is slotted and not sheathed the fire itself or embers from the fire could possibly enter under the structure and if slotted litter could accumulate under the structure which further increases the chance of ignition.

Figure 29. Good example of a deck

Figure 30. Example of a poor deck. High risk

4.2.2.2 Storage of Flammable Materials

In Sunrise Beach, some lots have propane tanks and/or debris piles. Propane tanks pose a significant hazard and should be located at least 10 meters away from the building; this may not be feasible for some properties therefore propane tanks need to have vegetation maintained within a 3 meter radius. Combustible debris piles, such as firewood or building materials, are potential points of ignition. Residents should be encouraged to remove or relocate these materials 10 meters from buildings.

Figure 31. Combustible debris pile

Figure 32. Propane Tank

4.3 Vegetation Management

FireSmart's principles of the three priority zones of vegetation management does not guarantee that fire will not affect a property or community, but it will assist by reducing the risk of damage and improve the defensibility of a structure or an area.

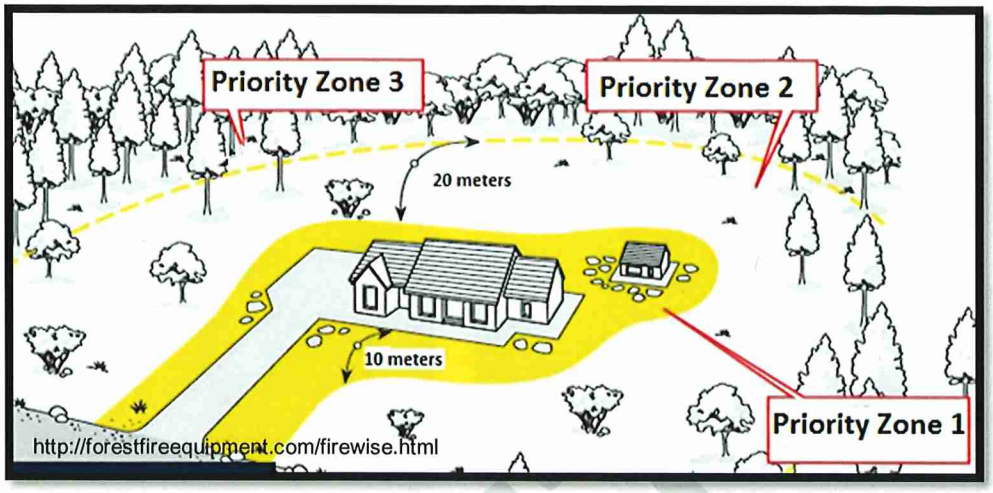


Figure 33. Priority zones around structures

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[7].

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[8]. This zone will typically apply to the community or county.

Table 7. Zone 1, 2, and 3 Fuel Management options to improve defensibility of structures in the event of wildfire

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	**Reduce the number of coniferous (they are much more combustible)**
Plant fire resistant vegetation	
Thin and/or prune existing vegetation	
Remove piled debris	

Landowners tend to be concerned about pruning conifer trees. Not all spruce and pine trees need to be pruned. Only 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 33** shows a spruce tree that does not require

[7] 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.
[8] FireSmart Protecting Your Community from Wildfire – 2003

pruning, while **Figure 34** shows spruce trees that should be pruned. The lawn surrounding the tree is well maintained and there are no structures or other trees nearby.

Figure 34. Example that does not require pruning

Figure 35. Spruce trees that require pruning

Resource and Education Links:

- 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 County Vegetation Management

Prescribed burning of the grass along the shoreline of Sandy Lake will drastically decrease the fire hazard by reducing the amount of fuel available to burn (**Appendix X**). There are multiple ecological benefits to fire such as the recycling of nutrients and increasing habitat availability. Prescribed burning should be done every spring or fall, depending on the fuel availability, and while following the restrictions of the Migratory Birds Convention Act[9]. Prescribed burns should only be attempted during calm, favourable winds and with human and community safety as key priorities. With the appropriate amount of personnel, equipment, and planning these burns should take less than 2 hours from ignition to full extinguishment. However personnel should stay for a predetermined period of time after the burn to ensure full extinguishment.

AESRD manages the bed and shore of all lakes in Alberta. AESRD in Whitecourt have stated that they would be interested in assisting with a prescribed burn in this area. They would provide the resources and would assist in planning, but require Sturgeon County would to take full responsibility for the burn. This may be an opportunity for AESRD, Sturgeon Department of Protective Services, and the

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

Summer Villages of Sunrise Beach and Sandy Beach to demonstrate the many benefits of reintroducing fire onto the landscape.

Figure 36. Potential prescribed burn area

4.3.2 Community Vegetation Management

Conifer trees along the ditches on Municipal lands in the southern section of Sunrise Beach should be pruned 2m from the ground, and dead and down fuel be cleared (**Figure 13**). This will decrease ground and ladder fuels, decreasing the potential for torching or crown fires. Pruning should be done in the late fall so that stress and physical damage of the trees is minimized.

Figure 37. Conifer trees on municipal land.

A debris burning pile was identified close to the village maintenance shop near continuous grass (**Figure 37**). Embers from this pile are a risk to ignite cured grass during the spring and fall months. It is suggested that this pile and others like it be moved or inactive when grass along the lake shore is more than 50% cured.

Figure 38. Burn Pile

4.3.3 Residential Vegetation Management

There are a large number of lots within Sandy Beach that have significant amounts of vegetation. (**Figure 35**). It would be recommended that residents implement Zone1 and Zone 2 FireSmart treatment areas on all private property within the summer village. By providing the information on the ways to manage fuels within each of the zones, the residents could understand why it is important to maintain their yards

Figure 39.Example of a Zone 1 and/or 2 and the need for fuel management.

Figure 40. Example of a good yard.

To assist residents with Zone 1, 2 and 3 treatments and regular maintenance of their property it is recommended that the summer village offer a vegetation debris disposal service. This service would encourage property cleanup of wildfire hazards by supplying a means for property owners to dispose of flammable debris. These initiatives illustrate the importance of FireSmart and the dedication of the summer village to achieve a FireSmart Community.

4.4 Legislation

4.4.1 Fire Bylaw

The Sunrise Beach "Untidy and Unsightly Premises and Nuisance Bylaw", "Off-Highway Vehicles Bylaw", and "Fire Bylaw" are a comprehensive set of legislations that have elements to support a FireSmart community. The Fire Bylaw clearly distinguishes between fires that are allowed and fires that need a permit. The maintenance of combustible debris, materials, and vegetation on private land should be consolidated into the Fire Bylaw. Writing these fire preventative prescriptions into legislation will illustrate the importance of vegetation management on private land and the outline the responsibility of the land owner.

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 Sunrise 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. These municipalities and agencies are:

Table 8. Mutual Aid Agreements

Adjacent Municipality / Agency	Mutual Aid Agreement
Sturgeon County	Yes
Lac Ste. Anne County	Yes
County of Barrhead	Recommended
Westlock County	Recommended
County of Thorhild	Recommended
Lamont County	Recommended
Strathcona County	Recommended
Parkland County	Recommended
City of Edmonton	Recommended
AESRD Whitecourt	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 AESRD 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

The AESRD Whitecourt Wildfire Management Branch have stated that if any of the local fire departments have any interest joint exercises they would welcome the opportunity. These exercises should emphasize scenarios of mutual aid, grass fires. 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

The Summer Village of Sunrise Beach does not have a municipal emergency plan. Section 11(a) of the *Emergency Management Act* states that a local authority[10][11] "shall prepare and approve emergency plans and programs." With this definition, it is the responsibility of Sunrise Beach to develop an emergency plan encompassing more than just fire emergencies. There are, however options to developing these plans.

Section 11.3(1), Delegation by local authority, of the *Emergency Management Act* states that "a local authority may delegate the local authority's powers or duties under this Act to":

(a) A regional services commission established under the *Municipal Government Act* representing 2 or more local authorities if the regional services commission is authorized in its establishing regulation to exercise that power or duty;
(b) If authorized by ministerial order, a joint committee representing 2 or more local authorities that is composed of one or more members appointed by each of the local authorities;
(c) In the case of a summer village and if authorized by ministerial order, another local authority.

Sunrise Beach may benefit from partnering with one or more Summer Village to develop a municipal emergency plan, either under a regional services commission or establishing a joint committee; providing ministerial order is granted to do so. Both communities would benefit from sharing costs, duties, and resources.

The Pigeon Lake Regional Emergency Management Plan, comprised of the 10 summer villages surrounding Pigeon Lake, has been established, received ministerial order, and is fully functional. This precedent may reduce the challenges required to establish another Regional Emergency Management Plan[12].

---

[10] "A council defined by the municipal government act" – Emergency Management Act (Current as of December 11, 2013)
[11] "Council means the council of a …summer village." – Municipal Government Act (Current as of May 14, 2014)
[12] Email correspondence with President of ASVA – September 19, 2014

5.0 Summary of Recommendations

The community risk assessment tool (**Appendix XI**), shows that if the suggested recommendations are implemented the community risk score will drop from 532 to 319. This tool represents a measure of the benefit to the community realized through implementing the recommendations. 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.

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	Moderate	**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
Moderate	Low	**3. 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 one main access/ egress point for the southern end of Shedden Dr. **Project Lead:** Summer Village Council **Benefits:** Clear communication between community and fire department.	When needed	4.2.1
High	Moderate	**4. 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	4.2.1

5.3 Vegetation Management Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
High	High	**5. Recommendation Action:** Prescribed burning of the Sandy Lake shoreline. **Project Lead:** Sturgeon County **Benefits:** Prescribed burning will decrease the fire hazard around Sandy Lake by reducing the amount of fuel available to burn	Annually/ When needed	4.3.1

High	Low	**6. 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	**7. 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	Semi-Annually	4.3.2
High	Low	**8. Recommended Action** Monitor burn pile at community facility during high fire hazard. Extinguish as necessary. **Project Lead:** Summer Village **Benefits:** Eliminates a source of ignition	When needed	4.3.2
High	Moderate	**9. Recommendation Action:** Southern section of Sunrise Beach should be pruned 2m from the ground, and dead and down fuel be cleared **Project Lead:** Summer Village Council **Benefits:** It will decrease ground and ladder fuels, decreasing the potential for torching or crown fires	Annually/ When needed	4.3.3

5.4 Legislation Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Low	Moderate	**10. Recommendation Action:** Sunrise Beach considers adding a hazard section to the Fire Bylaw. Review Sturgeon County Fire Bylaw for any discrepancies. **Project Lead:** Summer Village Council **Benefits:** Ensure that Sunrise Beach's Bylaw is inclusive and has no discrepancies with primary fire responders.	One Time	4.4.1

5.4 Emergency Planning

Urgency	Effort	Recommendation	Frequency	Reference Section
High	High	**11. Recommendation Action:** The Summer Sunrise Beach collaborates with Sandy Beach to develop an Emergency Management Plan. **Project Lead:** Summer Village Council **Benefits:** Under an emergency the entire Summer Village and emergency responders are knowledgeable as to what the protocol is for evacuation.	One Time	4.7

Appendices

Appendix I – Glossary

AESRD – Alberta Environment and Sustainable Resource Development

Anchor Point – Please refer to Staging Area.

ASVA – Association of Summer Villages of Alberta

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.

CFFBP – Canadian Forest Fire Behaviour Prediction System

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.

FireSmart Canada Community Recognition Program (FCCRP) – A program that draws on community's spirit and its willingness to take responsibility for reducing wildfire risks.

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

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

FRIAA – Forest Resource Improvement Association of Alberta

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 3** for more information.

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.

Points of Ignition –

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.

Registration Area – Please refer to Staging Area

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

Saprophytic Habitats – A habitat where organisms which obtain nutrients from dead organic matter.

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 – A designated safety zone where evacuated residents can assemble in a case of an emergency and where an incident command post can be set up.

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

Appendix II – Wildfire Preparedness Guide

WILDFIRE PREPAREDNESS GUIDE

Sandy Beach & Sunrise Beach

June 1, 2015
CPP Environmental

Key Contacts

County of Sturgeon	780-939-9303
(Emergency after hours)	780-498-9647
County of Lac Ste. Anne	1-780-785-3411
SRD Whitecourt	1-780-778-7265
Girl Guides Camp	1-780-967-2028

Utilities

Ste. Anne Gas Coop (Gas)	780-967-2246
Fortis (power)	310-4300

RCMP

Mornville Office	1-780-939-4520

Alberta Emergency Management Agency (AEMA) 1-866-618-2362

Village Administration Office 780-967-2873

(After hours contact number and name)

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— Power distribution lines.

Dangerous Goods— Waste Transfer Station/Fuel station.

Special— Girl Guides Camp

Staging Areas

Corner of Shedden Drive and Leisure Ln.

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.

Dikohes—suitable for two-way travel

Private Driveways— Width is ~4meters; length ~15meters (gravel)

Water Supply

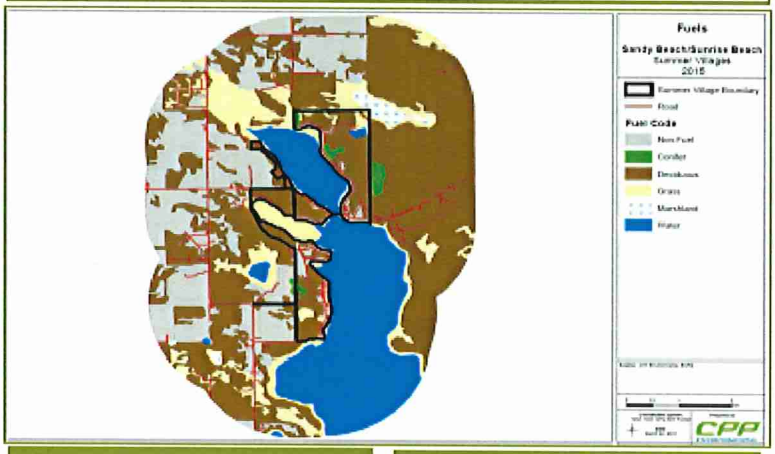
Catchments???

Communications

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 east of Mornville on Hwy 642.



Fire Department Resources

Mornville Fire Department— 27km east

District 1 Fire (Onoway)— 25km south

20-Manpower

1-Quick Response Bush Truck

1-Water Tender (7,000L)

Evacuation Protocol

Sandy Beach

Evacuation Routes

East side– South on Lakeshore drive to Hwy 642

Western Side– South on Blue Herron Drive to HWY 642

Ask Council about a "muster point"

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

Ask Council about a "muster point"

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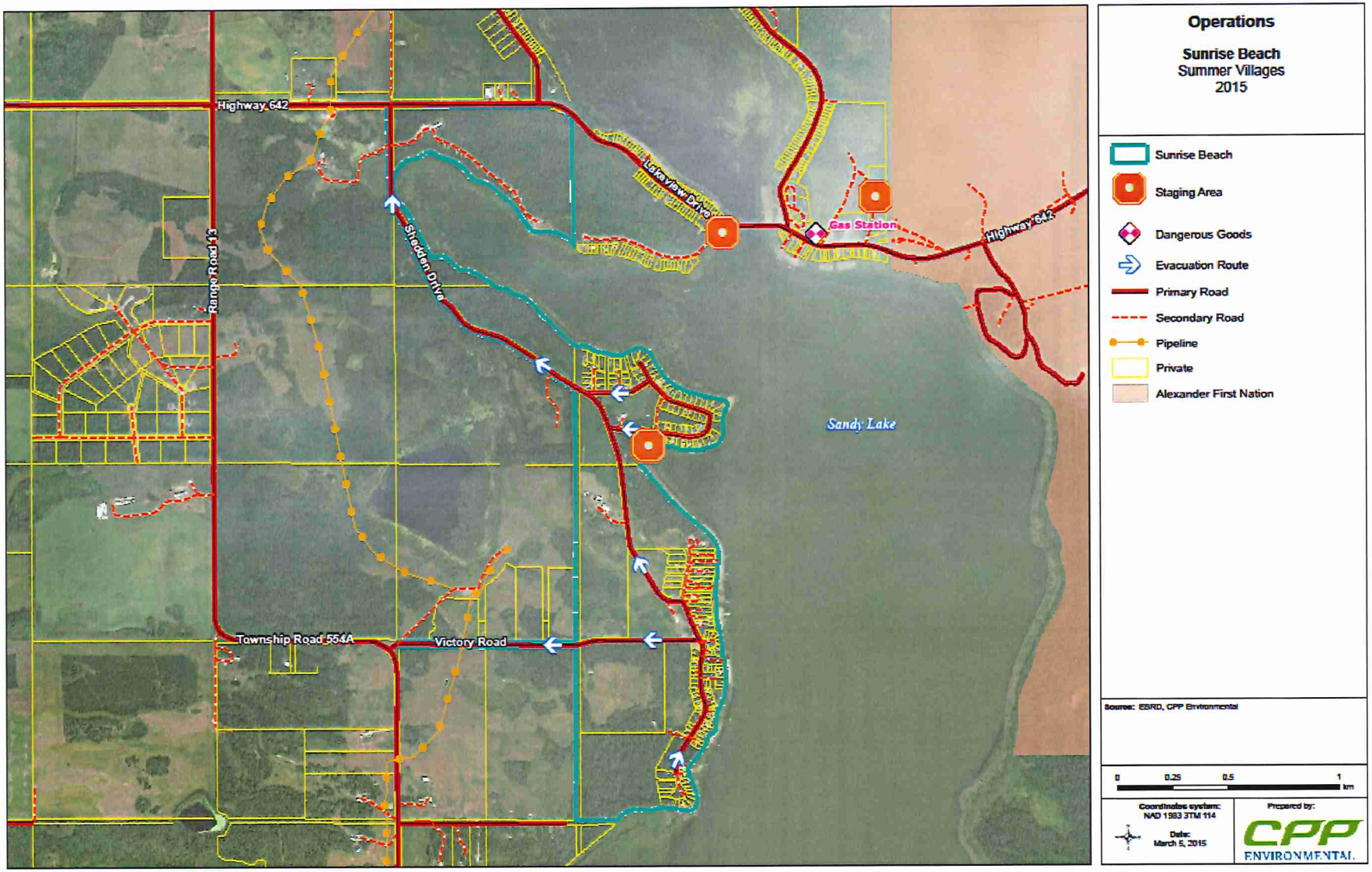

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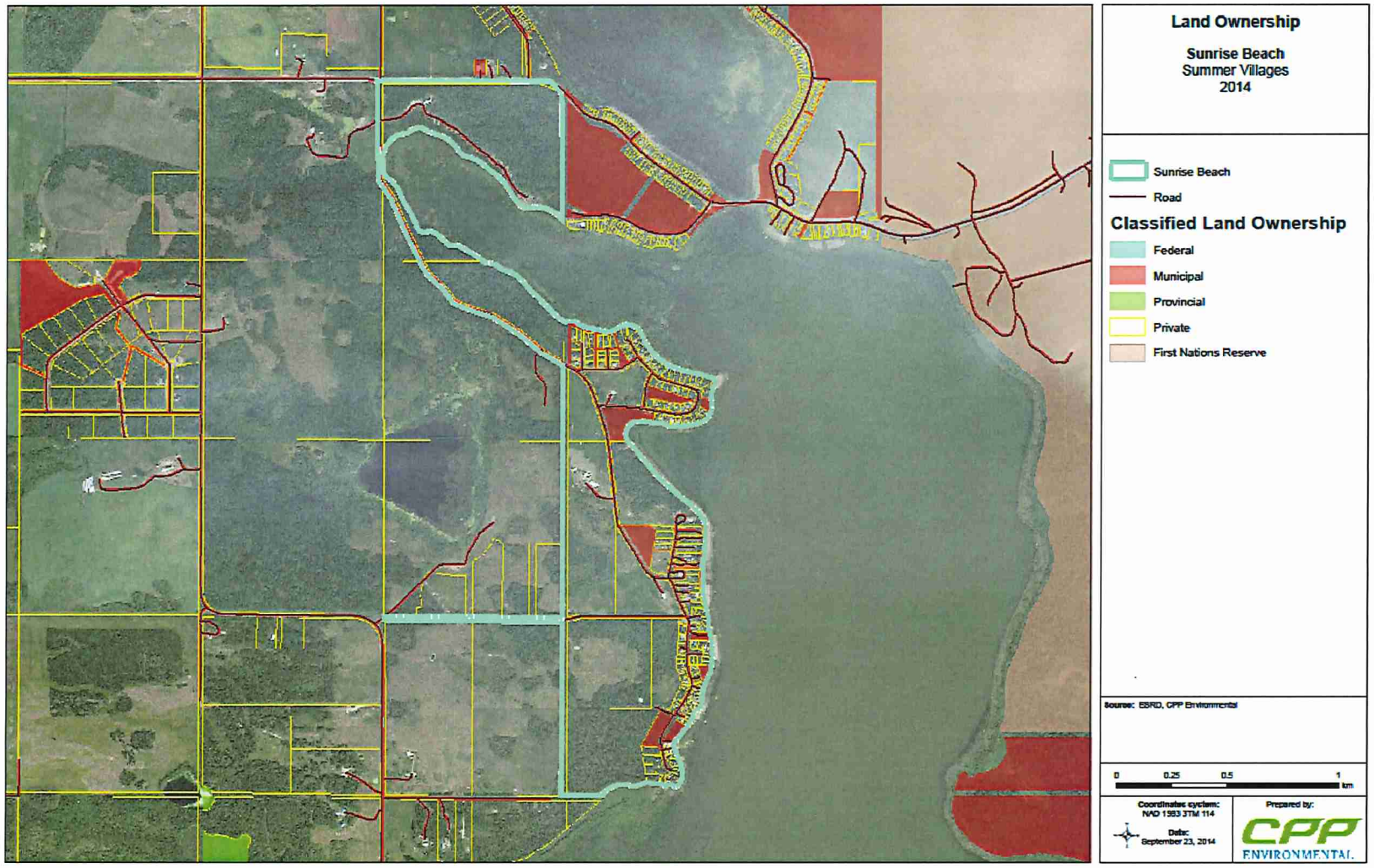
Appendix III – Planning Area Maps



Map 1. Land ownership

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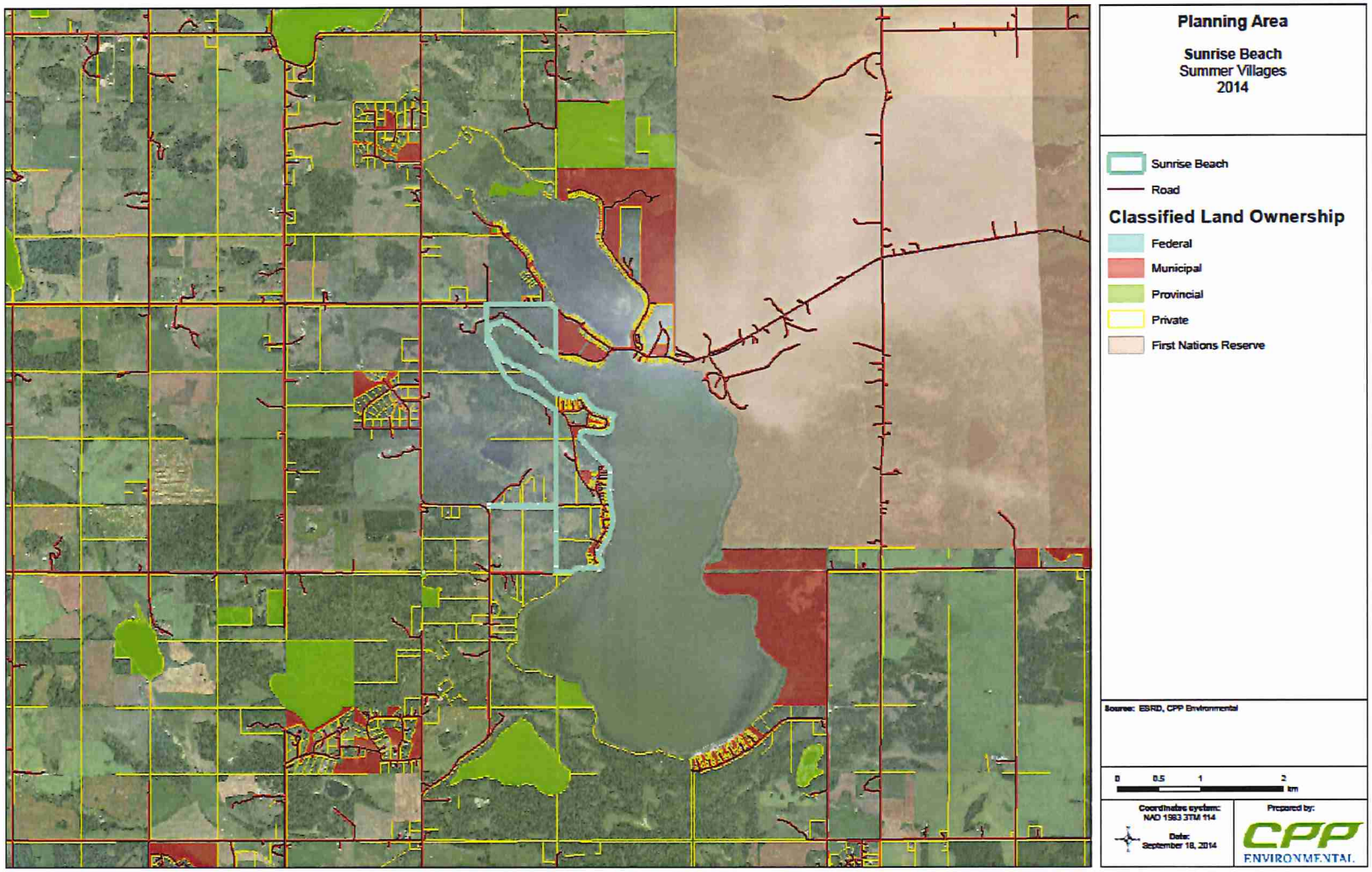

Map 2. Planning area

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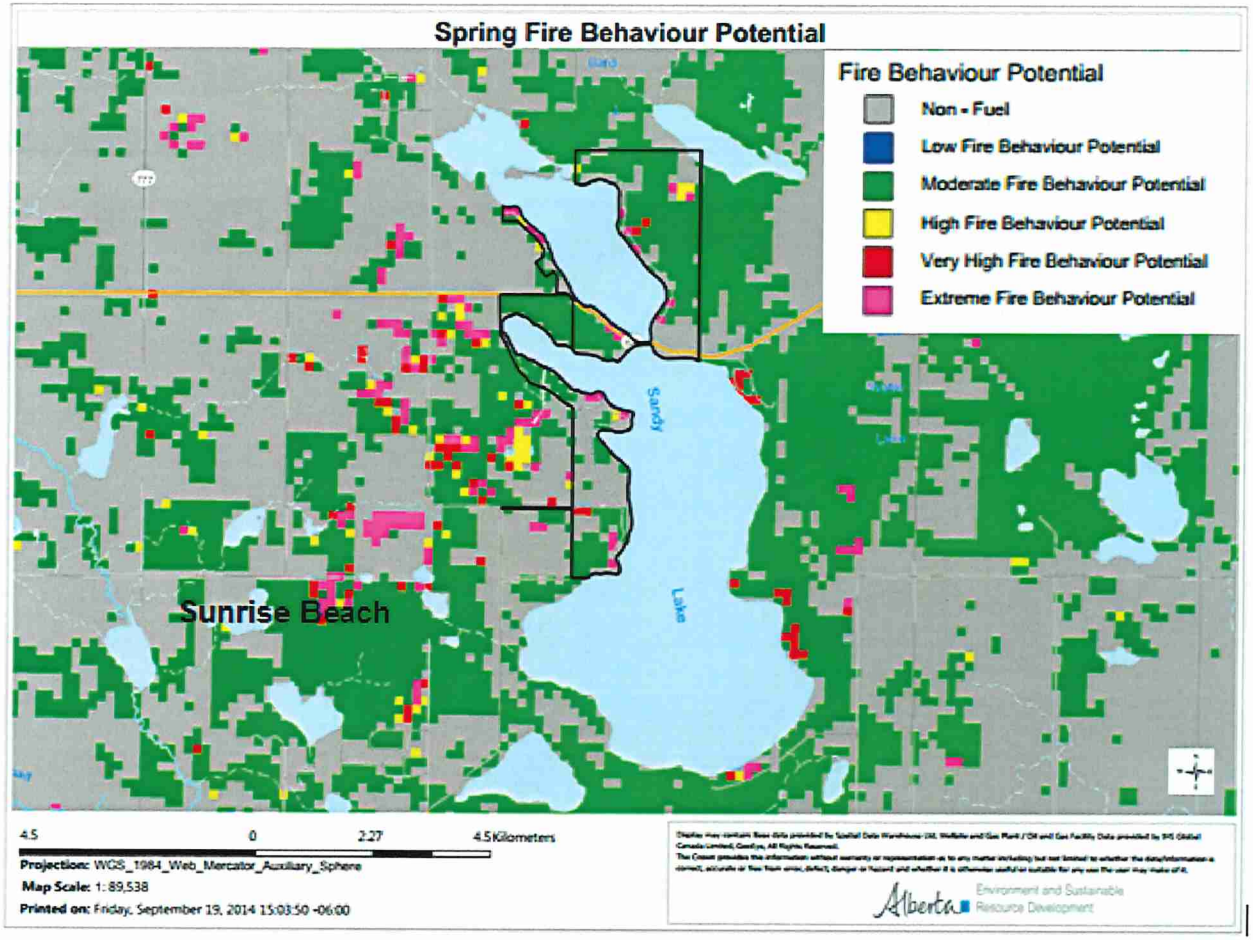
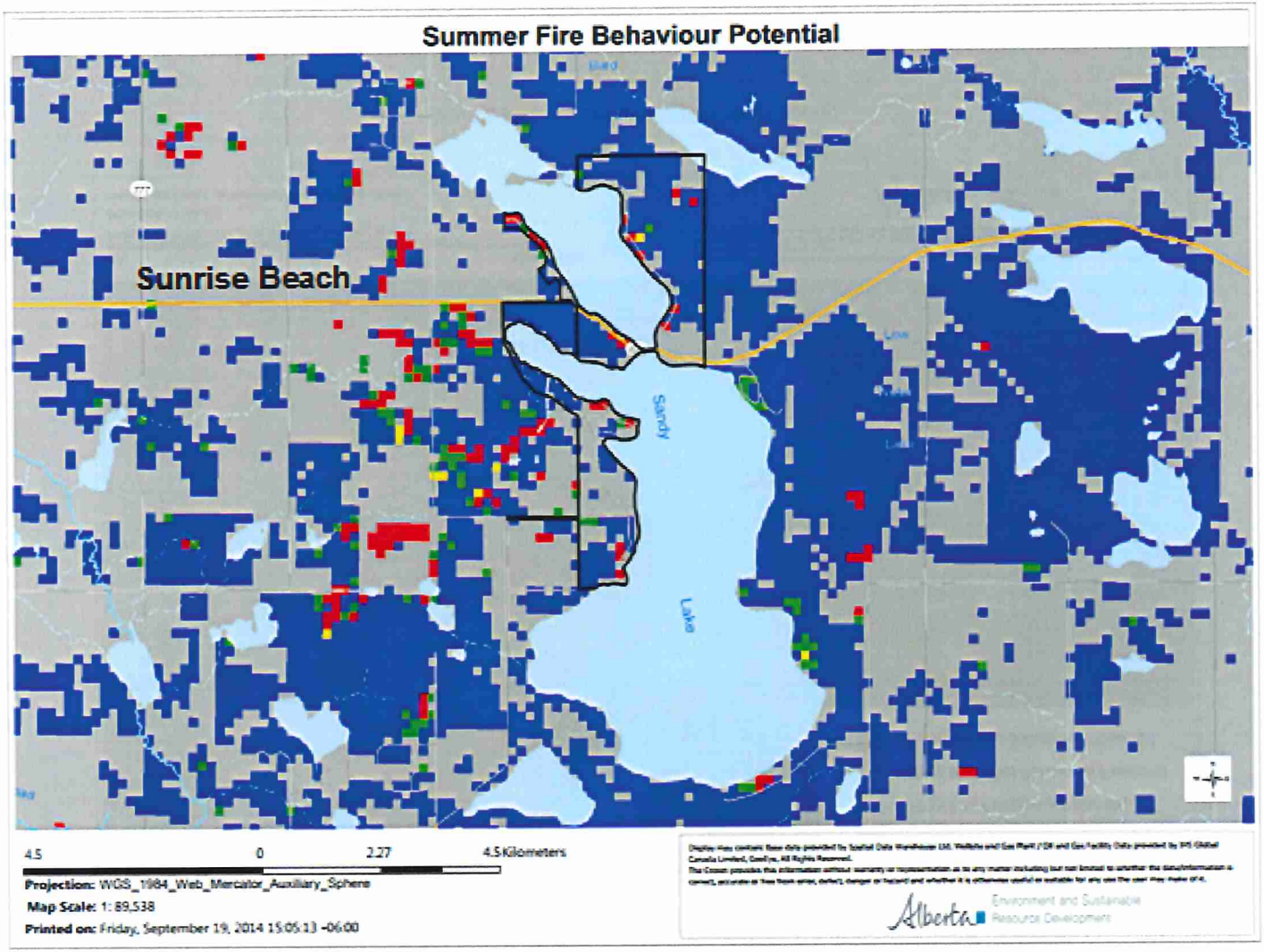
Appendix IV – Wildfire Behaviour Potential Maps



Map 3. Wildfire behaviour potential - spring



Map 4. Wildfire behaviour potential – summer

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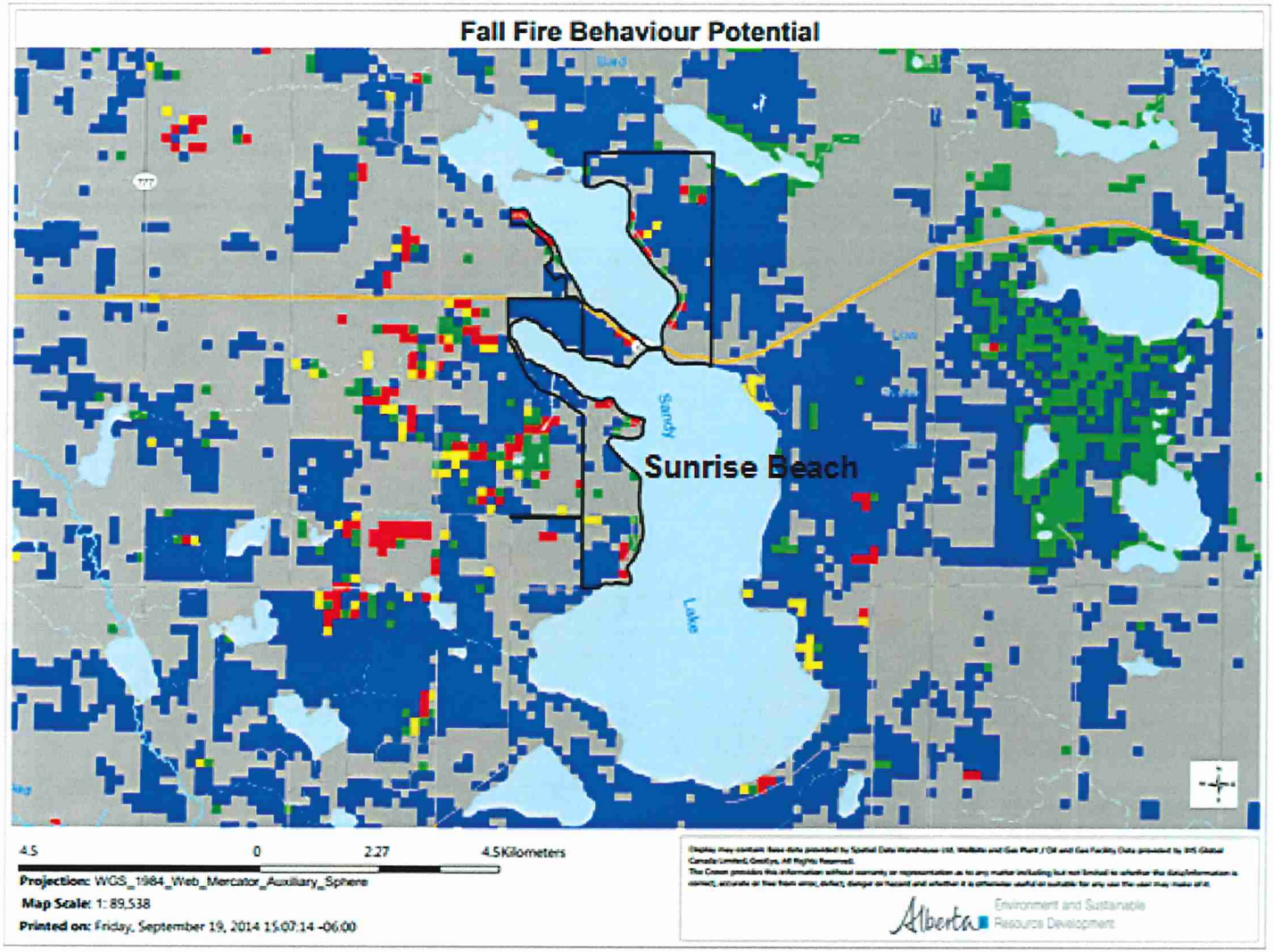
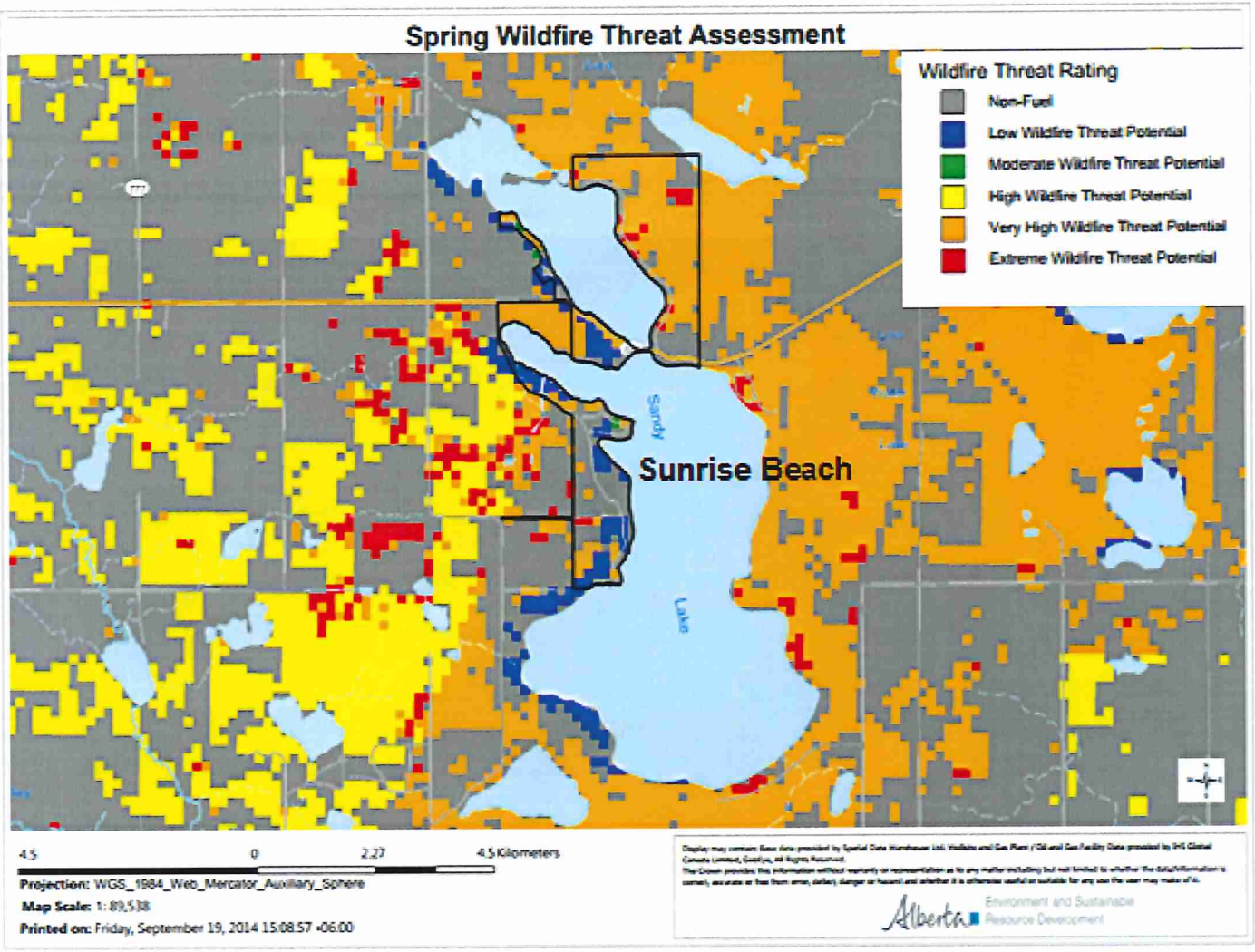


Map 5.Fall Fire Behaviour Potential

Appendix V – Wildfire Threat Rating Maps



Map 6. Wildfire threat rating - spring

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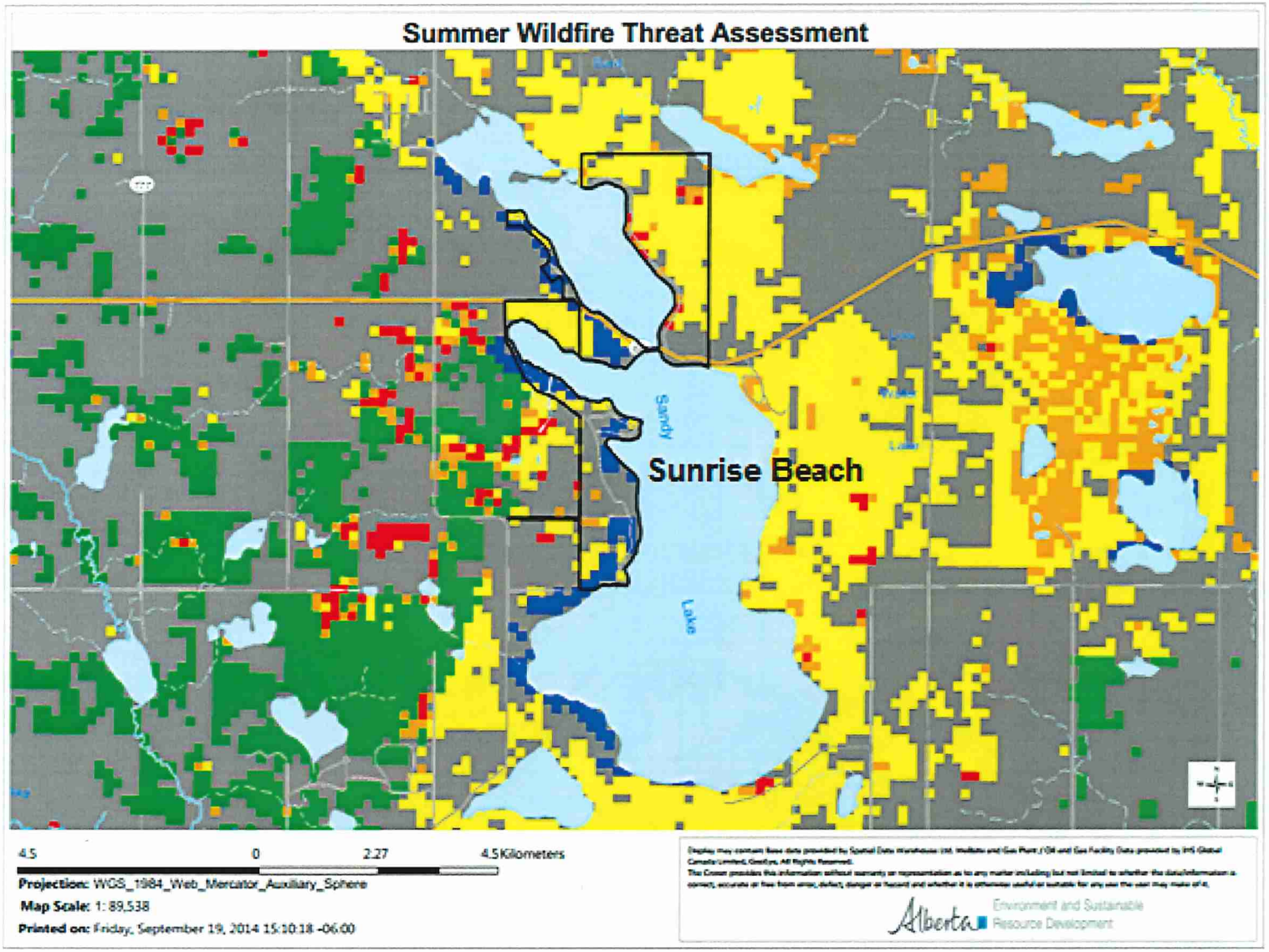

Map 7. Wildfire threat rating - summer

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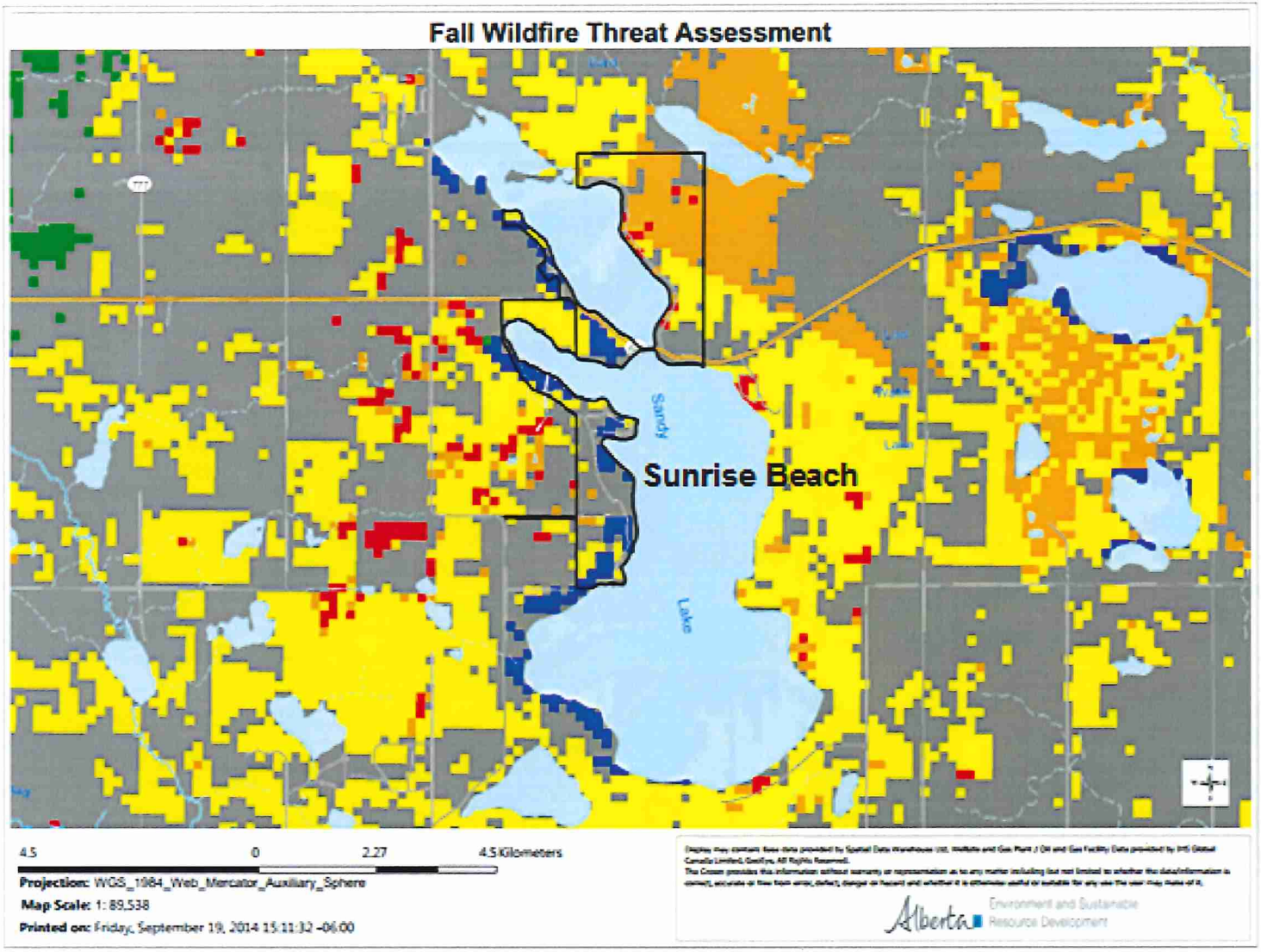
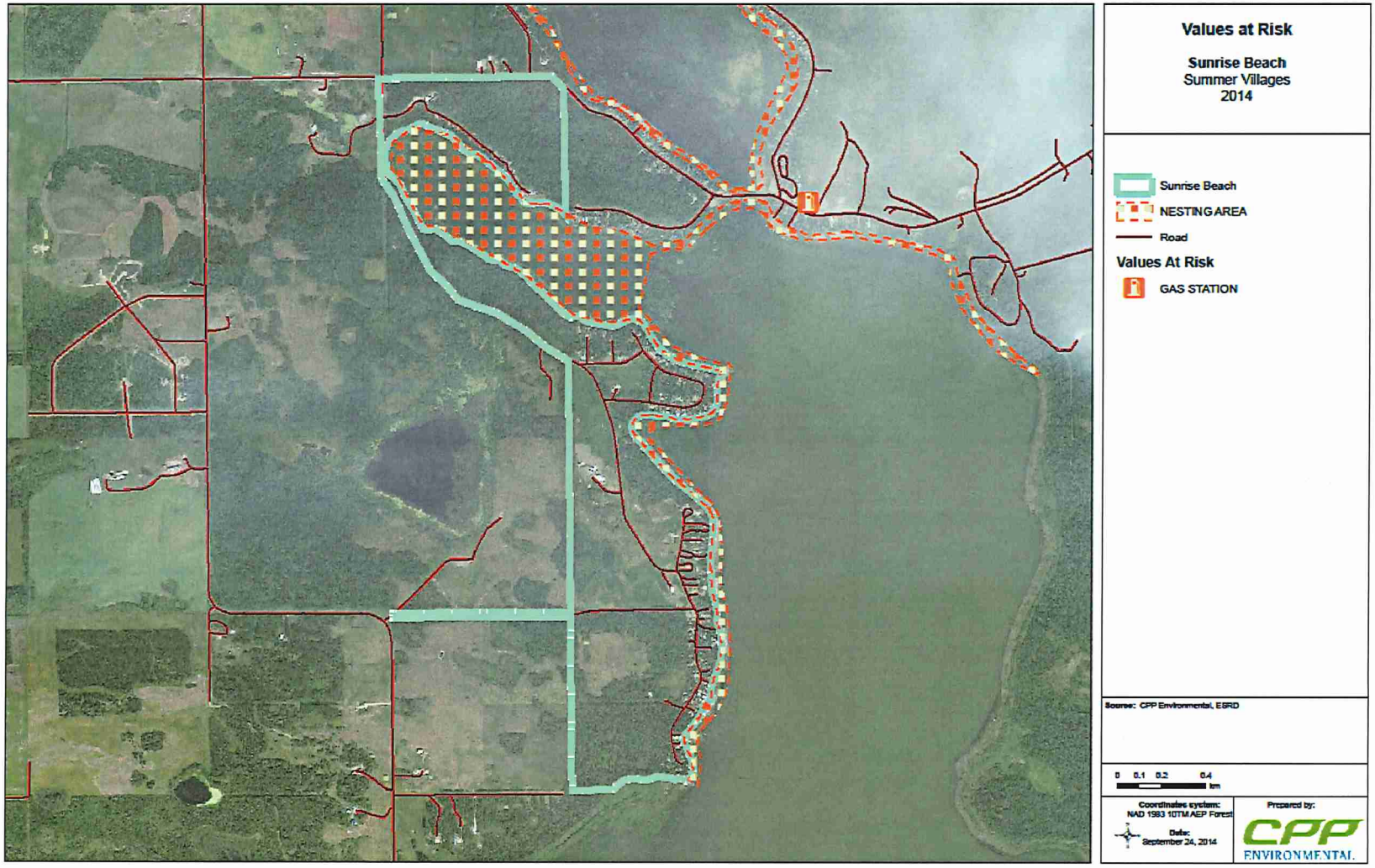


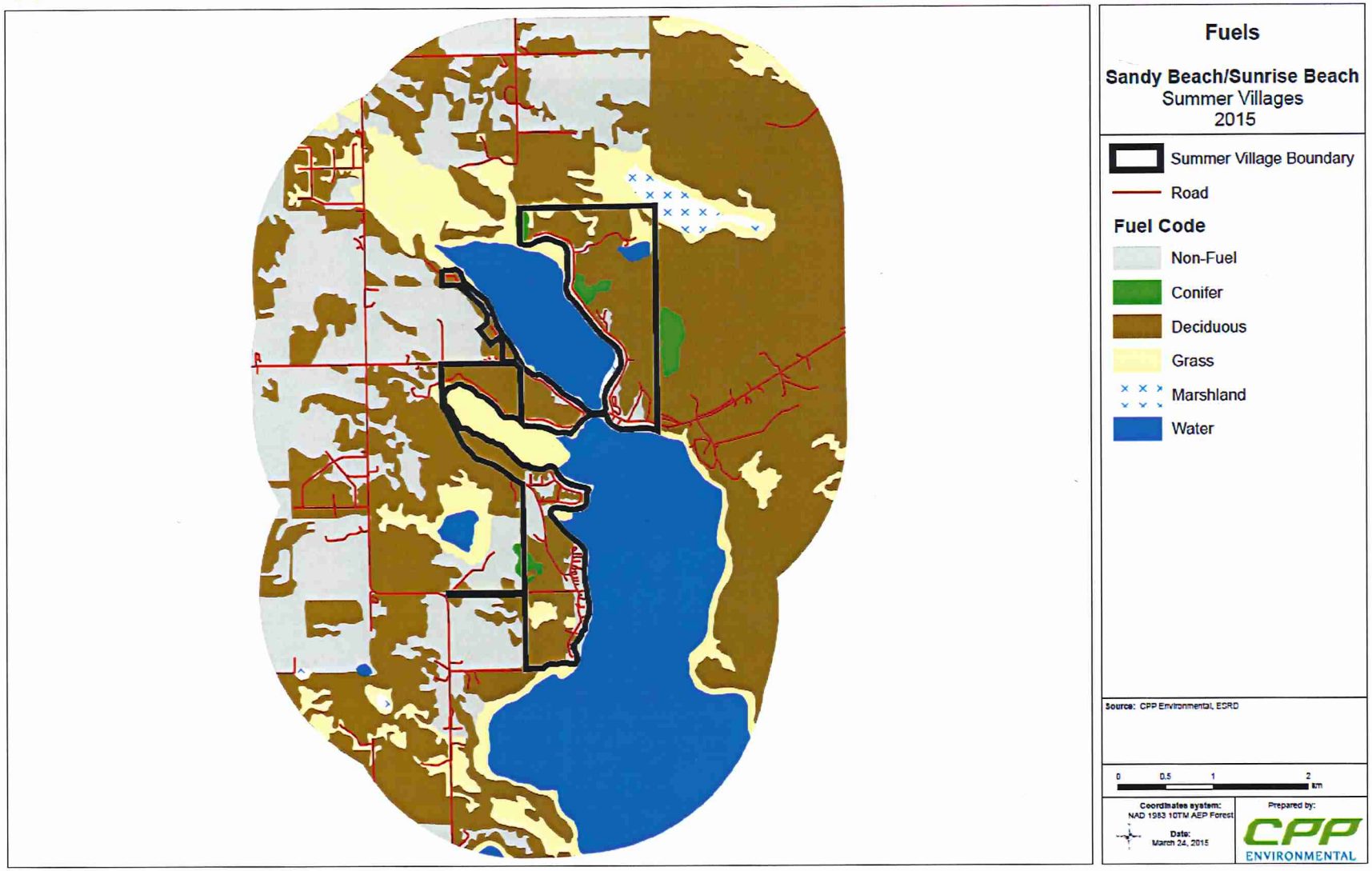
Map 8. Wildfire threat rating - fall

Appendix VI – Values at Risk Map



Map 9. Values at risk

Appendix VII – Fuel Maps



Map 10. Fuel types

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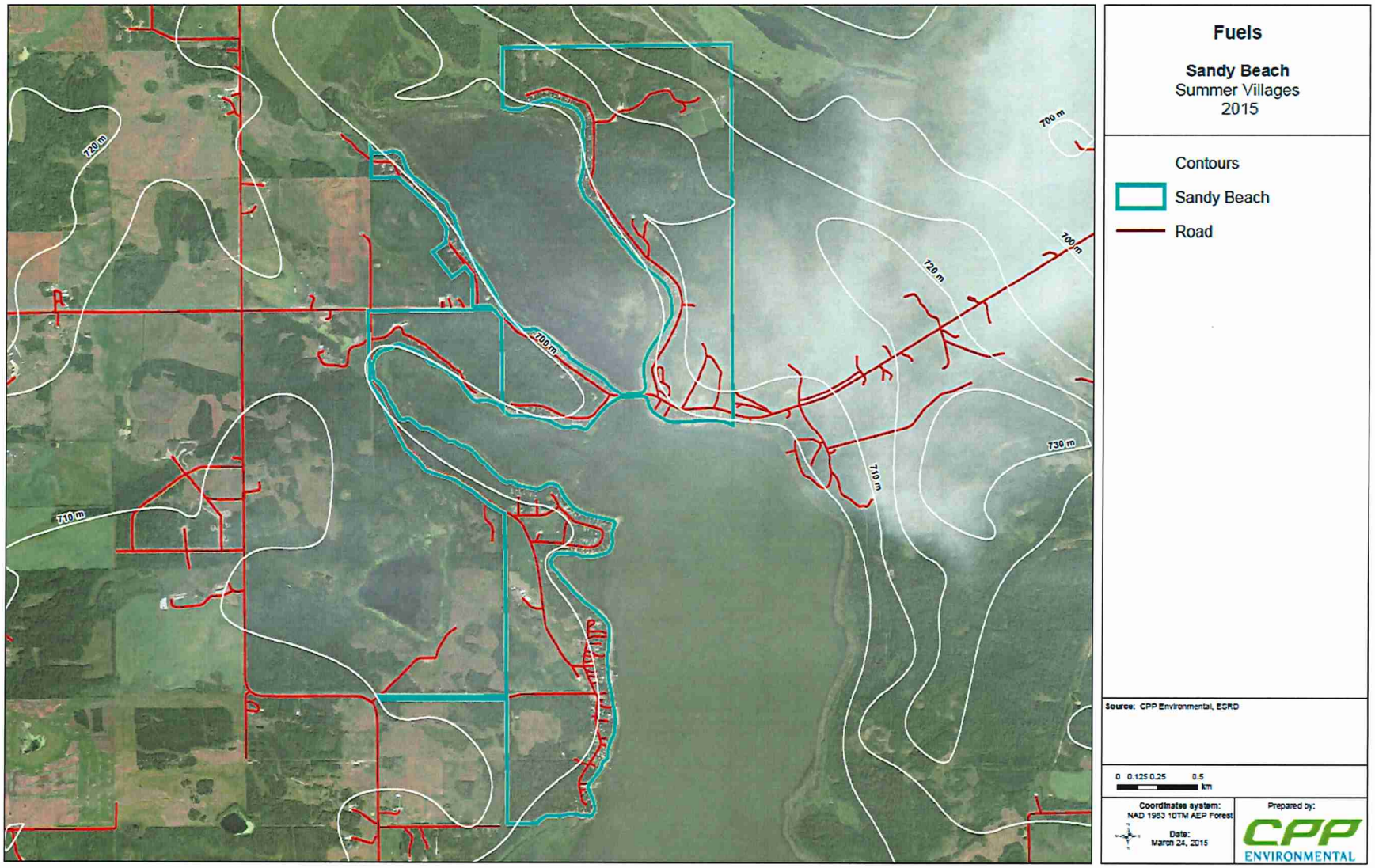
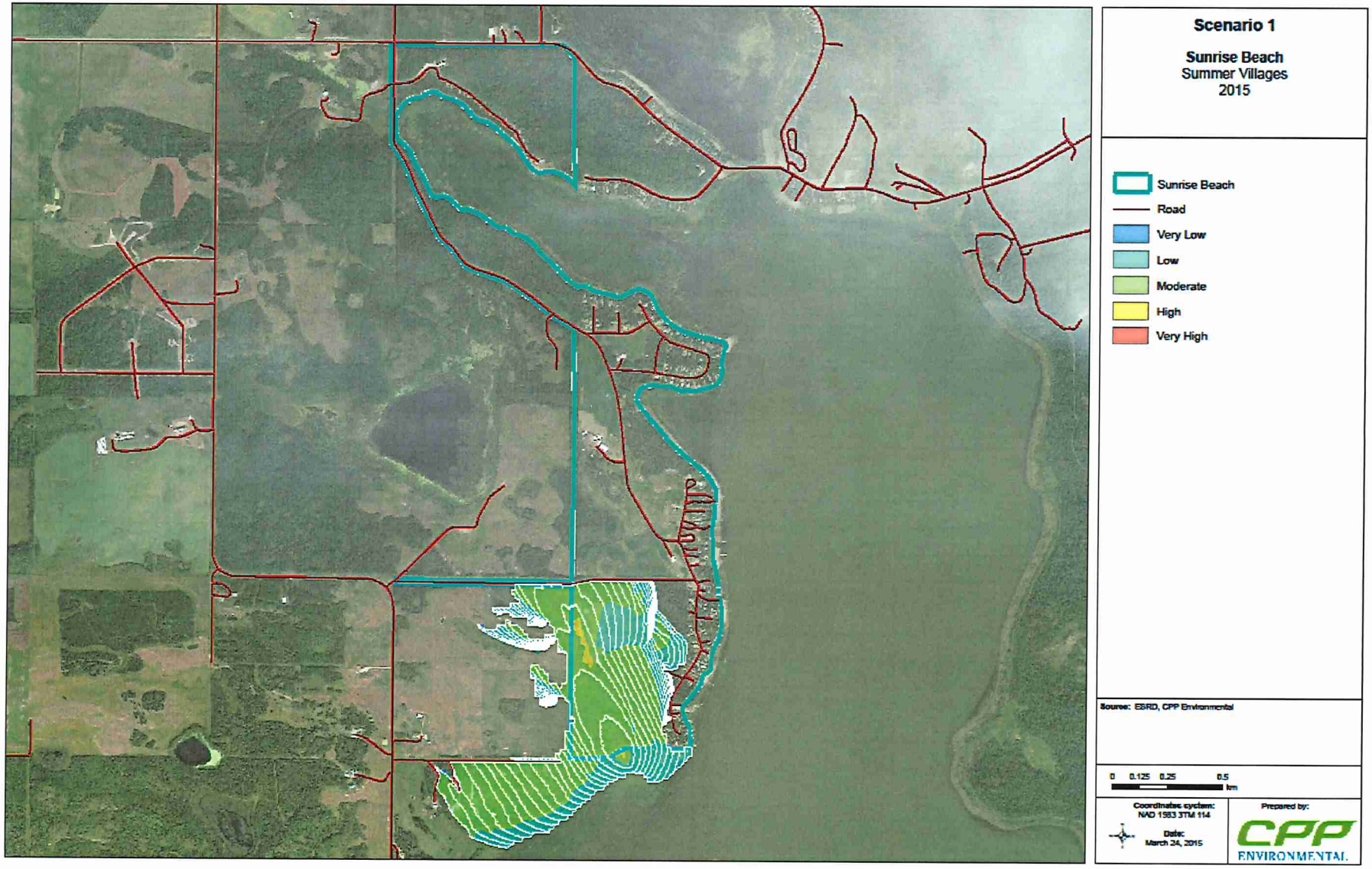
Appendix VIII – Topography

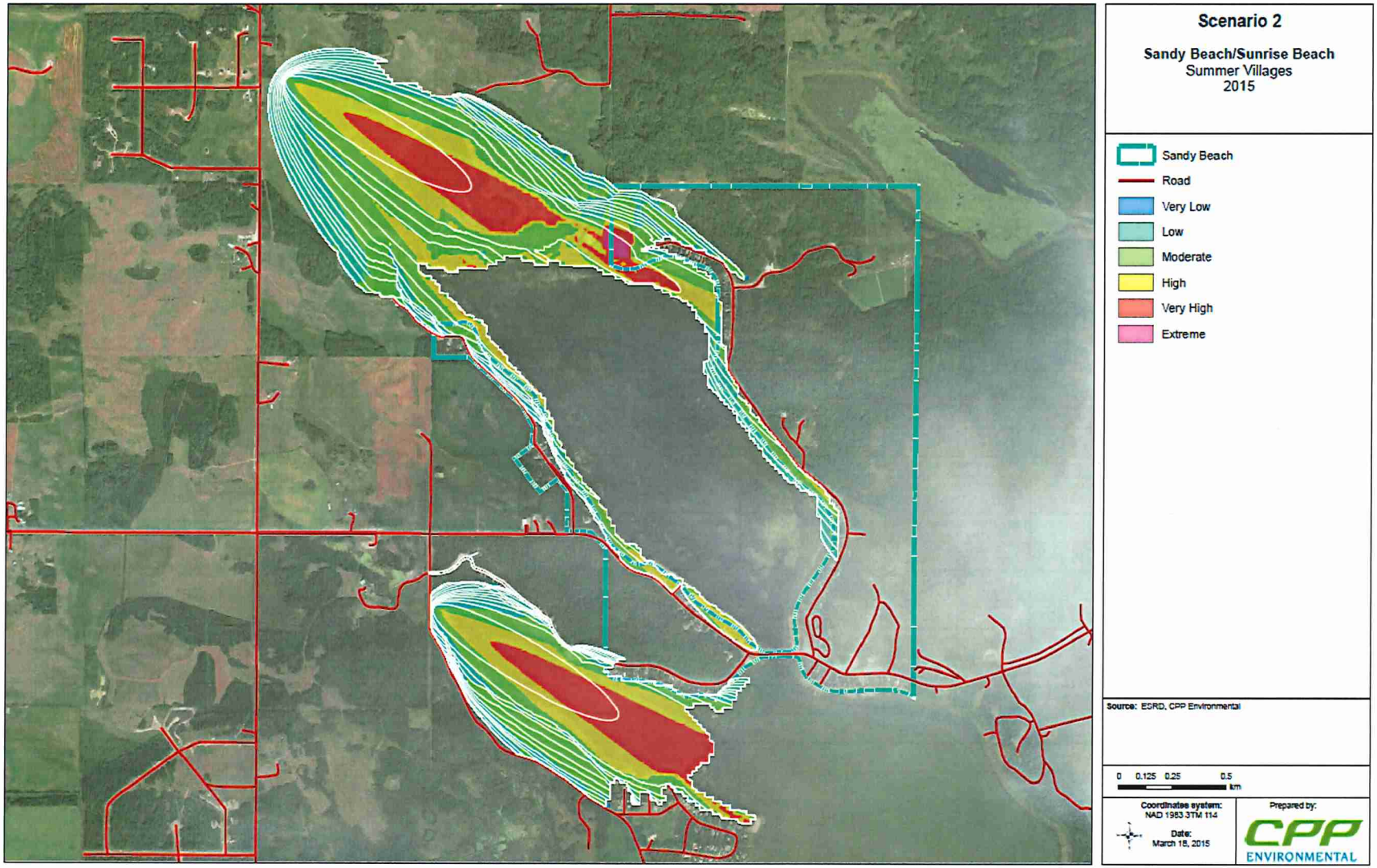


Appendix IX – Prometheus Wildfire Model

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.

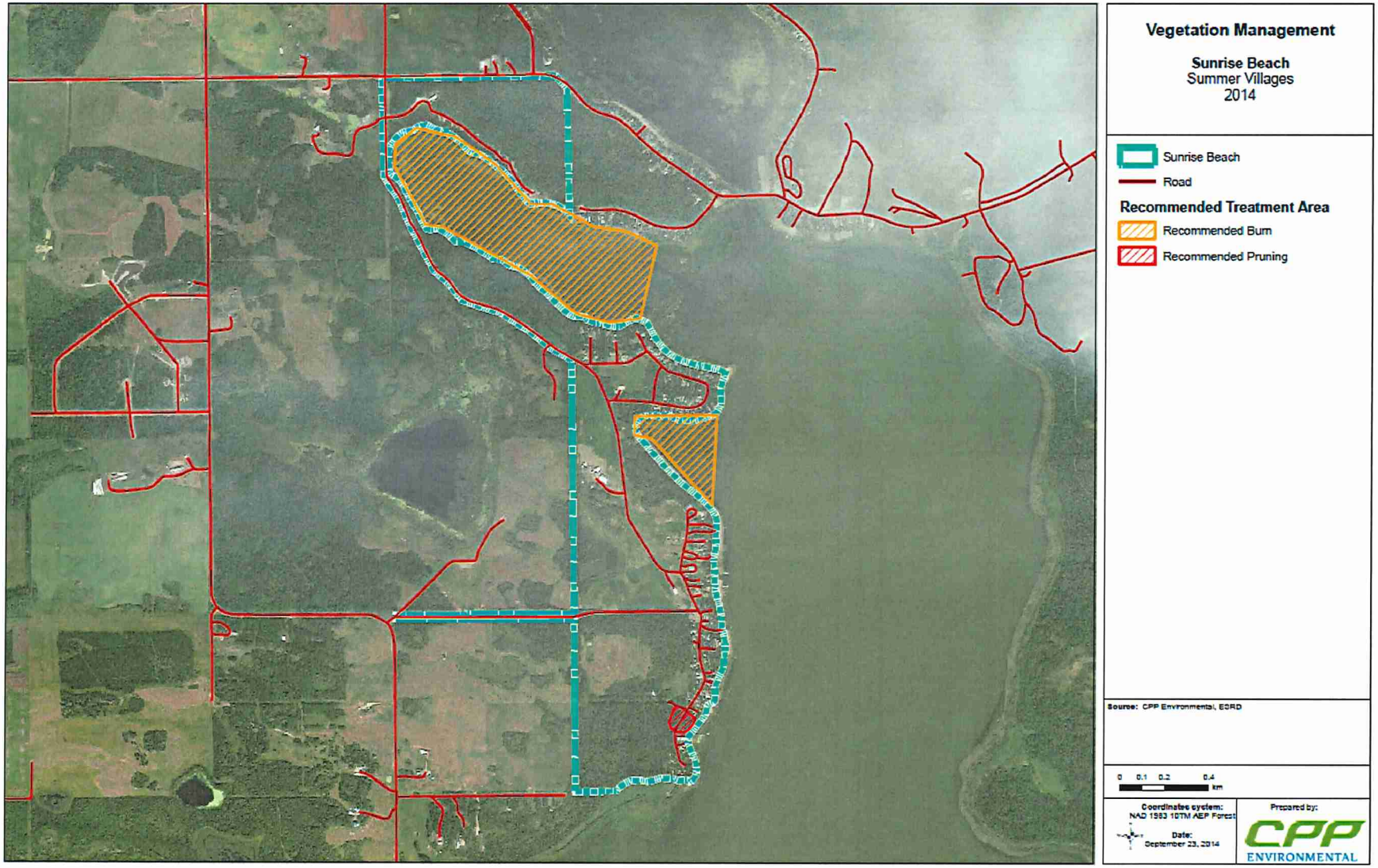

Scenario 1
Sunrise Beach
Summer Villages
2015
Sunrise Beach
Road
Very Low
Low
Moderate
High
Very High
Source: EBRD, CPP Environmental
0 0.125 0.25 0.5
km
Coordinates system:
NAD 1983 3TM 114
Date:
March 24, 2015
Prepared by:
CPP
ENVIRONMENTAL

Scenario 1 Data																
	Weather factors					Fire Weather Indices			Area		Percent HFI					
Date and Time	Temperature (°C)	Relative Humidity (%)	Wind Direction (deg)	Wind Speed (km/h)	Precipitation (mm)	Hourly FFMC	Hourly ISI	Hourly FWI	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 10:00	17.8	30	150	30	0	83.7	8	15.9	0	0	0	0	0	0	0	0
5/11/2011 10:30	17.8	30	150	30	0	83.7	8	15.9	0	0	0	0	0	0	0	0
5/11/2011 11:00	18.7	26	150	35	0	86.9	16	26.2	0	0	0	0	0	0	0	0
5/11/2011 11:30	18.7	26	150	35	0	86.9	16	26.2	0	0	0	0	0	0	0	0
5/11/2011 12:00	19.8	26	150	32	0	90.1	21.8	32.3	0	0	100	0	0	0	0	0
5/11/2011 12:30	19.8	26	150	32	0	90.1	21.8	32.3	1.85	1.85	0	32.47	67.53	0	0	0
5/11/2011 13:00	20.3	25	150	33	0	89.6	21.3	31.8	3.87	5.72	0	14	86	0	0	0
5/11/2011 13:30	20.3	25	150	33	0	89.6	21.3	31.8	7.12	12.84	0	11.96	71.2	0	4.35	12.5
5/11/2011 14:00	20.8	24	150	35	0	90.3	26.1	36.3	9.23	22.07	0	8.74	86.41	1.29	2.27	1.29
5/11/2011 14:30	20.8	24	150	35	0	90.3	26.1	36.3	9.2	31.27	0	18.88	81.12	0	0	0
5/11/2011 15:00	21.3	23	150	33	0	90.9	25.7	36	5.95	37.22	0	30.49	69.51	0	0	0
5/11/2011 15:30	21.3	23	150	33	0	90.9	25.7	36	4.92	42.14	0	31.69	68.31	0	0	0
5/11/2011 16:00	21.4	23	150	33	0	91.4	27.6	37.7	3.93	46.07	0	25	75	0	0	0
5/11/2011 16:30	21.4	23	150	33	0	91.4	27.6	37.7	3.7	49.77	0	30.48	69.52	0	0	0
5/11/2011 17:00	21.6	22	140	32	0	92	28.6	38.6	3.4	53.17	0	26.53	72.45	1.02	0	0
5/11/2011 17:30	21.6	22	140	32	0	92	28.6	38.6	5.61	58.78	0	26.47	73.53	0	0	0
5/11/2011 18:00	21.1	23	140	33	0	91.4	27.6	37.7	6.25	65.03	0	28.83	66.67	2.7	1.8	0
5/11/2011 18:30	21.1	23	140	33	0	91.4	27.6	37.7	6.04	71.07	0	34.69	60.54	0.68	4.08	0
5/11/2011 19:00	20.2	24	140	28	0	90.8	19.7	30.2	8.7	79.77	0	42.33	56.44	1.23	0	0
5/11/2011 19:30	20.2	24	140	28	0	90.8	19.7	30.2	4.59	84.36	0	48.53	50.98	0.49	0	0
5/11/2011 20:00	19	25	130	28	0	89.4	16.1	26.3	4.97	89.33	0	37.89	62.11	0	0	0
5/11/2011 20:30	19	25	130	28	0	89.4	16.1	26.3	4.66	93.99	0	40.14	59.18	0.68	0	0
5/11/2011 21:00	17.5	27	130	30	0	88.1	14.8	24.8	4.03	98.02	0	52.21	46.32	1.47	0	0
5/11/2011 21:30	17.5	27	130	30	0	88.1	14.8	24.8	3.71	101.73	0	82.47	15.46	2.06	0	0
5/11/2011 22:00	16.2	30	130	30	0	86.7	12.1	21.5	4.57	106.29	2.31	76.3	21.39	0	0	0


Scenario 2
Sandy Beach/Sunrise Beach
Summer Villages
2015
Sandy Beach
Road
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:
March 18, 2015
Prepared by:
CPP
ENVIRONMENTAL

Scenario 2 Data																	
	Weather Factors					Fire Weather Indices				Area		Percent HFI					
Date and Time	Temperature (°C)	Relative Humidity (%)	Wind Direction (deg)	Wind Speed (km/h)	Precipitation (mm)	Hourly FFMC	Hourly ISI	Hourly FWI	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	81.3	4.4	9.8	32.5	0	0	0	0	0	0	0	0
9/3/2012 10:30	13.1	53	300	24	0	81.3	4.4	9.8	32.5	0	0	0	0	0	0	0	0
9/3/2012 11:00	14.2	49	300	35	0	84.5	11.5	20.5	32.5	0	0	0	0	0	0	0	0
9/3/2012 11:30	14.2	49	300	35	0	84.5	11.5	20.5	32.5	0	0	0	0	0	0	0	0
9/3/2012 12:00	15	39	300	41	0	87.7	24.2	34.4	32.5	0	0	100	0	0	0	0	0
9/3/2012 12:30	15	39	300	41	0	87.7	24.2	34.4	32.5	0.48	0.48	0	35.71	64.29	0	0	0
9/3/2012 13:00	15.4	40	300	37	0	86.4	16.4	26.4	35	2.09	2.57	0	48.28	51.72	0	0	0
9/3/2012 13:30	15.4	40	300	37	0	86.4	16.4	26.4	35	2.26	4.83	1.25	47.5	51.25	0	0	0
9/3/2012 14:00	15.8	35	310	39	0	87.2	20.3	30.6	35	2.49	7.32	2.15	47.31	50.54	0	0	0
9/3/2012 14:30	15.8	35	310	39	0	87.2	20.3	30.6	35	2.69	10.01	2.27	55.68	42.05	0	0	0
9/3/2012 15:00	16.3	35	310	32	0	87.9	16	26	35	2.56	12.57	0.93	62.04	37.04	0	0	0
9/3/2012 15:30	16.3	35	310	32	0	87.9	16	26	35	2.82	15.39	0.8	59.2	40	0	0	0
9/3/2012 16:00	16.4	33	300	30	0	88.5	15.8	25.7	35	3.49	18.88	0	72.22	27.78	0	0	0
9/3/2012 16:30	16.4	33	300	30	0	88.5	15.8	25.7	35	3.67	22.55	0	74.5	25.5	0	0	0
9/3/2012 17:00	16.1	32	310	30	0	89	17	27	35	4.17	26.72	0	48.72	51.28	0	0	0
9/3/2012 17:30	16.1	32	310	30	0	89	17	27	35	6.08	32.8	0	50	50	0	0	0
9/3/2012 18:00	15.2	38	310	24	0	88.5	11.7	20.8	35	4.35	37.15	0	98.15	1.85	0	0	0
9/3/2012 18:30	15.2	38	310	24	0	88.5	11.7	20.8	35	2.72	39.87	0	99.36	0.64	0	0	0
9/3/2012 19:00	12.7	48	300	13	0	87.9	6.2	12.8	35	2.47	42.33	0	100	0	0	0	0
9/3/2012 19:30	12.7	48	300	13	0	87.9	6.2	12.8	35	0	42.33	0	100	0	0	0	0
9/3/2012 20:00	10.6	54	260	13	0	86.6	5.1	11	35	0	42.33	0	100	0	0	0	0
9/3/2012 20:30	10.6	54	260	13	0	86.6	5.1	11	35	0	42.33	0	100	0	0	0	0
9/3/2012 21:00	10	58	280	13	0	85.3	4.3	9.5	35	0	42.33	0	100	0	0	0	0
9/3/2012 21:30	10	58	280	13	0	85.3	4.3	9.5	35	0	42.33	0	100	0	0	0	0
9/3/2012 22:00	9.7	61	270	17	0	83.8	4.2	9.5	35	0	42.33	0	100	0	0	0	0

Appendix X – Vegetation Management



Map 11. Recommended treatment areas

CPP ENVIRONMENTAL

Appendix XI – Risk Assessment

Wildfire Risk Assessment For Rural Communities							
COMMUNITY:	Sunrise Beach	INHERENT		STRATEGIES TO OBTAIN RESIDUAL RISK	RESIDUAL	
		Rating	Scores		Rating	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:			No Change		
	A $0 - $300 000	1	1		1	1
	B $300 001 - $500 000	2			2	
	C $500 001 - $750 000	3			3	
	D >$750 000	4			4	
	Avg Home Cost: $ 162 428					
		/4	0		/4	0
VALUES AT RISK	Presence of:			No Change		
	A Critical Infrastructure	0 or 3	0		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		Sunrise Beach adopt or create a section in the fire Bylaw to address fire hazards on private property.	1	1
	B Local media involvement and internal structural changes to Emergency Services or programs	2			2	
	C Regional media involvement, lack of public confidence, and external changes to Emergency Services or county	3	3		3	
		/3	3		/3	1

DEFENSIBILITY OF COMMUNITY	DENSITY OF STRUCTUR	A	< 20 m between homes	3	2	No Change	3	2
		B	21 - 40 m between homes	2			2	
		C	41 - 100 m between homes	1			1	
		D	> 100m between homes	0			0	
				/3	2		/3	2
	BARRIERS TO FIRE SPREAD	A	East w/ Barrier within 200m	0 or 2	2	Prescribed burning of grass on the shore of Sandy Lake	0 or 2	0
		B	West w/ Barrier within 200m	0 or 4	0		0 or 4	0
		C	South w/ Barrier within 200m	0 or 4	4		0 or 4	4
		D	North w/ Barrier within 200m	0 or 2	2		0 or 2	2
				/12	8		/12	6
	FOREST FUEL PATCH	A	No forest patch present within community	0		No Change	0	
		B	Patch 0.1 - 0.9 ha within community boundary	1			1	
		C	Patch 1 - 2.9 ha within community boundary	3			3	
		D	Patch > 3 ha within community boundary	5	5		5	5
				/5	5		/5	5
	RESIDENTIAL FIRESMART	A	0-20 %	4	3	Property owners mow, prune, and clear debris from land. Consolidating fire hazard removal into fire bylaw. Gaining FireSmart Canada status as a recognized FireSmart community.	4	
		B	21-40 %	3			3	
		C	41-60 %	2			2	
		D	61-80 %	1			1	
		E	81-100 %	0			0	0
				/4	3		/4	0
	FUEL MAIN-TENANCE	A	Utility ROW maintenance	0 or 1	0	Pruning of coniferous trees along ditches on Municipal lands.	0 or 1	0
		B	Fuel maintenance required - other agency	0 or 1	0		0 or 1	0
		C	Fuel maintenance required - municipality	0 or 1	1		0 or 1	0
				/3	1		/3	0
	ACCESS	A	Loop turnarounds/ cul-de-sacs are suitable for large fire apparatus without back-up maneuvers	0 or 1	1	Develop standard lot signage for the community.	0 or 1	1
		B	2 or more means of egress	0 or 1	0		0 or 1	0
		C	Standard visible lot signage	0 or 1	1		0 or 1	0
				/3	2		/3	1
	SUPPRESSION CAPABILITY	A	Responding Fire Department has proper equipment for bush fires	0 or 1			0 or 1	
		B	Fire fighters have basic wildfire fighting training	0 or 1			0 or 1	
		C	Mutual Aid Agreements are present	0 or 1	0		0 or 1	
				/3	0		/3	0
				TOTAL:	38		TOTAL:	29

Wildfire Risk Assessment For Rural Communities

COMMUNITY:		Sunrise Beach		INHERENT		OBTAIN RESIDUAL RISK	RESIDUAL	
				Rating	Scores		Rating	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: NA Slope %: NA		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	0	No Change	0	0
		B	Scattered- 3-5m separating logs, branches &	1			1	
		C	Abundant-Continuous logs, branches & twigs	3			3	
				/3	0		/3	0
	FUEL STRUCTURE: LADDER FUEL	A	Absent- <25% of trees have ladder fuels	0	3	Pruning ladder fuels in mixedwood stands.	0	0
		B	Scattered- 25% - 75% of trees have ladder fuels	3			3	
		C	Abundant- > 75% of trees have ladder fuels	5			5	
				/5	3		/5	0
	PRESENT LANDSCAPE IGNITION SOURCES	A	Recreation (Presence)	0 or 1	0	No Change	0 or 1	0
		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	2		/4	2
	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		532	TOTAL:	14		TOTAL:	11
	Consequence x Likelihood = RESIDUAL		319					

		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	