



Wildfire Mitigation Strategy



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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 Half Moon Bay 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 meets with the local fire station for an orientation day to discuss emergency response issues.
	The Summer Village acquires standard signage for each lot.
Vegetation Management	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 cleanup.
Legislation	Half Moon Bay updates their Fire Bylaw and review Town of Sylvan Lake Fire Protection Bylaw for any discrepancies.

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

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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 Sylvan Lake Fire Department during an incident within Half Moon Bay. These two documents will assist Half Moon Bay 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 Half Moon Bay 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 Half Moon Bay. 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 Half Moon Bay is located on the mid-eastern shore of Sylvan Lake, within Lacombe County, approximately 34 km northwest of Red Deer, Alberta (**Figure 1**). The planning area includes Half Moon Bay and adjacent lands up to 2 km from Half Moon Bay's borders (**Appendix III**).

The Summer Village of Half Moon Bay 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

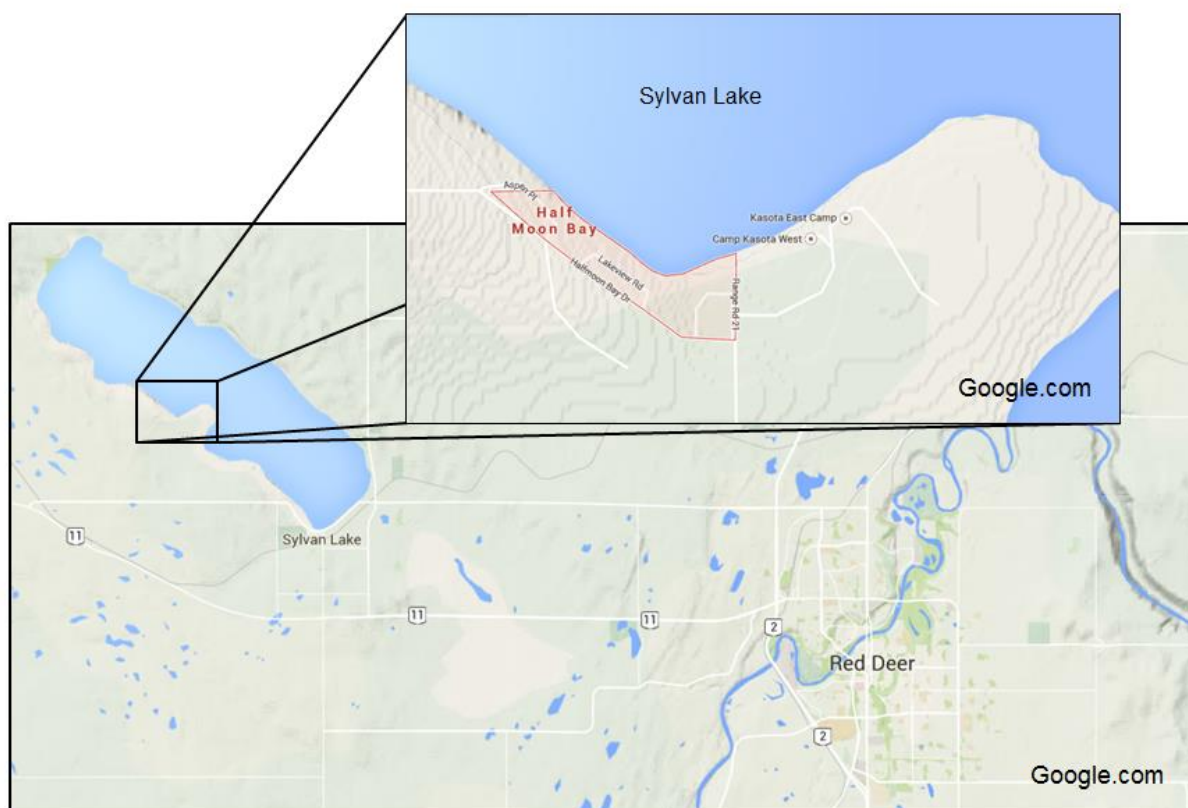


Figure 1. General location of Half Moon Bay

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

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 Half Moon Bay 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. Sylvan Lake Fire Department provided local knowledge, strategies, and tactics for fire suppression. Alberta Environment and Sustainable Resource Development provided technical expertise and guidance throughout the process.

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

- The Summer Village of Half Moon Bay
- The residents of Half Moon Bay
- Sylvan Lake Fire Department
- Association of Summer Villages of Alberta (ASVA)
- Alberta Environment and Sustainable Resource Development (AESRD)
- Red Deer Watershed

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 Half Moon Bay is high during the spring and fall while it is low during the summer. The Prometheus Wildfire Model (**Appendix VI**) was used to assist the wildfire threat.

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 Half Moon Bay	Planning Area
Standard	62 residences	N/A
Critical	None Identified	None Identified
Dangerous Goods	None Identified	Oil and Gas Lease
Special	None Identified	None Identified

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 topography².”

3.2.1 Vegetation Fuel Types

The landscape, within 2 km of Half Moon Bay, consists of deciduous (**Figure 2**) and grass (**Figure 3**). Agricultural lands are common in 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. Example of Grass 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, Half Moon Bay. Historical weather (**Table 3**) was acquired from April, 2005 – October, 2014 from the Rocky Tower Fire Weather Station, located just north of Rocky Mountain House. Temperature, relative humidity and wind speed were averaged using daily noon actuals; values at 12:00 noon. Precipitation (**Figure 4**) was calculated using the monthly average. The Fire Weather Index (FWI) is a general index of fire danger throughout forested areas in Canada³. The 90th percentile FWI was calculated to better understand what months are at a higher risk of sustaining a wildfire in the Half Moon Bay area. The 90th percentile was calculated (FWI 10.95) and all days equal to, or greater than the 90th percentile are considered to be days where a wildfire could spread (**Figure 5**). Seasonal prevailing wind direction, in the form of wind roses, was generated using the “Canadian Wind Energy Atlas” website⁴ (**Figure 6, Figure 7, and Figure 8**). Wind roses were generated seasonally using a height of 30 meters; 30 meters was the closest measurements to the ground.

Table 3. Weather data

Rocky Tower, Alberta (April - October, 2005 - 2014)						
Season	Month	Average Temperature (°C)	Average Relative Humidity (%)	Average Wind Speed (km/h)	Average Precipitation (mm)	90 th Percentile FWI (average days/year)
Spring	April	9	52	12	15	13
	May	15	54	10	75	7
Summer	June	18	66	9	122	2
	July	22	63	7	108	2
	August	20	66	6	84	1
Fall	September	17	62	8	52	3
	October	10	70	10	36	4

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

⁴ <http://www.windatlas.ca/en/maps.php>

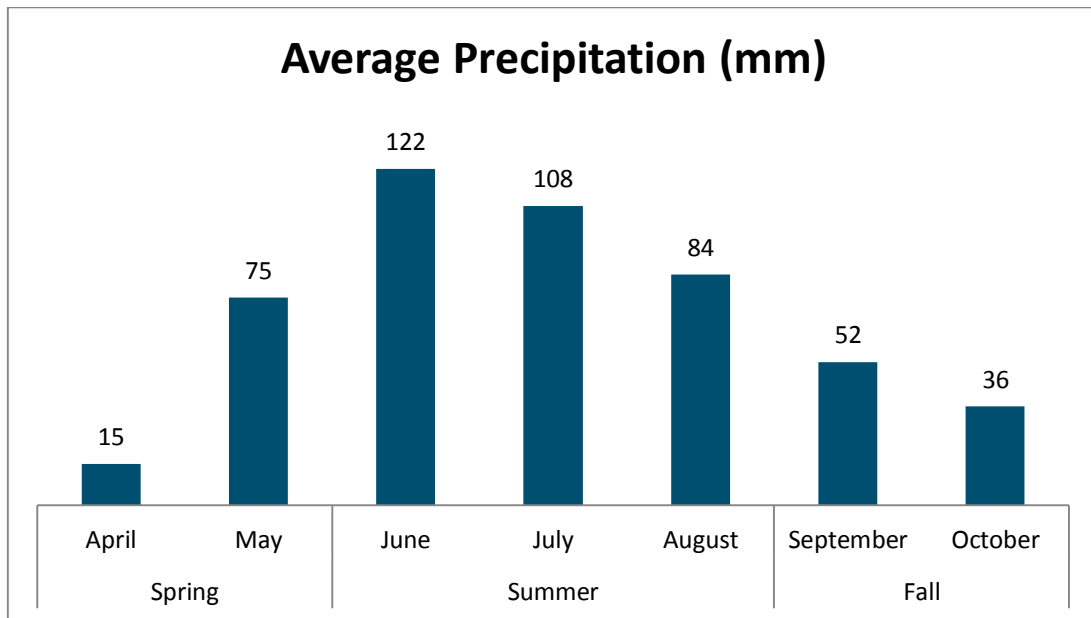


Figure 4. Average precipitation

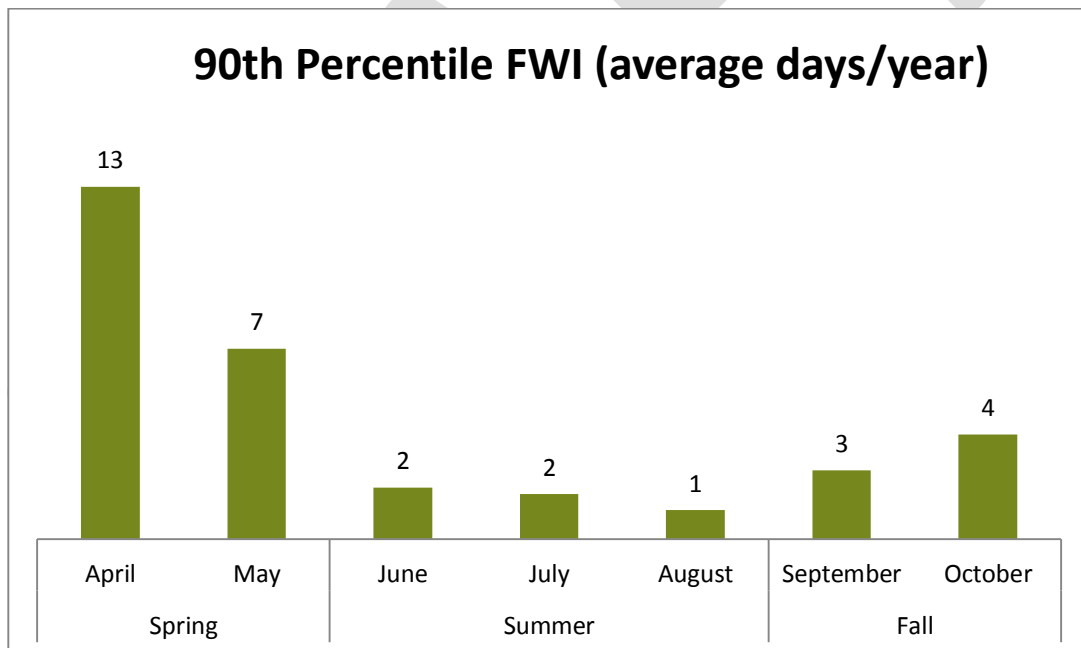


Figure 5. 90th percentile FWI

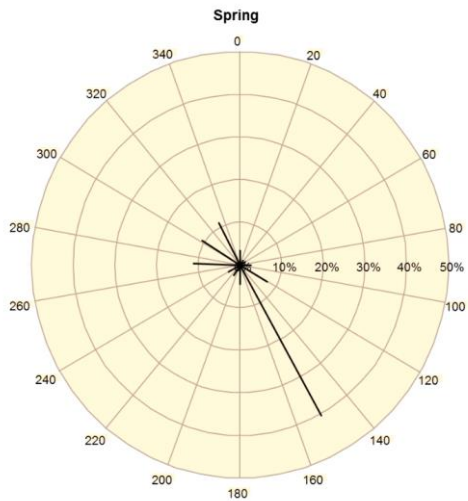


Figure 6. Spring prevailing wind

Spring winds are predominantly out of the southeast, with a range from southeast to northwest.

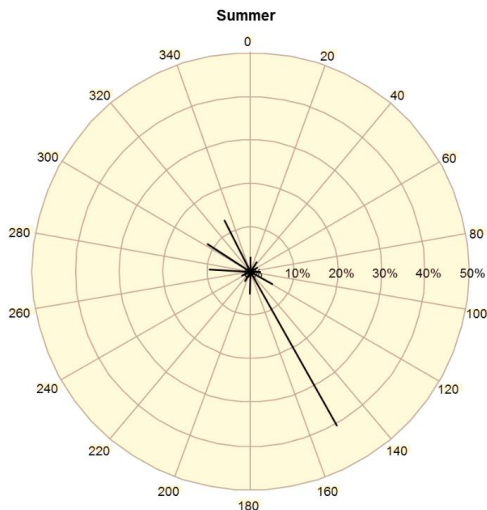


Figure 7. Summer prevailing wind

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

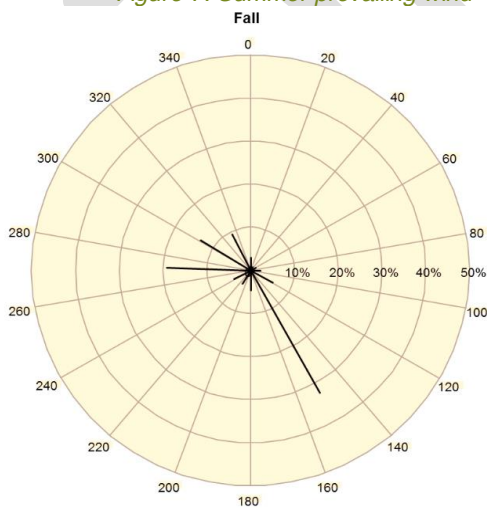


Figure 8. Fall prevailing wind

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

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 properly analyze potential fire behaviour. The topography in the planning area is generally flat (**Appendix V**). 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 Canada⁵, 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	90 th percentile weather will support fire growth
Barriers are effective if they are 1.5 times wider than flame lengths	Weather in Half Moon Bay does not vary from Rocky Tower
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 9)	An area that is less than 25% vegetated is a non-fuel



Figure 9. Example of spotting

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

With Prometheus, a scenario was generated for Half Moon Bay (**Appendix VI**). The scenario used a day where weather was above the 90th percentile FWI; days above the 90th percentile are assumed to sustain fire growth. Weather data from 10:00 – 22:00 was chosen from an actual date from Rocky Tower.

Prometheus Scenario:

Table 5. Summary of weather and fire data

Summary Weather on May 9, 2007				
Max Temperature	Min Relative Humidity	Wind Direction	Average Wind Speed	Max FWI
21°C	49%	Northwest	23 km/h	16
Summary Fire Data				
Ignition Point	Time of Ignition	Fire Growth Stopped	Total Area Consumed	General Fire Behaviour
North of Township Road 392	13:00	22:00	4.52 ha	Low

During the first hour the fire grows to 0.08 hectares and the fire continues to spread southeast. Three hours after ignition, the fire continues to spread southeast and has reached the northwestern boarder of Half Moon Bay. By 22:00 the fire has entered into Half Moon Bay, and has burned a section of houses in the northeast portion. The fire reaches a final size of 4.52 hectares.

This simulation illustrates areas of concern for Half Moon Bay. Half Moon Bay is susceptible to a wildfire from the northwest and east, due to the presence of continuous fuels. With an average wind speed of 23 km/h, it can be speculated that there may be embers being carried further into the community by the wind. All properties are susceptible to home ignitions if there is spotting. This example demonstrates the need for all community members to participate with FireSmart. If all properties within Half Moon Bay are FireSmart it will create a defensible barrier to the fire spreading into, and throughout, the community and decrease the potential of home ignitions.

3.3 Wildfire Incidence

Grass and field fires are the most common type of wildfire in the Sylvan Lake area. The cause of wildfire is almost exclusively human induced; however, lightning has started fires in the area. The average number of wildfires per year is highly variable and dependent on ignition sources, time of year, and fuel types.⁶

Note: Individual summer villages do not keep record of fire occurrence.

3.4 Firefighting Capabilities

Sylvan Lake Fire Department relies mainly on volunteer firefighters and provides fire rescue and emergency medical services to Sylvan Lake residents. Bush trucks and mini-pumpers are on pick-up truck chassis and tend to be better suited to action wildfires. The fire department has a water tender, which will benefit remote firefighting by supplying water to areas where water sources may not be readily available.

Table 6. Fire department distance and resources

Fire Department	Distance from Half Moon Bay	Manpower	Quick Response Bush Truck	Water Tender (Capacity)	Specialized Equipment
Sylvan Lake	10 km	35	1	1	

⁶ Correspondence with Sylvan Lake Fire Chief – December 9, 2014

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

Summer Village educate and encourage ratepayers to participate in FireSmart

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 Half Moon Bay. This should have priority as maintenance of the area will reduce the risk of fire ignition and increase the defensibility of the structure. To assist homeowners, FireSmart Canada's Structure and Site Assessment form is attached in **Appendix VII**.

4.1.2 Distribution

The council of Half Moon Bay 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 Half Moon Bay, 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 Half Moon Bay should consider becoming a part of the FireSmart Canada Community Recognition Program (FCCRP)⁷. This process has already started with the Wildfire Mitigation Strategy and Preparedness Guide documents. A member of council, employee or a community leader of Half Moon Bay would attend a Local FireSmart Representative workshop to learn how to acquire and maintain FCCRP for Half Moon Bay. Having a community

Recommendation 2

Summer Village identify a community leader to assist with FireSmart education

⁷ FireSmart Canada, *FireSmart Community Champion Workshops* – Accessed August 14, 2014

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

Half Moon Bay two means of access/egress into community. Although roads and ditches are in fair condition for two way traffic (**Figure 10**), the side roads are fairly narrow (**Figure 11**) and the loop turnarounds are not suitable for large fire apparatuses without back up maneuvers.

To mitigate against such issues it is recommended that Half Moon Bay meet with the local Fire Department to discuss possible limitations to safe access/egress.

Recommendation 3

Summer Village meet with local Fire Department to discuss issues and strategies



Figure 10. Typical road and ditches

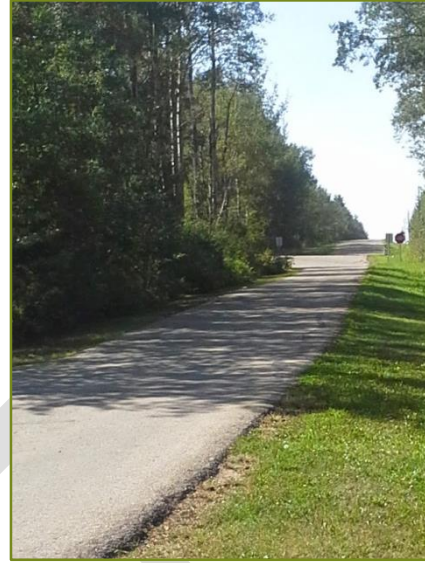


Figure 11. Narrow side roads

4.2.2 Water Availability

Sylvan Lake Fire Department, which is the primary responder in Half Moon Bay, primarily uses water tenders to supply firefighters with water (**Figure 12**). Water tenders are filled with the 400+ fire hydrants located in the Town of Sylvan Lake. Additional water could be drafted from the boat launch in Half Moon Bay if necessary (**Figure 13**).



Figure 12. Water Tender in Sylvan Lake



Figure 13. Boat Launch

4.2.3 Signage

Signage of individual lots within Half Moon Bay varies among properties. It is recommended that 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 14**). This will assist emergency responders in finding properties quickly.

Recommendation 4

Summer Village acquire standard signage for each lot.



Figure 14. Example of lot signage



Figure 15. Community signage.

4.2.4 Utilities

The powerlines in Half Moon Bay appeared in good standing, with no vegetation interference by non-insulated lines (**Figure 16**). The maintenance program by the electrical provider appears to be sufficient to prevent unnecessary ignition potentials. Natural gas residential distribution lines (**Figure 17**) 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 16. Powerlines.



Figure 17. Gas line signage

4.2.5 Staging Areas

The open field along Range Road 21 (**Figure 18**), just south of Half Moon Bay could be utilized as an operational staging area, by Fire Departments.



Figure 18. Potential staging area

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 Half Moon Bay was only based on what was visible from the road.

4.2.6.1 Roofing

Roofing in Half Moon Bay tends to be a mix of asphalt shingles, tin (**Figure 19**), ceramic or wooden shakes (**Figure 20**). 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)⁸. A few roofs within Half Moon Bay were seen to have debris buildup. Debris buildup decreases the fire resistance of asphalt shingles, tin, and treated wooden shakes. Roofing should be clear of debris to maximize fire resistance.

⁸ FireSmart Protecting Your Community From Wildfire — 2003



Figure 19. Tin roofing



Figure 20. Wooden shakes

4.2.6.2 Siding

Siding materials within Half Moon Bay are a mix of vinyl, stucco (**Figure 21**) and wood siding (**Figure 22**). 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 21. Stucco siding



Figure 22. Wood siding

4.2.6.3 Decks

Decks in Half Moon Bay, from what could be seen from the street were in good condition (**Figure 23**). Decks, if they are not sheathed, or if the deck is slotted can be a concern. If the structure is slotted, such as lattice litter can accumulate underneath the structure.



Figure 23. Good Deck

4.2.7 Storage of Flammable Materials

In the community of Half Moon Bay a few residents were noted to have combustible debris piles. Combustible debris piles (**Figure 24**), such as firewood or building materials, are hazards. Although no propane tanks were seen from what could be viewed from the road; residents should be encouraged to remove or relocate these materials no less than 10 meters from buildings, if some residents do have propane tanks. Propane tanks (**Figure 25**) 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 24. Combustible debris pile



Figure 25. Example of a 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.

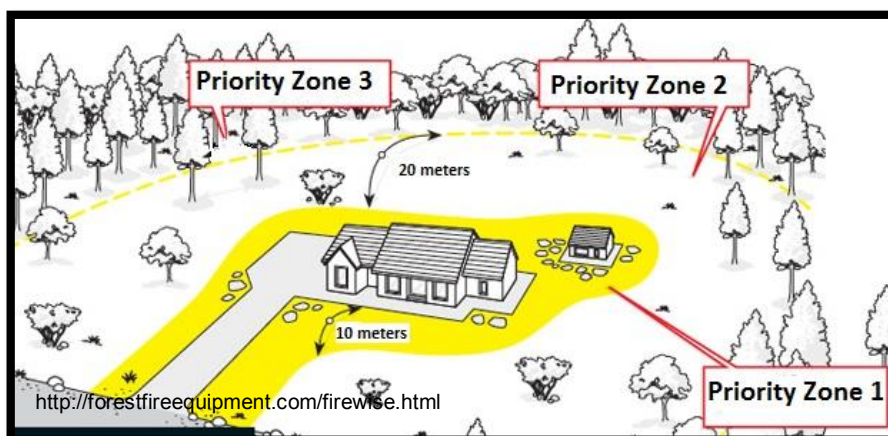


Figure 26. Priority zones around structures

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 removed⁹.

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 2¹⁰. This zone will typically apply to the community or county.

Table 7. 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	

⁹ 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.

¹⁰ FireSmart Protecting Your Community from Wildfire – 2003

Landowners tend to be concerned about pruning conifer trees. Not all spruce and pine trees need to be pruned. **Figure 27** 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 28**).



Figure 27. Example that does not require pruning



Figure 28. 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-Landscaping.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 Residential Vegetation Management

Properties within Half Moon Bay are well maintained. However, some lots have vegetation and/or debris buildup (**Figure 29**). It is recommended that all residents implement Zone 1 and Zone 2 FireSmart treatment areas on all private property within the summer village.

Recommendation 5

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.

To assist residents, it is recommended that Half Moon Bay 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 Half Moon Bay to achieve a FireSmart Community.

Recommendation 6

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



Figure 29. Lot requiring debris disposal.

4.4 Legislation

4.4.1 Fire Bylaw

The “Burning and Fire Pit Bylaw” (bylaw 122-12) has very descriptive sections on fire pits and cost recovery. The “Fire Pits” section describes the materials that fire pits can be constructed from as well as the responsibilities of persons in charge. It does not explain the dimensions of a fire pit (i.e. a maximum diameter). It is recommended that the bylaw be revised to include specific dimensions of fire pits. A fire hazards should be included in the existing bylaw. This section should include the community’s right to order removal, and if there is no compliance, remove fire hazards. This will ensure the Half Moon Bay’s ability to remove hazards that affect the entire community. While reviewing the Burning and Fire Pit bylaw, Half Moon Bay should review the Sylvan Lake Fire Protection Bylaw to ensure the two bylaws do not contradict one another.

Recommendation 7

Summer Village updates their Bylaw and reviews their Bylaw to ensure compatibility with Town of Sylvan Lake.

Town of Sylvan Lake Fire Protection Bylaw:

- <https://sylvanlake.civicweb.net/document/14799/1584%20-%20Fire%20Bylaw.pdf?handle=DAB241D42AAF4EE7B96F5A6CF6288FBC>

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

Sylvan Lake Fire Department provides primary emergency response services for Half Moon Bay. 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	Mutual Aid Agreement
Lacombe County	Yes
County of Stettler No. 6	Yes
Kneehill County	Yes
Mountain View County	Yes
Clearwater County	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

AESRD Rocky Mountain House Wildfire Management Area has stated that if local fire departments have an interest in joint exercises, they would welcome the opportunity. These exercises should emphasize mutual aid scenarios. Exercises could be coordinated with a hazard reduction. 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 Half Moon Bay is under the Lacombe Regional Emergency Plan. This plan is updated on an ongoing basis.

DRAFT

5.0 Summary of Recommendations

The risk assessment tool, included in **Appendix VIII**, shows that if the suggested recommendations are implemented the fire hazard rating score will drop from 171 to 144. 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
High	Low	3. Recommended Action: The Summer Village meets with the local fire station for an orientation day to discuss emergency response issues. 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	4.2.3

5.3 Vegetation Management Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
High	Low	5. 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	4.3.1
High	Moderate	6. 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	4.3.1

5.4 Legislation Recommendations

Urgency	Effort	Recommendation	Frequency	Reference Section
Moderate	Moderate	7. Recommendation Action: Half Moon Bay updates their Fire Bylaw and review Town of Sylvan Lake Fire Protection Bylaw for any discrepancies. Project Lead: Summer Village Council Benefits: Ensure that Half Moon Bay's Bylaw is inclusive and has no discrepancies with primary fire responders.	One Time	4.4.1

Appendices

Appendix I – Glossary

Appendix II – Wildfire Preparedness

Appendix III – Planning Area

Appendix IV – Fuels

Appendix V – Topography

Appendix VI – Prometheus Wildfire Model

Appendix VII – Structure and Site Assessment

Appendix VIII – Risk Assessment

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 °C or 100 and 200 °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.

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° to the wind.

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 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.

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 9**).

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.

WILDFIRE PREPAREDNESS GUIDE

May, 2015
CPP Environmental

Half Moon Bay & Norglenwold

Key Contacts

Town of Sylvan Lake	1-403-887-2141
Lacombe County	1-403-782-6601
Red Deer County	1-403-350-2150
SRD Rocky Mtn. House	1-403-845-8266
Utilities	
Diamond Valley Gas Co-op (Gas)- <u>Half Moon Bay</u>	1-403-746-3223
Direct Energy (Gas) - <u>Norglenwold</u>	1-866-420-3174
Fortis (power)	310-4300
RCMP	
Emergency/Search and Rescue	911
Alberta Emergency Management Agency (AEMA)	1-866-618-2362
Village Administration Office	
<u>Half Moon Bay</u>	1-403-782-6601
<u>Norglenwold</u>	1-403-887-2822

Fire Behaviour Factors

Forest Fuel	Grass (O1), Deciduous (D1)
Topography	Fairly flat

Values at Risk

Critical	N/A
Dangerous Goods	Oil & Gas Lease
Special	N/A

Staging Areas

<u>Half Moon Bay</u>	Field along RR21
<u>Norglenwold</u>	gated field located across from the corner of Grand Ave View Ave

Roads & Turnarounds

Signage	No standard lot signage present in either community.
Access	<u>Half Moon Bay</u> -has 2 means of access/egress. <u>Norglenwold</u> - Western section has 1 means of access/egress (RR20). Eastern section has 2 means of access/egress (RR15 & Rustic Rd).
Roads	Roads are 6.5 - 7 meters in width
Loop Turnarounds	<u>Half Moon Bay</u> -Requires backup maneuvers for large apparatuses.
	<u>Norglenwold</u> -Does not require backup maneuvers for large apparatuses.
Ditches	<u>Half Moon Bay</u> -Not suitable for two-way travel. (Steep in places). <u>Norglenwold</u> -Suitable for two-way travel. (Steep in places)
Private Driveways	Width is ~4meters; length ~10-15meters

Water Supply

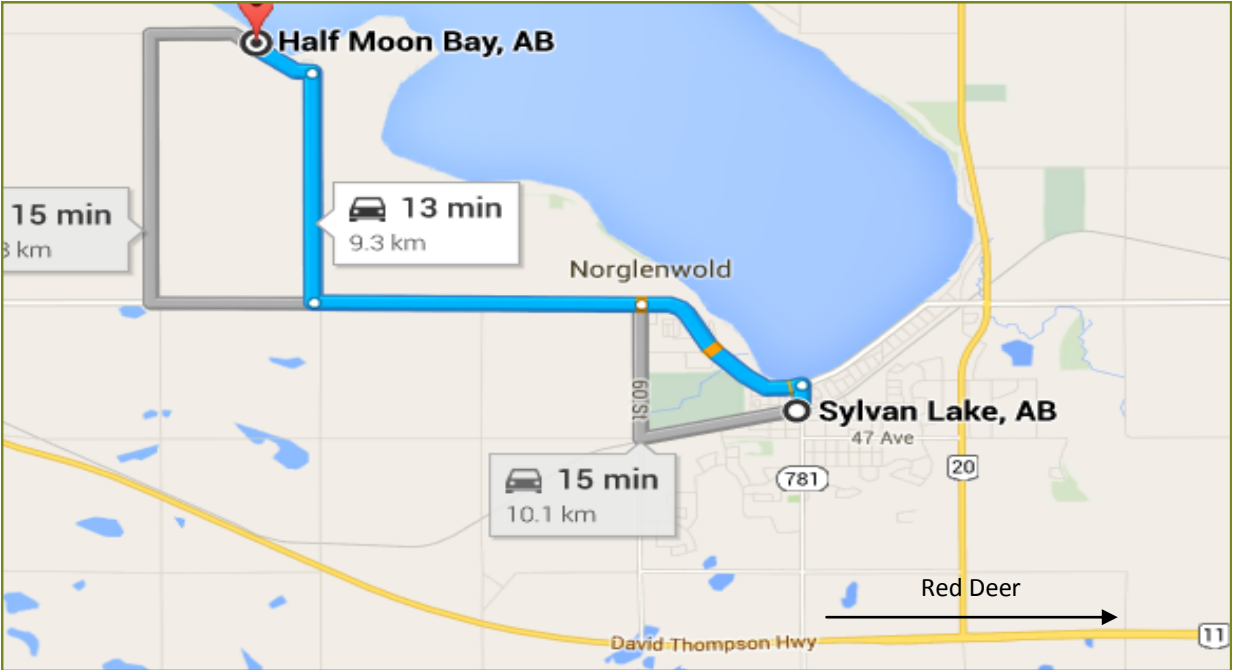
Sylvan Lake Fire Hydrants (400+ in town)
<u>Half Moon Bay</u> – Boat launch—north end of RR 21
<u>Norglenwold</u> -Boat Launch– north end of RR. 20

Communications

Radio & phone

Area Description

Number of residences: Half Moon Bay (62) & Norglenwold (193).
Half Moon Bay– Has 2 means of access, but no standard lot signage.
Norglenwold– West has 2 means of access, east has one means of access. No standard lot signage.



Half Moon Bay is approx. 10 km northwest of Sylvan Lake. Head west on Lakeshore Dr, continue on to Twp Rd. 390, north on RR. 21 and west on Half Moon Bay Dr.
Norglenwold is approx. 3 km northwest of Sylvan Lake. Head west on Lakeshore Drive, then north on RR. 15.



Fire Department Resources

Sylvan Lake Fire Department—Southeast
35-Personnel
3-Engines
1-Water Tender
1-Rescue Unit
1-Utility Vehicle
1-Bush Truck
1-Squad Truck








Evacuation Protocol

<u>Half Moon Bay</u>
Evacuation Routes-
1. East on Half Moon Bay Dr, south on RR 21.
2. Northwest on Half Moon Bay Dr to Aspen Pl, west on Twn Rd 392.
<u>Norglenwold</u>
Evacuation Routes-
Western Portion–
1. West on Honey Moon Dr, south on RR 20.
Eastern Portion–
1. South on Grand Ave, south on RR 15, west on Twp Rd 390.
2. Southeast on Lakeshore Dr to Sylvan Lake.

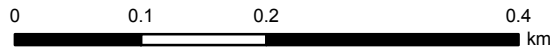


Operations

Half Moon Bay
Summer Villages
2015

-  Half Moon Bay
-  Evacuation Route
-  Water Source
-  Staging Areas
-  Pipeline
-  Road
-  Private

Source: ESRD, CPP Environmental



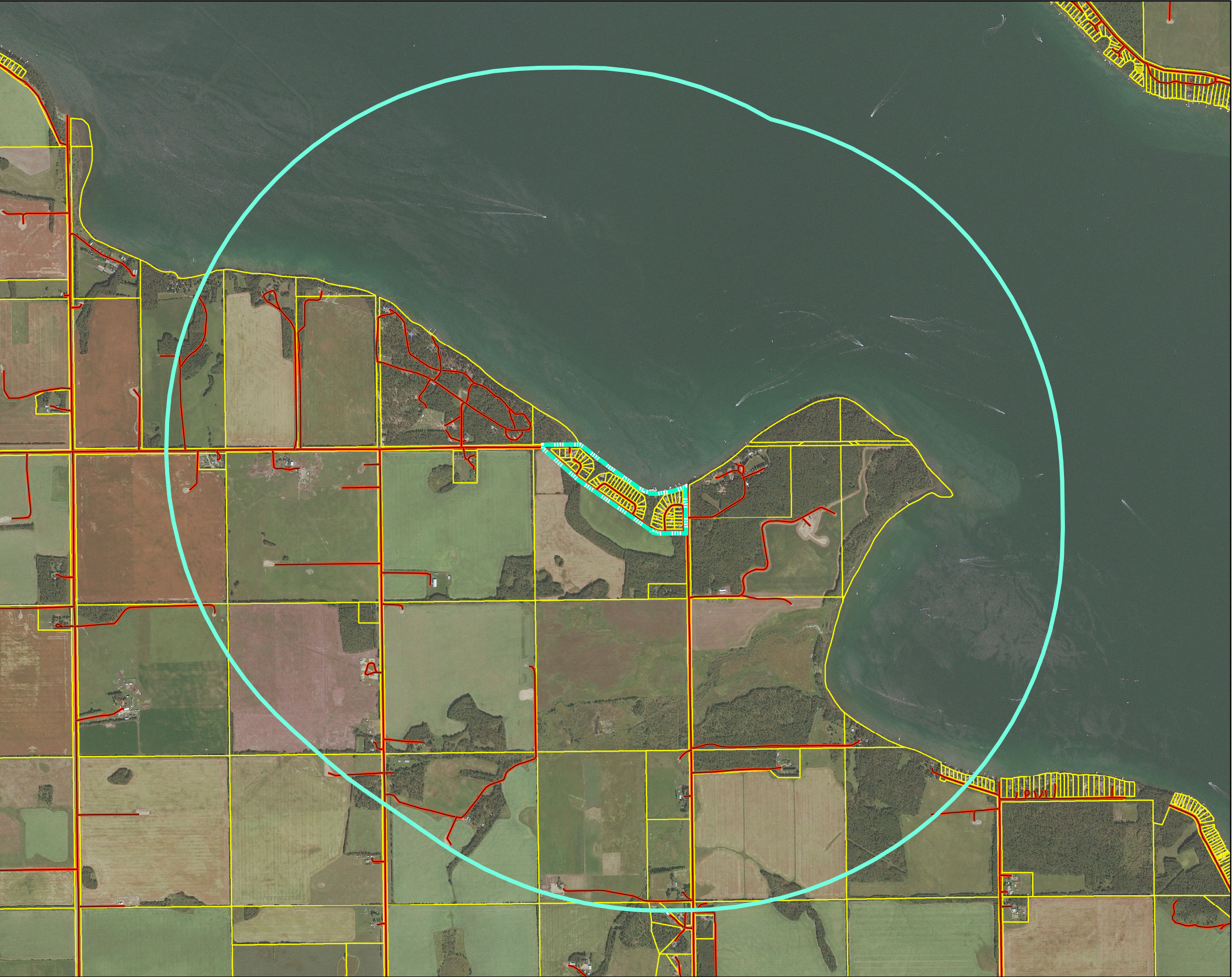
Coordinates system:
NAD 1983 10TM AEP Forest

Date:
May 26, 2015



Prepared by:

CPP
ENVIRONMENTAL



Planning Area

Half Moon Bay
Summer Villages
2015

-  Planning Area
-  Sylvan Lake Villages
-  Road
-  Private
-  First Nations Reserve

Source: ESRD, CPP Environmental




<p>Coordinates system: NAD 1983 10TM AEP Forest</p> 	<p>Prepared by:</p> 
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Fuels

Birchcliff / Half Moon Bay
Jarvis Bay / Norglenwold
Sunbreaker Cove
Summer Villages
2015

 Sylvan Lake Villages

 Road

Fuel Code

 Non Fuel

 Deciduous

 Grass

 Water

Source: Aitalis

0 0.75 1.5 3 km

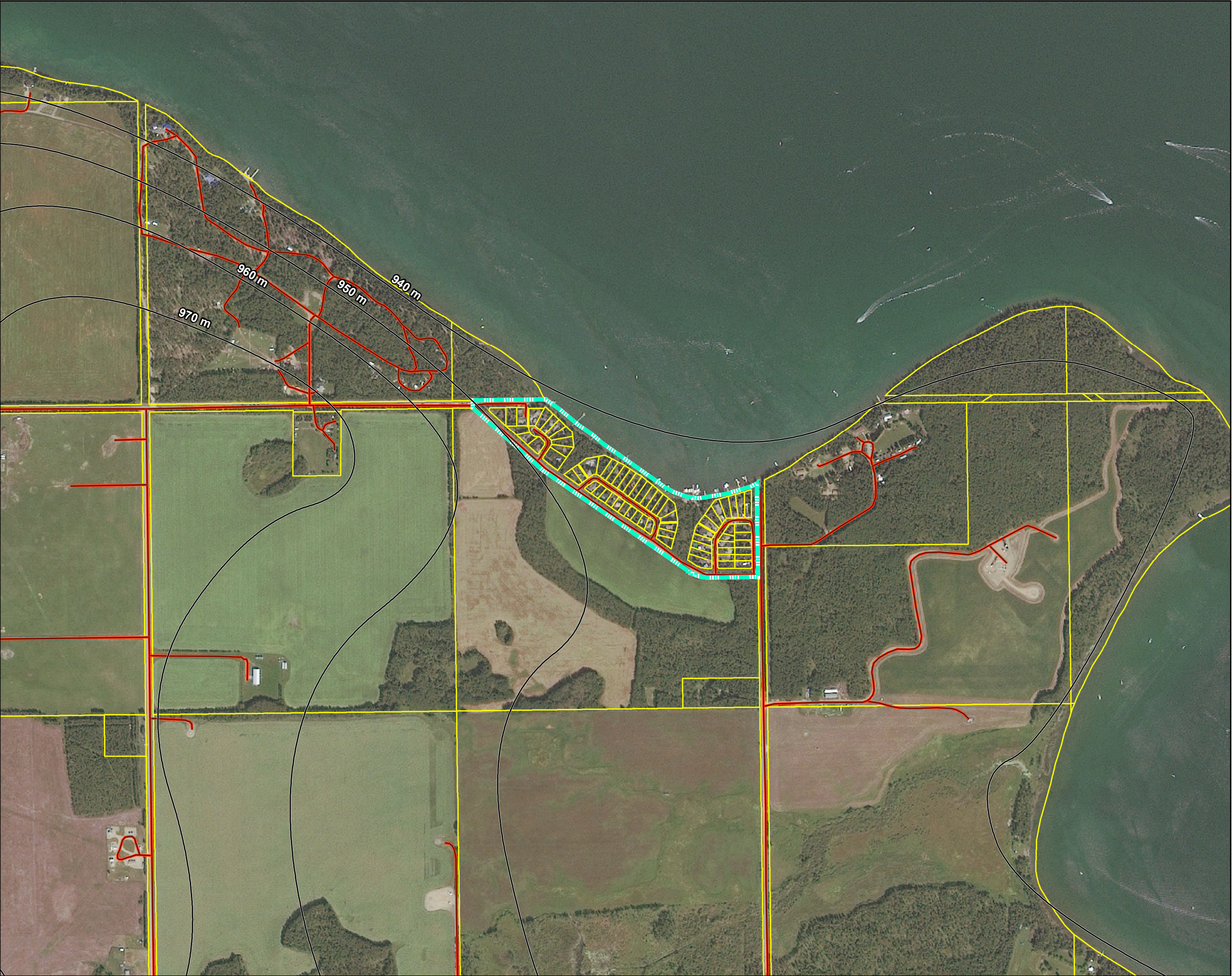
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NAD 1983 10TM AEP Forest



Date:
May 13, 2015





Prepared by:

CPP
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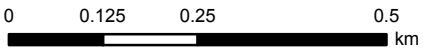


Topography

Half Moon Bay
Summer Villages
2015

- Contours
-  Sylvan Lake Villages
-  Road
-  Private
-  First Nations Reserve

Source: ESRD, CPP Environmental



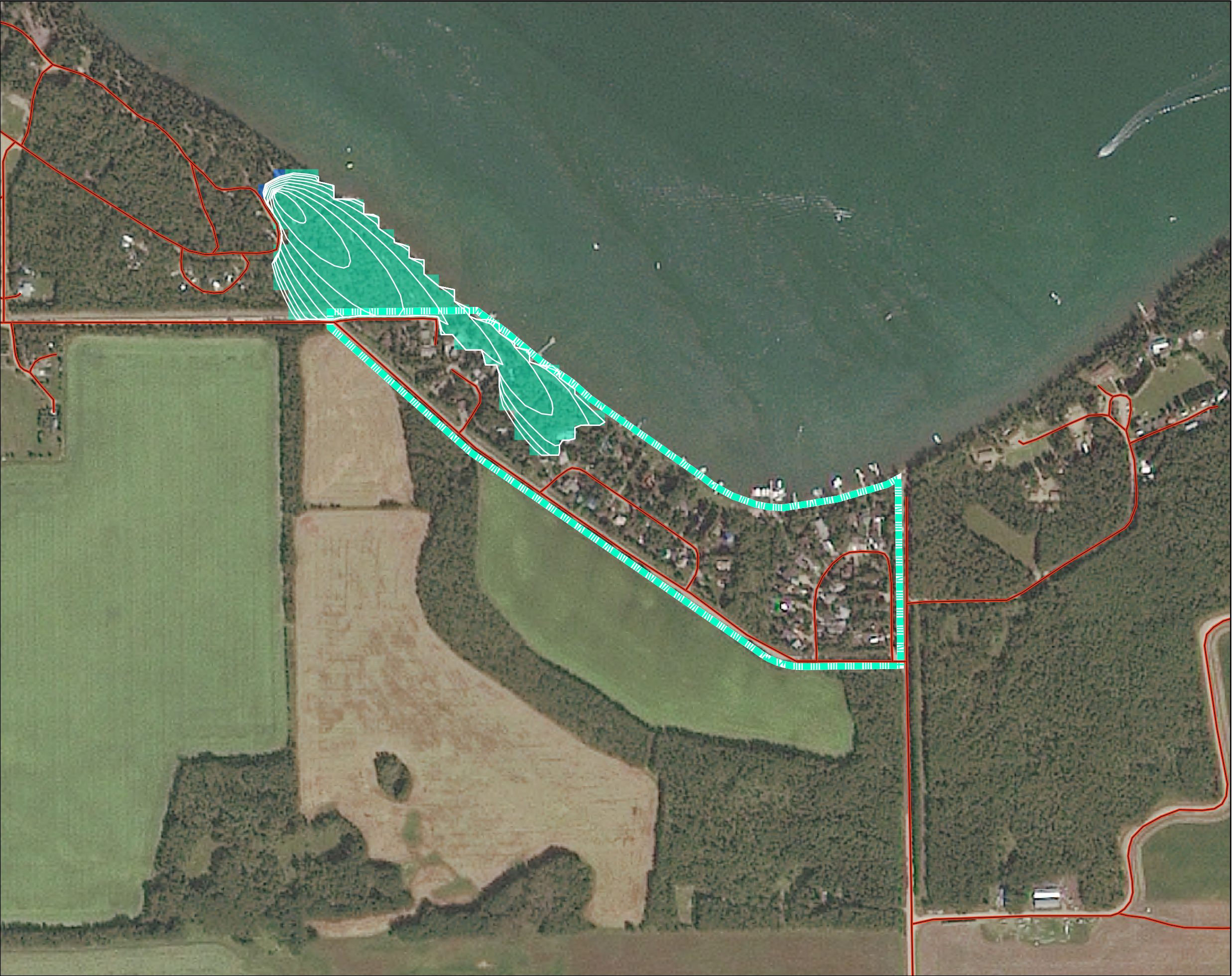
Coordinates system:
NAD 1983 10TM AEP Forest

Date:
May 26, 2015




Prepared by:

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Prometheus Scenario
Half Moon Bay
Summer Villages
2015

 Half Moon Bay

 Road

Fire Behavior

 Very Low

 Low

Source: Altalis

0 0.05 0.1 0.2
km

Coordinates system:
NAD 1983 10TM AEP Forest



Date:
May 27, 2015

Prepared by:

CPP
ENVIRONMENTAL

Prometheus Scenario																			
Date and Time	Fire Weather					Fire Indices						Area		Percent HFI					
	Temperature (deg C)	Relative Humidity (%)	Wind Direction (deg)	Wind Speed (km/h)	Precipitation (mm)	Houly FFMC	Hourly ISI	Hourly FWI	BUI	DMC	DC	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)
5/9/2007 10:00	13.9	74.8	315	21.8	0	74	2.2	4.9	29.8	18	217	0	0	0	0	0	0	0	0
5/9/2007 11:00	15.9	66.4	315	23.2	0	77.3	2.9	6.5	29.8	18	217	0	0	0	0	0	0	0	0
5/9/2007 12:00	17.5	60.1	315	24.5	0	81.2	4.4	9.5	29.8	18	217	0	0	0	0	0	0	0	0
5/9/2007 13:00	18.9	55.4	315	25.3	0	83.1	5.9	12	33.1	20.3	222.8	0	0	100	0	0	0	0	0
5/9/2007 14:00	19.9	52.1	315	25.9	0	84	6.7	13.4	33.1	20.3	222.8	0.08	0.08	6.25	93.75	0	0	0	0
5/9/2007 15:00	20.6	50	315	25.7	0	84.9	7.6	14.6	33.1	20.3	222.8	0.39	0.48	4.17	95.83	0	0	0	0
5/9/2007 16:00	21	49.1	315	24.7	0	85.6	7.9	15.2	33.1	20.3	222.8	0.88	1.35	3.45	96.55	0	0	0	0
5/9/2007 17:00	20.9	49.2	315	23.8	0	86.2	8.3	15.7	33.1	20.3	222.8	0.72	2.07	0	100	0	0	0	0
5/9/2007 18:00	20.5	50.4	315	22.9	0	85.7	7.4	14.4	33.1	20.3	222.8	0.77	2.84	2.38	97.62	0	0	0	0
5/9/2007 19:00	19.8	52.6	315	22	0	85.1	6.5	13	33.1	20.3	222.8	0.67	3.51	2.5	97.5	0	0	0	0
5/9/2007 20:00	18.7	56.2	315	21.1	0	83.9	5.3	11	33.1	20.3	222.8	0.63	4.14	5.71	94.29	0	0	0	0
5/9/2007 21:00	17.2	61.2	315	20.3	0	82.7	4.3	9.3	33.1	20.3	222.8	0.27	4.41	27.27	72.73	0	0	0	0
5/9/2007 22:00	14.1	73.8	315	19.5	0	81.1	3.4	7.6	33.1	20.3	222.8	0.12	4.52	36.36	63.64	0	0	0	0

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							
		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							
		High 30-35 points		Extreme >35 points		Area Hazard Level							
Remarks													

Wildfire Risk Assessment For Rural Communities

COMMUNITY:		Half Moon Bay	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	0		0 or 3	0
	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	0		/15	0
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	
	B	\$300 001 - \$500 000	2			2	
	C	\$500 001 - \$750 000	3	3		3	3
	D	> \$750 000	4			4	
	Avg Home Cost: \$ 640 551		/4	3		/4	3
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	0		0 or 3	0
			/9	3		/9	3
POLITICAL RISK	A	Local media involvement and no structural impact to Emergency Services or programs	1		Summer Villlage updates their fire Bylaw; develop an emergency plan and community works 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

DEFENSIBILITY OF COMMUNITY	DENSITY OF STRUCTURES	A	< 20 m between homes	3	2	No Change	3	2
		B	21 - 40 m between homes	2	2		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	0	No Change	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	0		0 or 4	0
		D	North w/ Barrier within 200m	0 or 2	0		0 or 2	0
				/12	0		/12	0
	FOREST FUEL PATCH SIZE	A	No forest patch present within community	0		No Change	0	
		B	Patch 0.1 - 0.9 ha within community boundary	1	1		1	1
		C	Patch 1 - 2.9 ha within community boundary	3			3	
		D	Patch > 3 ha within community boundary	5			5	
				/5	1		/5	1
	RESIDENTIAL FIRESMART	A	0-20 %	4		Zone 1 & 2 Vegetation Management.	4	
		B	21-40 %	3			3	
		C	41-60 %	2			2	
		D	61-80 %	1	1		1	
		E	81-100 %	0			0	0
				/4	1		/4	0
	FUEL MAINTENANCE REQUIRED	A	Utility ROW maintenance	0 or 1	0	No Change	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	0		0 or 1	0
				/3	0		/3	0
	ACCESS	A	Loop turnarounds/ cul-de-sacs are suitable for large fire apparatus without back-up maneuvers	0 or 1	1	The Summer Village invites the local fire department out to the village. They acquire standard lot signage.	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	No Change	0 or 1	0
		B	Fire fighters have basic wildfire fighting training	0 or 1	0		0 or 1	0
		C	Mutual Aid Agreements are present	0 or 1	0		0 or 1	0
				/3	0		/3	0
				TOTAL:	19		TOTAL:	16

Wildfire Risk Assessment For Rural Communities

COMMUNITY:			Half Moon Bay		INHERENT		STRATEGIES TO 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	0		0 or 3	0			
		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	3		/10	3			
	SLOPE & FUEL TYPE	VAR on or within 100 m of the top crest of a sustained slope					No Change				
		Fuel Type: N/A		Slope % : N/A	0 to 6	0		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		1	1
			C Abundant-Continuous logs, branches & twigs		3			3		3	3
					/3	1		/3	1		
		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		3	3		
			C Abundant- > 75% of trees have ladder fuels		5	5		5	5		
				/5	0	/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	0		0 or 1	0			
		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		1	/4	1		
	RESIDENTIAL BURNING TYPES ALLOWED	A Incinerator Fires		0 or 1	1	No Change	0 or 1	1			
		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		2	/3	2		
	PROBABILITY OF EXTREME FIRE BEHAVIOR	A 90 th Percentile of FWI > 30		4	2	No Change	4	2			
		B 90 th Percentile of FWI > 17		3			3				
C 90 th Percentile of FWI > 9		2	2	2			2				
D 90 th Percentile of FWI < 9		1	1	1			1				
			/4	2	/4		2				
	Consequence x Likelihood = INHERENT RISK			171	TOTAL:	9		TOTAL:	9		
	Consequence x Likelihood = RESIDUAL RISK			144							

		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	