

Community Wildland Interface Fire Protection Plan for the Improvement District of Saltspring Island

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Executive Summary:

Saltspring Island, British Columbia's largest Gulf Island, lies in the rainshadow of Vancouver Island and the US Olympic Mountains. The Island attracts visitors and prospective residents because of its mild climate and abundant annual sunshine. The Island is comprised of several distinctive neighbourhoods with a growing population. In keeping with the agricultural environment of Saltspring, residents wish to maintain the natural forested ecosystem types found on the Island and, as a result, there is considerable wildland interface. Wide-spread fires have not occurred on the Island for some time and many wildland regions are showing evidence of high or extreme fire hazard.

BC provincial regional districts, municipalities, and fire departments are currently creating wildland interface fire management plans because weather patterns and flammable vegetation have created a high-risk for interface fires. Planning, fire hazard assessment mapping and interface hazard mitigation through fuel reduction have been the focus of the protection plans.

The overall objectives of BC wildland interface fire protection plans are to:

- Empower communities to organize, plan, and take action on issues impacting community safety,
- Enhance levels of fire resistance and protection to the community,
- Identify the risks of wildland/urban fires in the area, and
- Identify strategies to reduce the risks to homes and businesses in the community during a wildfire.

To address wildland interface hazard mitigation for Saltspring, the Saltspring Fire and Rescue Department forwarded an application for a grant from UBCM to create a protection plan. This protection plan offers:

- Hazard assessment with Ministry of Forests standard criteria,
- GIS hazard map production, and
- Generation of wildland interface hazard mitigation recommendations.

Based upon the assessment ratings established for Saltspring neighbourhoods, we interacted with Saltspring Island's Fire Chief, Dave Enfield, members of Islands Trust, and several environmental organizations in arriving at recommendations for the Fire Protection Plan. Robin Clark, assisted by Kelly Busch, completed field hazard assessments; Sharon Hope collaborated in mapping as well as contacted stakeholders about public education and policy strategies. She sought information from local Regional representatives for mapping and compiled specific information within the report concerning the hazard assessments, the policy review and educational strategies. Neale Quan produced the GIS files and map of the hazard zones.

The wildland interface hazard mitigation recommendations for Saltspring Island are:

- 1) Formation of a Wildland Interface Fire Committee for the Island including provincial government, Islands Trust, Regional District, First Nations, and non-government organizations that will address wildland interface concerns.
- 2) Through the Wildland Interface Fire Committee, to consider incorporating wildland interface fire mitigation into the Islands Trust Official Community Plan (OCP), as well as to consider introducing restrictive bylaws or ordinances for development and building materials.
- 3) Through the Committee, to explore modification to the current covenants for watershed protection to allow for fire access and hazard mitigation.
- 4) To explore the possibility of a planned network of greenspace/firebreaks for the Island.
- 5) To review water supply sources for the Island's wildland interface-this recommendation builds on a recommendation found in the Fire Underwriters Survey delivered to the Fire Chief and some actions may have been undertaken.
- 6) To explore through the Committee, how slash and debris from hazard mitigation can be disposed of via composting or chipping on the Island.
- 7) Through the Committee, to arrive at an acceptable plan for mechanical or manual thinning treatment in extreme and high interface fire hazard areas. To work with BC Hydro on hazard mitigation on transmission lines, as well as to collaborate with Ministry of Forests, BC Parks, Ministry of Highways and other large tract landholders in the development of perimeter buffers that are compatible with interface fire hazard reduction.
- 8) To devise a long term public education strategy for the Island in terms of wildland interface fire hazard mitigation.
- 9) To designate a representative to address the public education issues described within the plan. This individual would work with residence associations, environmental groups, agencies, corporations and government.
- 10) To engage in media coverage and enhanced website postings for wildland interface hazard mitigation.
- 11) To consider demonstration areas as part of an overall educational strategy.

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1. Introduction

Saltspring Island, with an area of 182 km², supports farming, the arts and tourism. The local economy is service-oriented and located primarily in Ganges. The Island is geographically configured to form several distinctive communities situated both to the north and south of Ganges. Ownership is mixed consisting of Land Conservancy and Saltspring Island Conservancy lands, Watershed Protection Society lands, Islands Trust Fund lands, Provincial Parks, Capital Regional District holdings, Crown lands, BC Hydro holdings, BC Ferry Corporation holdings, developments and private residences.

Wildland interface fires on Saltspring are problematic because:

- They often are more difficult to control and they can behave differently than structural fires,
- They can be increasingly flammable because of long-term fire suppression policies that culminate in a build-up of fuels, and
- The inhabitants of interface areas often have come directly from urban settings and may not be aware of the fire hazards associated with their community.

In 1994, the Garnet fire near Penticton destroyed 18 homes and many other structures and caused the evacuation of more than 3,500 people. It damaged more than 5,500 hectares and cost the provincial government more than \$5 million to engage. In 1998, The Silver Creek fire near Salmon Arm destroyed 40 buildings and caused the evacuation of about 7,000 people. It damaged over 6,000 hectares and cost the provincial government more than \$15 million dollars. The FireStorm of 2003 in the Central Interior caused the destruction of over 300 homes.

These phenomena may be repeated in future within other BC jurisdictions such as Saltspring Island because of the terrain, growing resident and visitor density and recent fire weather patterns. Since Saltspring is in a rainshadow, it has numerous days with extreme fire weather (Pat Hayse MOF Protection Branch personal communication 2005).

Weather is a dominant factor in wildland fire. The last ten years' average fire weather shows an index with an equivalent fire hazard less than Rank 4. The 2003 fire weather patterns are above the ten-year average reaching Rank 5 for extended periods; patterns for 2004 and 2005 are, so far, quite similar to 2003. **The next few years are predicted to be drier than the ten-year average and, as a result, BC municipalities and improvement districts are concerned about the impact of wildland fire on their respective communities.**



Figure 1: Fire Weather Index: Ten -Year Average and 2003.

Source: BC Forest Service Protection Branch.

The Protection Plan addresses several avenues for wildland interface fire hazard mitigation on the Island:

- Community Hazard Risk Assessments,
- Hazard Mapping and,
- Technical, Policy, and Educational Strategies.

Procedurally, the Saltspring Island Fire Department liaises or requests the services of the Ministry of Forests Protection Officers from the Coastal Fire Centre for all wildland fires. However, if the Ministry manpower and equipment has already been allocated to a fire with a greater imminent danger to a population and consequently a higher priority, the agency may limit a call for Saltspring. The Ministry of Forests Protection Branch will not fly at night to respond to a fire. In 1999, Saltspring firefighters were aided by seven fire staff from Cobble Hill to contain a blaze that moved into timber from several cabins that were alight. This is an example of only one of a series of wildland interface fires over the past 6 years.

Since wildland fires can travel rapidly, the Island must be able to respond quickly to potential fires, have in place ordinances that address wildland fire hazard mitigation and develop public relations programs that successfully engage the public in reducing hazards.

The purpose of the Saltspring Island Wildland Interface Fire Protection Plan is to consider alternatives and strategies that will generally follow or expand upon, BC Ministry of Forests FireSmart recommendations. These strategies involve silviculture, regulation and education. The recommendations for each of these categories have been tailored to the neighbourhood communities on Saltspring Island. The Protection Plan seeks to integrate wildland interface fire protection into existing plans in place for ecosystem conservation.

2. Description of Saltspring Island Wildland Interface

Much of Saltspring Island consists of rolling hills, steeper slopes, benches and rocky outcrops. The southern extremity of the Island contains some areas with continuous forest that are relatively inaccessible. Some locations on the Island, such as Cusheon Lake, have riparian areas that may require updated hazard assessments and/or special consideration. Saltspring Island has become a significant tourist and hiking destination. There are a number of preserved natural areas and parks on the Island; Baynes Peak, for example, is composed of a forest of mature grand fir and Garry oak. A provincial ecological reserve has been established here to protect the region and provide biologists an opportunity to study these ecosystems. Mt. Maxwell Park is adjacent to the ecological reserve and offers a number of hiking trails with beautiful views.

The primary coniferous vegetation on Saltspring is Douglas-fir with ingress of redcedar and western hemlock. These secondary species can act as ladder fuels because they retain lower branches. Understory vegetation is common. Garry Oak ecosystems also occur frequently on Saltspring. Since fire has been absent from the Island for many years, there has been a build-up of surface litter and in some cases loss of the park-like open canopy usually associated with Garry oak ecosystems. Broom is a significant invasive species on the Island. Because broom is a flammable vegetation type, its presence in open spaces is a concern.

Saltspring Island populations have grown considerably over the last thirty years but the setting is still basically rural. Currently, there are over ten thousand residents on the Island including a large number of people who have relocated there to retire. As a result, the mean resident age is somewhat older than the BC mean age. Property values on Saltspring vary, but single-family homes are typically valued from approximately \$127,000 - \$500,000. Farms and waterfront estates are potentially worth much more; these estates range from 1 - 1.5 million dollars. The highest sale price on Saltspring in 2004 was \$3,500,000 on Sunset Drive while the lowest price was \$45,000 for a unit in Brinkworthy.

The residents of Saltspring tend to be aware of water shortages. There are several "water systems" on Saltspring Island that use local lakes, but many people obtain their drinking water from private wells. Some wells are subject to a low flow in summer and as a result, available water for fire fighting is limited in some locations.

The Vesuvius and Fulford residential communities have wildland interfaces of concern. The Vesuvius neighbourhood is located about ten or fifteen minutes to the northwest of Ganges, BC. It is mostly residential, but there is a small grocery store, a restaurant and a pub all clustered close to the Ferry Terminal. The Fulford Harbour neighbourhood has developed on the southern end of the Island. It has small lots with narrow, winding and dead end roads close to the Ferry Terminal. Residences that are near Reginald Hill have continuous interface close by. The neighbourhood is about 20 minutes south of Ganges.

Four neighbourhoods can be found on Saltspring Island:

1) Saltspring North Including Channel Ridge

This neighbourhood consists of residential lots one hectare or greater, on west, north and east aspects. It has rolling and steeper topography with residences that have interface hazards. The Channel Ridge Properties, consisting of 400 new homes with the potential for more development, lies in this region on dry, west facing slopes. The access road to this new development has ladder fuels on the gentler lower slopes. A large farm at the western base of Channel Ridge acts as a natural firebreak and is a continuation of a series of farms and a golf course to the south. The eastern slope of Channel Ridge descends to St. Mary Lake and is owned by the Water Preservation Society. The Society has a covenant that prohibits any modification to the vegetation on this slope. Some logging has recently taken place on the northern extremities of Saltspring Island and there are questions of appropriate slash disposal.

2) Cusheon Lake, Beddis Point, Beaver Point Road and Stewart Road

In this neighbourhood, there are areas of mature forest on gentler slopes and scattered farms with open fields. There are rocky upper slopes with dry vegetation types and ladder fuels that constitute an extreme hazard compared to the lower slopes that are classified as high. Rockier slopes typically have Douglas fir, arbutus, ocean spray, Himalayan blackberry, an occasional oak, and broom. The moister, and/or gentler slopes are covered with Douglas fir, grand fir, big leaf maple and swordfern. Alder patches exist in recent cleared locations. Larger holdings tend to be hobby farms or fruit farms and there are tracts of undeveloped or forested land.

3) Mt. Maxwell and Mt Belcher

This is a large area with rocky slopes, broom, and ladder fuels that has low road density except in the location of subdivisions on the slopes of Mt. Belcher. Mt Maxwell Provincial Park occupies a major portion of this region. Residents on Mt. Belcher are concerned about fires in their neighbourhood. Fire response to the subdivisions is generally good because they are in close proximity to Ganges but the many rocky outcrops raise the hazard levels. At the same time, Mt. Belcher is a northeast exposure and therefore not as dry as other south or west exposures.

4) Mt. Tuam, Mt. Bruce and Isabella Point

The rugged and mountainous southern end of the island is dominated by Mount Tuam and Mount Bruce, separated from the equally mountainous mid-island region by the Fulford Valley, located between Fulford and Burgoyne Bay. There is considerable development toward Isabella Point—this is an area that Ministry of Forests designated as extreme in the last interface fire hazard rating. Here interface is scattered with some large farms closer to the Fulford Valley. The lower slopes are moisture receiving and have a high rather than extreme rating. The road to the top of Mt. Maxwell has alder and second growth Douglas fir—Mt. Maxwell Provincial Park is continuous forest with south and west exposures. Residences in this neighbourhood range from modest small bungalows to larger million dollar homes.

Firebreaks

There are many natural and man made firebreaks on Saltspring Island, including farmland and vegetation-free zones. About 225 farms that have open fields on lower slopes and valley bottoms may be considered firebreaks. This includes farms in the Fulford Valley. There is a major BC Hydro transmission line that crosses the Island north of Ganges that is also a potential firebreak. In addition, there are two golf courses, a series road networks and a number of lakes. One of the golf courses is located near Channel Ridge. Some of these firebreaks have been mapped and could be incorporated into a planned network. The map of the hazard zones can be consulted to view the currently recognized firebreaks.

To summarize, Saltspring Island's past high and extreme wildland interface fire hazard rating is related to several factors.

Saltspring:

- *Is treed with conifers and has steep terrain,*
- *Has had fire suppression in effect for many decades,*
- *Has only one or two main access roads in some Saltspring neighbourhoods with narrow dead end roads branching from the main roads,*
- *Has past community terrain hazard assessments with extreme ratings,*
- *Has poor or limited available water supply for engaging interface fires (few hydrants) in some cases,*
- *Has an average response time of 15 minutes for much but not all of the Island,*
- *Is a recreation destination but has limited access in some locations and,*
- *Has mutual aid agreements that involve water transport due to its location.*

As a result of these factors, specific strategies are necessary to respond to wildland interface fire hazards.



Figure 2: Saltspring Island Interface Fire, 1999. Source: <http://www.for.gov.bc.ca/ftp/!Project/WildfireNews/Mvc-029s.JPG>



Figure 3: An Example of Winding Dead End Roads on Salt Spring Island. Source: Dave Enfield, Fire Chief, Salt Spring Island Fire Department.



Figure 4: Residence with an Unenclosed Deck in a Salt Spring Island Wildland Interface. Source: Dave Enfield, Fire Chief, Salt Spring Island Fire Department.

3. Community Models for Fire Protection Plans

General Response to Wildland Interface Fire Hazards

Canadian responses to potential wildland interface fires usually involve four components of hazard reduction:

- hazard mapping,
- fuel management,
- adoption and enforcement of stricter building codes, and
- educating the public about what they can do to make their property safer.

The Langford Plan, for example, sets out a model process and a model development permit by-law that communities can follow. For the Langford municipality, implementation of the by-law has allowed the community to implement measures to reduce the risk of an interface fire while at the same time providing strong rationales for compact, higher density urban development as opposed to rural sprawl. Langford explored the use of development permits to control the construction of buildings and landscape treatments in high risk areas, as well as requiring restrictive covenants to manage how land is subdivided and built upon.

Each community is different. At one stakeholders meeting during the formulation of the Williams Lake Wildland Interface Protection Plan, the following actions were discussed: mapping, forestry harvesting and potential hazards associated with felling and access, fences and power lines, rights of way, signage, and liaison with First Nations. The final plan had 22 recommendations.

The Ministry of Forest's wildland interface fire mitigation manual, FireSmart, has been designed to give recommendations to developers, planners, private owners, local governments, the insurance industry, utility representatives and fire departments. It consists of a comprehensive overview of the issues, assessment, emergency procedures, wildland interface fire training, communications and public education, land use planning and models of success. It outlines fire behaviour as well as some case study interface fires; it describes fire hazard assessment priority zones and the modifications to residential structures that can be taken. The manual describes the terrain and vegetation factors that create potential hazard conditions as well as suppression factors such as access and water availability. It outlines in considerable detail the modifications that can be made to landscapes surrounding private residences in terms of fuel reductions and the types of plants for gardens that may lower fire potential. The manual suggests debris disposal alternatives including chipping, composting, burning on site and landfill disposal. Under planning, it covers design and layout, such as road ingress and egress, signage, water supply sources, and utility safety features. It features emergency preparedness protocols and firefighting training needs. Finally, it describes effective communication tools.

The Fire Underwriters Survey for the Saltspring Fire and Rescue forwarded to Saltspring Fire and Rescue Department does discuss the need for continuing to seek an appropriate water supply for new developments but does not specifically target interface water supplies. Although this document is not focused on wildland interface, it has some recommendations that could be expanded to include wildland interface considerations.

Specific Protection Plans

In some areas of the United States, counties are responsible for designing their wildland interface fire management plans. The Kootenai County Wildland Fire Protection Plan in Idaho is a typical example of a community plan. It has been paraphrased below.

Kootenai County Goals:

- 1) Use a proactive cooperative approach with incentive measures,
- 2) Develop a county-wide road and street system that provides efficient fire fighting,
- 3) Promote effective fuel treatment programs for homeowners and businesses, and
- 4) Advocate responsible practices for land development, recreational and commercial operations.

A summary of the Kootenai County mitigation strategies includes:

- Forming a Wildland Interface Fire Task force to insure that mitigation is implemented,
- Initiating neighbourhood level fire prevention plans,
- Enforcing access requirements of the fire code,
- Encouraging utility companies to reduce ignition fuels and windfalls in power line corridors,
- Encouraging building contractors to build a model residential development to demonstrate best practices,
- Contacting outside communities to determine what actions they are taking and which ones were successful,
- Encouraging all land development and ordinances and codes to include:
 - Requirements for adequate water supply,
 - Two means of egress and ingress,
 - Incentives for building with fire resistant material, and
 - Additional fire protection measures for large structures.
- Exploring the possibility of making debris fireplace fuel for low-income residents and seniors or using good wood for other charitable purposes,
- Purchasing and install wildland interface fire hazard appropriate signage,
- Supplying real estate professionals, insurance providers, and building contractors with information so that both buyers and sellers will be better informed, and
- Working with educators to provide a wildland interface fire hazard public school program.

4. Approach/Methods

The following steps were conducted to create a Wildland Interface Fire Protection Plan for Saltspring Island. As contractors we:

Step One	Met with Staff,
Step Two	Identified Lands of High Priority and Reviewed Relevant Documents,
Step Three	Established Plots and Completed Hazard Assessment,
Step Four	Collected Data and Produced the GIS Map,
Step Five	Provided Recommendations in a Action Plan, and
Step Six	Recommended Work for 2006.

Step 1:

Sharon Hope, Robin Clark, and Kelly Busch initially met with Fire Chief Dave Enfield and his staff to structure the project approach. We briefly toured the Saltspring Island interface.

Step 2:

Both Robin Clark and Sharon Hope established high priority lands working collaboratively with the Fire Chief and a member of his staff. Mr. Clark working with Kelly Busch and a member of the Fire Department, established 22, 40 m X 40 m plots representative of the wildland interface and delineated the boundaries of the hazard zones as a first approximation. The plot size was chosen to insure sufficient representative areas for the scale of 1: 30,000. Robin Clark and Sharon Hope rechecked the zone boundaries in the field subsequently. These boundaries can be further refined over time to include more detail.

Step 3:

Wildland interface hazard assessments were conducted using the form found in Appendix 1. For those questions that could not be answered in the field such as the Fire Weather Index over the fire season and fire history, MOF personnel, Fire Department staff and others were asked to supply the information. Silvicultural treatment recommendations were based on the hazard zones and discussions.

Step 4:

A number of GIS map layers were provided by the Capital Regional District, the Ministry of Forests and other organizations. These layers were combined with our field data to form the hazard map through the work of Neale Quan of ASIM Ltd. Ortho photos were used from the Capital Regional District to clarify boundaries.

Step 5:

Sharon Hope reviewed literature pertinent to Saltspring Island, fire protection plans for other localities, the FireSmart manual and other documents. She had discussions with MOF, conservation groups, Fire Chief Dave Enfield and then combined

this information with the experiences of other BC fire departments and municipalities. Sharon Hope also provided recommendations that were forestry, policy and education-oriented. All preliminary recommendations were reviewed with the Fire Chief.

Step 6:

Sharon Hope and Robin Clark provided 2006 wildland interface potential work goals.

Formation of Saltspring Island Hazard Zones

During hazard assessments that were conducted earlier by Ministry of Forests, most of the Island was assessed as high to extreme. The categories were based on factors within the wildland interface fire hazard assessment form. The factors listed on the form are:

- fire weather potential during the fire season,
- community density,
- duff and litter depth,
- fine and coarse woody debris,
- forest stand types,
- understory vegetation,
- terrain features such as slope and aspect,
- wildland values,
- recreational use, and
- fire potential on adjacent lands.

Each of the above categories has been assigned a point rating. The total points within each category form the basis for the hazard zone level. The ratings were classified in the following manner: 0-53 Low, 54-68 Moderate, 69-83 High, and 84+ Extreme.

The MOF wildland interface hazard assessment that was used in our 2005 assessment did not account for structure assessment owing to financial constraints. The question of structural hazards assessments (building materials assessments) in the extreme and high zones could be pursued in future years. For those who are not familiar with wildland interface or silvicultural terms, Appendix 2 provides definitions that may be helpful. General results from the plots can be found in Appendix 3; descriptions of the zones are given below.

Saltspring Island Extreme Hazard Zone Characteristics

In most cases, the Extreme Hazard Zone is rural with scattered interface but a portion of the zone is in continuous forest. The litter is often 5-13 cm deep; coarse woody debris consists of scattered branches with logs grouped or crossed. The forest is generally coniferous. The understory is brush in most cases. The highest ratings for the zone often have rolling and/or gullied topography and can have rocky outcrops. Lot sizes tend to be larger than 1 ha. There is fire potential throughout the zone. Whether in high or extreme hazard zones, there is often a lack of hydrants and a poor water supply for interfaces, although response time to a fire on the Island in general is good. One exception to the average of a 15-minute response time is the southern boundary of the

Saltspring Fire and Rescue's jurisdiction. Here response times can be up to 45 minutes. The fire history for Saltspring is one of frequent interface fires (6-15) over the last 5 years. Some of the highest ratings were located on steep, south or west facing slopes. In this zone, there is often some potential for additional fuel loading from logging. In Saltspring high hazard zones, redcedar and western hemlock appear in the understory; grasses grow on some sites. Salal is common on sites. Usually, oak is a minor component but it can be the major vegetation type in some locations.

Saltspring Island High Hazard Characteristics

The High Hazard Zone is usually rural with scattered interface and litter is more likely to be < 5 cm deep. The woody debris consists of scattered branches and logs in groups on some sites. The understory is brush; the topography tends to be gently sloping or flat. Again, the lot sizes tend to be larger than 1 ha and there is fire potential on most but not all adjacent lands. In this zone, there is usually a lack of available water but, like the extreme zone, response time to the fire is often below 15 minutes. There are some access problems but slopes tend to be under 25%. Aspects are usually not south or west, although fire history still ranges from 6-15 fires in a 5-year period. Neither large recreational or industrial projects are anticipated. Fuel loading from logging is not expected. Few utilities lie in the interface. Typical vegetation is Douglas fir, grand fir, redcedar, western hemlock, step moss, sword fern, snowberry, ocean spray, Oregon grape, and the occasional big leaf maple.



Figure 5: Classic Small Diameter Ladder Fuels on Saltspring Island. Source: Dave Enfield, Fire Chief Saltspring Island Fire Department.

GIS Methodology

Two derived digital datasets (firehaz and plots) were digitized from hard copy paper maps that were geo-referenced using road intersections. Robin Clark and Sharon Hope delineated the linework and plot locations using information from hard copy topographic maps and field ground truthing. Robin Clark and Neale Quan identified firebreaks. They were created via on-screen digitizing using digital black and white 2002 orthophotography.

The information gathered was digitized using ESRI ArcInfo Workstation 8.x software, with an RMS (Root Mean Square) error of 0.004 inches. The map was produced using AML (Arc Macro Language) to automate the map-making process. A map template was created using a page size of 35” by 52” in order to accommodate the requested 1:30,000 map scale of the entire Saltspring Island.

Table 1: Data Acquired and Displayed on the Hazard Zone Map (see Appendix 5 for the Hazard Zone Map).

FILE NAME	DESCRIPTION	FEATURE CLASS	SOURCE	FORMAT	DATE RECEIVED
fc1	Forest Cover	Polygon	Islands Trust	Shapefile	Sept. 7, 2005
salt_spring_zoning	Zoning Boundaries	Polygon	Islands Trust	Shapefile	Sept. 7, 2005
trust_cad_aug31	CAD	Polygon	Islands Trust	Shapefile	Sept. 7, 2005
trust_item	Item	Polygon	Islands Trust	Shapefile	Sept. 7, 2005
corrected_TRIM_water_features	Corrected TRIM Water Features	Line	CRD	Shapefile	Sept. 21, 2005
Contours	Contour Lines	Line	CRD	Shapefile	Sept. 21, 2005
Roads_full	Roads	Line	CRD	Shapefile	Sept. 21, 2005
qbec_bc	Ecosystems	Polygon	CRD	Shapefile	Sept. 21, 2005
SEVI_2004_CRD		Polygon	CRD	Shapefile	Sept. 21, 2005
trim_labels_crd	TRIM Annotations	Annotation	CRD	Shapefile	Sept. 21, 2005
SSI_Photo_BW_2002	Digital 2002 Black and White Orthos		CRD	TIFF	Sept. 21, 2005
CAPTIAL_REGIONAL_CABLE_WIRE	Cable Wires	Line	CRD	Shapefile	Sept. 22, 2005
CAPTIAL_REGIONAL_TELECOM_FACILITY	Telecom Facilities	Point	CRD	Shapefile	Sept. 22, 2005
CAPTIAL_REGIONAL_TELECOM_STRUCTURE	Telecom Structures	Point	CRD	Shapefile	Sept. 22, 2005
CRD_w_Municipal_Boundaries	Municipal Boundaries	Polygon	CRD	Shapefile	Sept. 22, 2005
structure_location		Point	CRD	Shapefile	Sept. 22, 2005
structure_text		Annotation	CRD	Shapefile	Sept. 22, 2005
Wires		Line	CRD	Shapefile	Sept. 22, 2005
Nonwildland	Non-Wildland Interface	Polygon	ASIM	Coverage	Oct. 13, 2005
Firebreaks	Natural Firebreaks	Polygon	ASIM	Coverage	Oct. 13, 2005
Parks_CRD_SSI_Clip	Provincial Parks	Polygon	CRD	Shapefile	Oct. 18, 2005

Recommendations

The action plan was created by reviewing FireSmart manual recommendations, engaging in discussions with individuals on Saltspring, drawing on ecological experience, and reviewing similar models and plans conducted in the United States and Canada.

5. Action Plan Strategies

The action plan is based on the results of interface fire hazard mapping and two other avenues: planning and public oriented strategies. Development and planning actions are quite similar across BC where the focus has been on modifying various Official Community Plans, bylaws and variances. The City of Kamloops' Official Community Plan, for example, recognizes the risk of building in wildland-urban interface areas of the community. This is accomplished through the steps that are taken to obtain a building permit for individual properties or through the specific criteria that must be met when applying to develop a subdivision. There is a requirement that a covenant go on an individual property to be developed in the interface identifying the use of specific roofing materials, spark arrestors and other fire-retardant features. The District of Salmon Arm has placed restrictive covenants, as a condition of subdivision approval, on properties that have been created by subdivision in the past five years. This process alerts purchasers that their property is in an area with high risk of interface fire and instructs them as to what they can do to be safer (e.g., clearing and keeping combustibles away from their homes).

The strategies for Saltspring Island are grouped into three classes:

- *Technical and Silvicultural Strategies*-This component consists of reviewing potential landscape modification that could be implemented in wildland interface continuous forest, scattered forest interface in rural locations and forest interface on the perimeters of suburban developments. This aspect is based primarily on the hazard zones and plots established in Saltspring Island's interface.
- *Planning or Policy Strategies*-These strategies involve reviewing, exploring and potentially modifying current governance policies and construction "best practices" to be compatible with interface hazard mitigation. This component examines potential modification to current by-laws, permit requirements and plans and,
- *Public Strategies* -This avenue consists of engaging residents, non government organizations, agencies, corporations and public works in mitigating structural and vegetation hazards on residential, commercial and public property.

Before work can be done in addressing wildland interface fire mitigation strategies for Saltspring Island, a means of conducting reviews and actions should be created.

There is a need for the formation of a Wildland Interface Fire Protection Committee or working group comprised of Islands Trust personnel, Conservancy

groups, Regional District personnel, Ministry of Highways, Ministry of Forests, BC Hydro, First Nations and Saltspring Island Fire Department personnel.

The list of stakeholders given above is not meant to be comprehensive and further discussion would be required to determine the composition of the committee. The formation of a committee would expedite collaborative long-term planning and should ease the difficulties of communication among stakeholders when addressing wildland interface fire mitigation. Subcommittees could be struck as required to address specific issues such as educational strategies.

General Strategies for Interface Fire Hazard Mitigation through Silvicultural Treatment

One goal of interface fire hazard reduction is to create defensible space using the natural landscape and vegetation. To realize this goal, actions on both public and private lands in other communities have focused on:

- Building and maintaining fireguards,
- Modifying green spaces,
- Clearing transmission lines, and
- Modifying vegetation adjacent to homes.

High wildland interface fire hazards often occur when there is a combination of terrain and vegetative characteristics such as:

- A continuous dense coniferous canopy with ladder fuels (the rationale being that continuous canopy is more flammable than deciduous tree cover and tends to retain branches low to the ground),
- An abundance of dry logs, branches and/or tall, dry grasses near homes and,
- Locations that are rocky, steep (more than 25%), or gullied slopes because fires usually burn more rapidly upslope and vegetation is often more slow growing leading to the creation of ladder fuels.

These canopy types and terrain characteristics largely determine the treatment designs mentioned in BC's FireSmart manual. The treatment options involve pruning the lower branches of conifers to 3 m and implementing several thinning intensities. The designs in FireSmart describe thinning to 40% of crown cover and having at least 6 m between crowns on gentle slopes. In areas with steeper slopes, the manual recommends 8 m between crowns.

The Saltspring Island treatments should be determined on a site-by-site basis and should incorporate coniferous thinning compatible with FireSmart recommendations. The potential for Garry oak ecosystem restoration should be considered within the general plan of fuel reduction. Modification in oak ecosystems should reduce broom dominance and promote the retention of herbaceous understories that could include rare plants. These ecosystems have been the source of attention by the Garry Oak Ecosystem Recovery Team and Parks Canada. On other Gulf Islands, Parks Canada has been

exploring experimental prescribed burning as one avenue to restore and maintain natural ecosystems.

Residences with treed acreages, ladder understories, tall grasses, and decayed surface fuels are most vulnerable to a wildland fire. Removal of subcanopy ladder fuels could return the forest to some semblance of natural fire regimes and restore wildlife habitat found in more open situations. For residences, cluster configurations that could be employed on slopes at distances greater than 10 m from residences are described in the FireSmart manual. Various districts and municipalities in BC have adopted chipping and debris removal programs to assist residents in modifying their acreages; there is a composting project on Saltspring that may be able to use natural debris from ladder fuel removal.

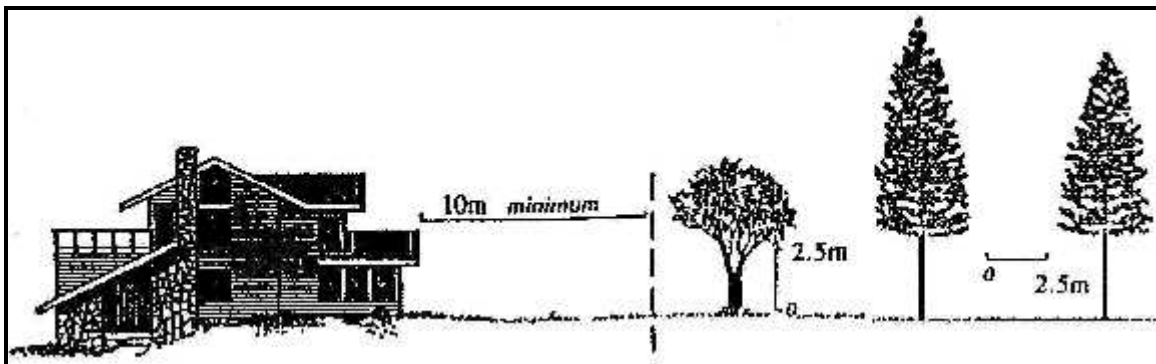


Figure 6: Landscape Design from MOF Protection Branch Fire Hazard Mitigation Website. Source: <http://www.for.gov.bc.ca/protect/safety/Landscape.htm>

I Silviculture-Oriented Strategies for Saltspring Island

Over time, hazard zones should be toured and monitored regularly for wildland interface concerns. It is anticipated that the public residing in wildland interfaces will be initially reluctant to remove substantial amounts of canopy but thinning to one tree canopy width on flat to gentle terrain, removal of ladder fuels (smaller saplings and lower branches), the creation of a 10 m defensible space about interface residences and disposal of slash and debris do appear to be reasonable initial goals given the public desire to retain a natural setting about their homes and communities. The fact that many residences are on steeper slopes creates some difficulties because the public often does not understand the need to thin to greater spacing on slopes; moreover, they feel this action creates more open space than they desire and the concept is often in conflict with their vision of canopied landscapes. There are also concerns about soil erosion that might occur if too much vegetation is removed.

Collaborative work is necessary on a site-by-site basis to tailor treatments to the landscape and to achieve owner satisfaction and FireSmart safety as well as to insure that treatments do not contribute to soil erosion. Collaboration with Ministry of Forests and

others will be necessary to formulate 5 and 10-year plans both for wildland nonresidential lands and residential neighbourhoods on the Island.

Silvicultural Strategies (assuming the initial formation of a Wildland Interface Fire Committee)

- 1) *The Committee should explore the creation of FireSmart buffers about perimeters of forested land similar to residence defensible spaces. The discussion could include the ordinances that would be appropriate and the establishment of recognized standards for operation. Wildland interfaces should be cleared of brush and ladder fuels within 10 m of residence fencing, buildings or property boundaries as appropriate (this applies particularly to residences near Channel Ridge, Isabella Point and the northern portions of the Island).*
- 2) *Public demonstration areas of appropriate design and spacing with permanent signage could be established, for example, in the Channel Ridge and Long Harbor vicinities. Locations where existing spacing has already occurred can act as interim examples.*
- 3) *The Committee could discuss with the province, conservation groups and developers, the use of thinning (this strategy should be compatible with wildland interface hazard mitigation and ladder fuel removal). The target would be younger stands reaching canopy closure and those with dense coniferous understories. The creation of recognized standards for operation is recommended. Soil erosion assessments should be included in those areas that have a potential erosion hazard.*
- 4) *The Committee should dialogue with Parks Canada (Rob Walker), Capital Regional District and the Garry Oak Ecosystem Recovery Team to assess the use of prescribed burning in maintaining and restoring both Douglas fir and Garry oak ecosystems types on the Island and should consult with experts on effective techniques for broom removal.*
- 5) *The Committee should determine if Public Works or an equivalent organization could assist in debris removal that could accumulate from FireSmart landscaping. Options for disposal and/or recycling could be explored and the most appropriate strategy should be made public. The potential for composting materials, referred to above, should be explored.*
- 6) *In collaboration with environmental and conservation groups (potentially by means of the Wildland Interface Fire Committee), private residents should be contacted directly to discuss alternatives for cost effective removal of ladder fuels and the creation of defensible spaces about residences. Public contact should be made as soon as possible in extreme zones.*

- 7) *Through the Committee, dialogue should take place with Ministry of Highways regarding future thinning and removing of ladder fuels on easements adjacent to existing roads in the high and extreme hazard zones and maintenance along major rights-of-way.*
- 8) *BC Hydro should be encouraged to review policies of brush removal including broom on transmission lines and the installation of FireSmart vegetation types.*



Figure 7: Broom, a Flammable Species is a Dominant Vegetation Type in Some Open Spaces. Source: Dave Enfield, Fire Chief Saltspring Island Fire Department.

- 9) *For private residences, the Committee could recommend a list of FireSmart native plants and provide the locations where these plants and shrubs might be available.*



Figure 8: Coarse Woody Debris and Broom at the Edge of a Wildland Interface. Source: Dave Enfield, Fire Chief Saltspring Fire Department.

II Planning-Oriented Strategies for Saltspring Island

The Islands Trust has produced an Official Community Plan (OCP). The plan encompasses preservation and conservation principles including planning for parks and natural areas. The plan does not contain any mention of wildland interface fire hazard potential or exploration of interface fire mitigation strategies.

Our recommendations under heading of planning encompass general planning and modifications to the OCP, as well as other types of development planning. The suggestions pertain to the introduction of wildland interface fire mitigation in planned and existing residential neighbourhoods as well as in new development and subdivisions, rural, greenway and environmentally sensitive areas.

- 10) A review should be undertaken to systematically map, define, assess and maintain the current firebreak network for the Island. This review could include detailed descriptions as well as planning for, and the addition of, other areas to the firebreak network. Certain firebreaks are present on the map we provided. The use of current ortho-photos may assist the process.*



Figure 9: A Fulford Valley Farm as a Representative Firebreak. Source: <http://www.gulfislandsguide.com/photos-saltspring/barn.html>

- 11) Environmentally sensitive areas should be examined on a site-by-site basis. Those areas that are riparian should be examined to see if the location has abundant dead woody debris or other signs of specific hazard. Since most riparian zones lie in moisture receiving situations rather than steep, dry south or west facing slopes, it is not anticipated that these areas will constitute high hazards. Removal of ladder fuels and woody debris should be conducted in a manner that does not cause negative impacts to streambank, fishery, soil and other natural resources.*
- 12) The Committee and Fire Department representatives should explore whether local parks and natural areas on the Island have appropriate access for fire protection and that frequently used locations for recreation such as trails, campsites, and playing fields have minimal ladder and ground fuels. Additional measures could be taken in very heavily used locations. For example, along*

frequented trails, signs denoting “Fire Hazard-Protect our Forest-No Smoking” could be installed.

13) Watershed planning should be reviewed for the potential for wildland fire hazard mitigation and for ground access in the event of a fire. Wildland interface fire hazard mapping could be conducted on these lands.

14) Power line and transmission line maintenance and interface hazard mitigation for other utilities such as propane tanks could be mentioned in Capital Region or Islands Trust planning. Mitigation has been mentioned earlier. The FireSmart manual can be consulted for guidance.

Future Development Plans:

According to the FireSmart manual, area structure plans contain information about land uses and density, access (rights of way) and public utilities. Standard by-laws and subdivision guidelines usually specify:

- Shape,
- Water supply and,
- Perimeter protection buffers.

Protection buffers have been mentioned. Some lands on the Island are currently without an adequate water supply within close proximity. This particularly applies to lands in the south portions of the Island.

15) It would be appropriate to review water availability in the rural portions and interface locations on the Island and if water availability is not sufficient for adequate fire protection, to take precautionary measures as deemed necessary. The Underwriter Survey has noted that some actions are underway.

Information required for development permits can be used to assess the wildfire risk. This information includes:

- Use of the lot or building,
- Placement of the building,
- Landscaping,
- Access and internal traffic circulation,
- Exterior building material and,
- Location of fire suppression infrastructure.

In terms of larger developments such as subdivisions, several factors are of concern in terms of interface fire:

- Topography,
- Parcel density,
- Layout (including driveway width and gradient) and,

- Infrastructure such as road access and internal traffic circulation.

16) In order to address the potential for wildland interface fire hazard mitigation, the planning aspects listed above could be reviewed.

Okanagan County in the United States provides a model for ordinances concerning driveway design and maintenance:

- (a) Newly constructed, extended or modified fire apparatus access roads shall be provided with approved turnarounds at intervals not to exceed one thousand (1,000) feet. Approved turnarounds may include cul-de-sacs or circles of at least ninety (90) feet in diameter, which may include the width of the roadway, intersecting fire apparatus access roads, or other arrangements which are approved by the fire marshal.
- (b) Private driveways in excess of one hundred fifty (150) feet in length shall be constructed and maintained in accordance with the following:
 - (i) A minimum width of at least twelve (12) feet of clear, unobstructed all weather driving surface;
 - (ii) An overhead clearance of at least thirteen (13) feet six (6) inches;
 - (iii) Extended to within fifty (50) feet of all buildings or structures that require building permits where fire department access is not otherwise required.
- (c) Private driveways in excess of three hundred (300) feet in length shall be provided with an approved turnaround at the terminus and at intervals five hundred (500) feet or less, such that no portion of the road or driveway is in excess of three hundred (300) feet from an approved turnaround or turnout.

17) We suggest that a review could take place through the Wildland Interface Fire Committee to insure standard two-way access routes, appropriate fire road access on properties, adequate road and driveway widths for fire trucks, posting of dead ends, and provision of turnarounds on dead ends for the lands and subdivisions of Saltspring Island.

Subdivision authorities can require information that is related to wildland interface fire mitigation:

- Use of lots,
- Slope,
- Location of buildings,
- The specific location of water sources for fire suppression purposes for the subdivision and,
- Access and internal traffic circulation information insures safe evacuation and access of fire fighting equipment.

According to the FireSmart manual, high-density wildland development can generate a more extreme hazard condition depending on how susceptible the building materials are to ignition. At least 15-20 m is necessary between buildings. Buildings on

slopes should be spaced further apart because fires tend to spread more rapidly upslope. Subdivision staging can be conducted in a way to keep fire hazards to a minimum.

18) A review could be undertaken to determine if subdivision by laws are sufficient to mitigate wildland interface fire hazards with respect to the above factors. There are areas of high hazard where more restrictive use of building materials might be an option.

Residence Building Materials and Wildland Interface Fire Mitigation Planning

The FireSmart Manual, considers 11 residence, 5 terrain factors and some ignition factors. The following is a short summary of the FireSmart list:

Residence Factors:

- Factors 1-3: Roofing material with the lowest hazard rating is noncombustible tile, asphalt or metal; shakes are not recommended because firebrands may ignite the roof. Roofs should be clean and gutters should contain no debris; siding like stucco or metal provide a better defense; log, shake or vinyl siding provides poor radiation or direct flame resistance.
- Factors 4-6: Eaves should be enclosed, vents screened, and balconies or decks should be composed of noncombustible material; the underside of decks or balconies should be sheathed in.



Figure 10: A Wildland Interface Residence. Source: Dave Enfield Fire Chief, Saltspring Island Fire Department.

- Factors 7-9: Combustible fuels such as chopped wood, lumber or logs should be at least 10 m from the home. Houses should be set back 10m from the crest of a slope or follow all FireSmart building recommendations. In terms of landscaping, deciduous tree canopies are recommended within 10-30 m of the house because they are less likely to sustain a crown fire.

- Factors 10-11: Lawns and noncombustible surface materials are recommended within 10 m of a home. Tall dry grass, branches, logs and twigs on the ground are a hazard. The presence of ladder fuels (trees or shrubs that can carry a flame into the tree canopy) is hazardous.

Local Terrain Factors:

- Factor 1: The overstory vegetation: Deciduous canopy is more desirable than coniferous canopy (the latter is more flammable and tends to retain branches low to the ground).
- Factor 2: Surface fuels: An abundance of dry logs, branches and tall, dry grasses near homes is hazardous.
- Factor 3: Fuel assessment: Dense conifer cover with branches close to the ground is a greater hazard than scattered park-like landscaping with the lower branches of trees removed.
- Factor 4: Terrain type: Steep (more than 25%) or gullied slopes constitute a greater risk because fires usually burn more rapidly upslope.
- Factor 5: Position on slope: Homes on upper slopes are at greater risk.

Fire Ignition – south aspects, areas with high human activity, unscreened chimneys (no spark arrestors), chimneys with over hanging branches, inadequate burning barrels, propane tanks near vegetation, and vegetation near powerlines may contribute to fire ignition.

19) Wildland Interface Fire Committee representatives should insure that real estate agents, insurance agents and building contractors on the Island are conversant with FireSmart recommendations. Copies of FireSmart Residence manuals could be provided to individuals in these and similar occupations.

20) The Wildland Interface Fire Committee could explore whether it would be possible for residents to receive insurance reductions if they are using FireSmart building materials and landscaping their homes to conform with FireSmart recommendations.

To summarize, it is recommended that permits, by-laws and variances be reviewed to determine if developers and residents should be required to use FireSmart building materials and to implement FireSmart landscape design recommendations with respect to wildland interface fire hazard.

III Public-Oriented and Education Strategies for Saltspring Island

At lower fire intensities, the following factors determine a structure's prospects for survival:

- The amount of cleared space around the structure,
- The structure's construction,
- Access to the site and,
- Whether anyone takes defensive action.

This section addresses several alternatives for engaging the public in wildland interface hazard mitigation. In discussions Sharon Hope has had with Fire Chiefs throughout the province of BC, very few of them reported successful public meetings. Public meetings may be poorly attended for a number of reasons: the homeowners may believe that wildland fire is not an issue for their community, that their houses and properties are safe from fire or they may not have the money or ability to modify their houses or landscapes. In the day-to-day lives of most homeowners who are in the workforce, or in active retirement, attending a public meeting about the chance of wildland interface fires takes a low priority.

The public may respond to more positively to activities considered to be fun or educational or ones that provide incentives.

21) A sub committee within the Wildland Interface Fire Committee could be struck to address public education aspects. Members of emergency preparedness, conservation groups, fire department personnel, public education and parks and recreation personnel could be invited.

22) Given the fact that public education is a major component of wildland interface fire mitigation, an over all strategy should be developed for the Island.

23) Since there will be a number of educational projects linked to wildland interface fire hazard reduction and formulation of an overall strategy, the Island should explore appointing a public liaison officer to undertake these activities and to form relationships with stakeholders in Saltspring neighbourhoods.

24) The potential for establishing a demonstration area has been mentioned under another section. Because of the size of the Island, more than one location would be desirable. The locations can become part of community education, school trips and youth excursions. Local service or environmental groups could become involved in creating the scenarios. Self-instructing signs can be mounted.

25) In the extreme and high hazard zones, a door-to-door approach to hazard mitigation is recommended beginning with the extreme hazard zone.

26) *With respect to the establishment of residence models of hazard mitigation, it may be possible to find individuals who will volunteer their homes for FireSmart modification. This opportunity should be embraced. FireSmart signage could be given to those who do conform to FireSmart recommendations.*

27) *In terms of reaching the public, local radio talk shows offer an opportunity to communicate. Community newsletters, and other local service group letters are additional avenues to present FireSmart recommendations to local residents. Market days offer an opportunity for posters and additional contact with both permanent and seasonal residents.*

28) *The Island and The Fire Department websites could be expanded to include what the public could do in terms of wildland interface fire hazard mitigation and the Fire Department website could ask for public support to form neighbourhood FireSmart committees. Photos of the interface hazards could appear on the website. A private resident has begun a website of this type. The designated public liaison individual could be responsible for developing these aspects on official websites.*

29) *Local service and environmental groups are quite often looking for community level projects. Having neighbours that can be seen actively modifying their properties is a powerful incentive for others to become involved. A series of local groups including the residents associations could be asked for their help in implementing the Protection Plan. Those groups willing to assist in the assessment of individual homes for the public would be ideal.*

Some factors that local neighbourhood leaders could explain to the public are provision of:

- Sprinkler systems for roofs,
- Landscape sprinkler systems,
- Foam converters or adaptors for garden hoses,
- Fire gels (these have a longer effect than foams but can be difficult to clean off),
- Long garden hoses,
- Shovels and grubbers and,
- Barrels of water in locations where water for fighting fires is limited.

Residents living in isolated areas with wells should consider having an additional electric generator. Residents should insure that their driveway is sufficiently wide for a fire truck to enter and that it has sufficient space at the end for a truck to turn. Some locations on the Island have long narrow driveways. Steep treed driveways may mean that a truck must back in or may not be able to navigate the driveway at all. Residents should be reminded that keeping their driveways accessible is important. This aspect has been addressed earlier under planning.

30) A recent review of school programs on the Internet has shown that Ontario, Alberta and the US have developed elementary and middle school curricula that involve some of the FireSmart principles. By contacting local school principals, science teachers and education departments, the potential use of the demonstration area and awareness of the FireSmart principles could be enhanced.

31) As the Kootenai County plan suggests, special help could be offered to seniors and those on low income through volunteers from service groups-firewood could be provided for those who wish it.

32) Ministry of Forest personnel could be asked to demonstrate appropriate thinning techniques to local government employees, conservation and environmental groups, private developers and landscapers.

33) Some communities have the Residents FireSmart Manual in real estate offices so that agents can distribute them

34) Suggestions for incentives for the public are listed below:

- a) Related businesses and industries could offer discounts, free materials, clean up and other types of assistance will send a clear message to the public that the project has community support.
- b) It is possible to organize contests for residences and for industry with prizes donated by local businesses such as Home Hardware.

35) The Wildland Interface Fire Protection Committee or the Fire Liaison Officer could address the effectiveness of the hazard mitigation process. Since this is an Islands Trust and Capital Regional District approach under the auspices of UBCM, it would be appropriate to conduct surveys among residents prior to the door- to-door campaign to determine the level of awareness and concern about wildland interface fires and subsequently to follow up in approximately two years with a survey to determine response to the FireSmart recommendations.

Other Strategies for Public Education

In the event of a wildland interface fire emergency, Saltspring Island has evacuation plans in place. Information will be forwarded to the public. The following is a short summary of the actions that residents can take to prepare for an emergency.

Residents should:

- Check insurance coverage,
- Plan for pet and livestock removal to safety,
- Locate all family members or employees and designate a safe meeting place should an evacuation be called while individuals are separated and,
- Have a routine in place to prepare the house for closure (for example, closing doors and windows) in the event of an evacuation.

For an imminent evacuation residents should:

- Gather family documents, valuable business papers, photos, medications, eyeglasses, care needs for dependents in readiness for departure,
- Plan for removal of the disabled, the elderly and children and,
- Remove livestock and pets to safety.

When a wildland fire threatens a community, the Office of the Fire Commissioner in consultation with Saltspring Fire and Rescue and the Ministry of Forests will implement four stages of alert. These levels of alert are specified in the Saltspring Island Emergency Plan.

- **Evacuation alert:** People are warned of an imminent threat to life and property through all media types including radio and TV, blow horns and possible door-to-door contact, if manpower and time permits. Moving handicapped and special groups is given high priority. The alert means that residents should:
 - Be ready to leave on short notice,
 - Be prepared for worsening conditions and,
 - Monitor news sources for evacuation orders that will include the location of emergency shelters, travel routes, and reception centers.
- **Evacuation order:** People must leave the area immediately. Travel routes and the location of a reception centre for evacuees will be given. The evacuation reception center will register all evacuated individuals. At that time:
 - Transportation requirements to reception areas for evacuees will be determined and arranged,
 - The location of pick-up points to transport residents will be designated and,
 - Residents will conduct house closure including power and gas shut off procedures as applicable.
- **Evacuation rescinded:** Residents are advised that they can return to their homes when the danger is passed.
- **All clear:** Residents are advised that the danger has passed (an evacuation may not necessarily have occurred).

The Current available evacuation plans for Saltspring Island may be adequate; inquires should be made of the Saltspring Island Fire Chief for details with respect to wildland interface fire evacuation plans.

6. Choice of Strategies and Future Steps

The amount of information in the FireSmart manual is considerable and creating operational strategies from the recommendations can be difficult for the following reasons:

- A resistance from property owners and developers,
- Expense incurred in fuel management,
- The development and land use patterns in the wildland/urban interface,
- The diffusion of responsibility among a wide range of government agencies,
- Priorities and jurisdictional issues and,
- Constraints imposed by law on fuel reduction and other mitigation efforts.

In BC communities, when controlled burning is suggested (to reduce the density of fuel), concern over smoke is raised. When tree and vegetation removal is proposed (to provide a fire break), the public voices concern about aesthetics around individual residences or within the community. When local authorities present bylaws and restrictive covenants that require the use of non-flammable building materials or limit the type of vegetation that can be planted on private property, residents question the need.

However, if measures can be taken to prevent the occurrence of a fire or at least reduce its intensity, those preventative actions are far more cost-effective than fighting fires and dealing with the subsequent destruction. We recognize that some of these impediments are more difficult to overcome than others. The choice of a collaborative approach to planning should be of assistance in gaining greater support for an overall plan.

We suggest that the Wildland Interface Fire Committee consider 5-year and ten-year comprehensive strategies for silvicultural, policy and educational aspects of wildland interface fire protection.

Immediate Future Steps

Presentation of the Plan

Once the draft plan has been approved through Saltspring Fire and Rescue, we offer, subject to budget, to present the plan to a by-invitation group that will be the core of the Wildland Interface Fire Protection Committee. Should we present the Protection Plan, it is understood that we will not lead the Committee nor are our recommendations in any way binding to the Committee.

Activities for 2006

Once recommendations have been reviewed and chosen, the following implementation activities could be undertaken in 2006:

- 1) *Specific details of spacing and thinning regimes for the extreme locations and high hazard zone interface should be pursued in order to standardize the*

approach. We would be happy to engage in further discussions with stakeholders and to put in place a more detailed silvicultural plan with a timeframe if necessary.

- 2) Training of Fire Department personnel in forest ecology and treatments as deemed appropriate.*
- 3) Training of neighbourhood leaders in FireSmart information as deemed appropriate.*
- 4) Our approach was to address initial areas of immediate concern. Over time, the hazard map should be refined to include low hazard zone areas, additional firebreaks and non-wildland locations.*
- 5) Should a public liaison officer or representative not be appointed, the ideas suggested in the plan could developed further under the education section, the demonstration areas could be established and interaction with stakeholders could be continued.*



Figure 11: Potential Demonstration Site at Long Harbour. Source: Robin Clark.

- 6) Should the Committee determine that the watersheds should undergo assessment for wildland interface fire hazard mitigation, an assessment could be conducted.*
- 7) Representative structural hazard assessments (building materials assessments) could be carried out in extreme hazard zones to supplement the current MOF forms that focus on vegetation.*

7. Summary of Recommendations

- 1) Formation of a Wildland Interface Fire Committee for the Island including provincial government, Islands Trust, Regional District, First Nations, and non-government organizations that will address wildland interface concerns. Subcommittees may be formed from the core group as necessary.
- 2) Through the Wildland Interface Fire Committee, to consider incorporating wildland interface fire mitigation into the Islands Trust Official Community Plan (OCP), as well as to consider introducing restrictive bylaws or ordinances for development and building materials.
- 3) Through the Committee, to explore modification to the current covenants for watershed protection to allow for fire access and hazard mitigation.
- 4) To explore the possibility of a planned network of firebreaks for the Island.
- 5) To review water supply sources for the Island's wildland interface-this recommendation builds on a recommendation found in the Fire Underwriters Survey delivered to the Fire Chief and some actions may already be underway.
- 6) To explore through the Committee, how slash and debris from hazard mitigation can be disposed of via composting or chipping on the Island.
- 7) Through the Committee, to arrive at an acceptable plan for mechanical or manual thinning treatment in extreme and high interface fire hazard areas. To work with BC Hydro on hazard mitigation on transmission lines, as well as to collaborate with Ministry of Forests, BC Parks, Ministry of Highways and other large tract landholders in the development of perimeter buffers that are compatible with interface fire hazard reduction.
- 8) To devise a long term public education strategy for the Island in terms of wildland interface fire hazard mitigation.
- 9) To designate a representative to address the public education issues described within the plan. This individual would work with residence associations, environmental groups, agencies, corporations and government.
- 10) To engage in media coverage and enhanced website postings for wildland interface hazard mitigation.
- 11) To consider demonstration areas as part of an overall educational strategy.

8. Appendices

Appendix 8.I Saltspring Island Interface Fire Hazard Assessment Form

Location:

Completed by:

Date: _____

DESCRIPTION OF THE COMMUNITY

Important Factors	Potential Hazard	Point Rating	Your Score
Fire Weather Potential	Moderate Danger Class or higher < 25% during fire season	0	
	Moderate Danger Class or higher 25%-42% during fire season	4	
	Moderate Danger Class or higher 42%-60% during fire season	10	
	Moderate Danger Class or higher >60% during fire season	20	20
Area Description	Strictly urban	0	
	Suburban with scattered forests	2	
	Rural with scattered forests	4	
	Rural with continuous forests	6	
Duff and Litter Layer	< 5 centimetres	1	
	5 to 13 centimetres	3	
	13 to 20 centimetres	5	
	>20 centimetres	6	
Fine and Coarse Debris	None or spread more than 5 metres apart and not elevated	1	
	Scattered branches and tops close to the ground	2	
	Scattered branches and logs grouped and crossed	5	
	Continuous branches and logs grouped and crossed	6	
Forest Stand Description	Generally deciduous	0	
	Mixed deciduous and coniferous	3	
	Generally coniferous	6	
Other Vegetation	Primarily domestic	0	
	Primarily domestic and wildland grasses	2	
	Primarily wildland brush	4	
	Primarily broom	6	
Topographic Features	Generally flat	0	
	Gently rolling and even	2	

	Rolling and gullied	4	
	Many steep areas or rock outcrops	6	
Values Protected	No significant development, primarily wildland values	2	
	Complete development, perimeter fire potential only	4	
	Incomplete development, fire potential throughout	6	
	Lot sizes larger than one hectare, homes at risk	6	
Recreational Use	No obvious use	2	
	Infrequent use, difficult access and few trails	4	
	Frequent use, signs of obvious use, well-tramped trails	6	
	High use, well-tramped trails, parks, private recreation areas	8	
	High use and the area has a history of recreational fire starts	10	
Fire Potential on Adjacent Lands	No significant fire potential	0	
	Low fire potential	2	
	Medium fire potential, small industrial development	4	
	High fire potential, garbage dump, school, campground, high-use	6	

FIRE SUPPRESSION

Important Factors	Potential Hazard	Point Rating	Your Score
Availability of Water	Good hydrant coverage, available water within 200 metres	1	
	Partial hydrant coverage, available water within 350 metres	2	
	No hydrants but good water supply within 500 metres	4	
	No hydrants and poor water supply	6	
Response Time to Fire	15 minutes	0	
	30 minutes	2	
	60 minutes	4	
	90 minutes	10	
Access for Emergency Vehicles	Fully accessible by pumpers and tankers	2	
	Some areas have access problems but can drive within 50 metres of fire location, grades less than 25%	4	
	Narrow winding road or bridge load limit but can drive within 50 metres of fire location, grades less than 25%	5	
	Significant areas of inaccessibility, air or foot access only	6	
Fire History	Fewer than 3 fires within the previous five years	0	
	3 to 5 fires within the previous five years	3	
	6 to 15 fires within the previous five years	6	
	More than 15 fires within the previous five years	11	

OTHER FACTORS

Important Factors	Potential Hazard	Point Rating	Your Score
	Frequent high winds over 30 km/h	0 - 6	
	Extensive areas of steep, south or west exposure slopes	0 - 6	
	Large-scale industrial or construction projects anticipated	0 - 6	
	Large-scale recreational activity project anticipated	0 - 6	
	Fuel loading increase due to logging or land clearing activity	0 - 6	
	Utilities within the interface area	0 - 6	
<i>TOTAL POINTS</i>			

Interface Fire Hazard Risk Rating

0 - 53 Low
54 - 68 Moderate
69 - 83 High
84+ Extreme

[AREA MAP]

Notes

Guidelines

Area Description

- Urban-strictly urban, high structure density and no trees,
- Suburban with scattered forests-communities adjacent to a city, moderate structure density, scattered forested areas,
- Rural with scattered forests-small communities and farmland with scattered structures and forest and,
- Rural with continuous forests-small communities and farmland with continuous forest throughout, some isolated structures.

Duff and Litter Layer

The duff and litter represent the decomposed, semi-decomposed, and freshly fallen material that makes up the upper layers of the forest floor. This includes fallen twigs, leaves, needles, cured grasses, herbs, and, any other combustible material present.

To determine the point rating for the thickness of duff/litter, use the following procedure:

- Use a sharp shovel to cut through the litter and duff, creating a soil profile,
- The depth should be measured from the top of the first mineral soil horizon to the height of the upper litter as it occurs naturally,
- Do not compress fresh needles or other recently fallen material,
- Create soil profiles in at least three different locations, and record the average reading on the form in the right hand margin and,
- Avoid squirrel caches, rotten materials, and abnormal fuel accumulations.

Add one point to this factor rating if pockets of thick duff or litter occur at least every 10 metres.

Fine and Coarse Debris

Debris represents the amount of all types of ground fuels, including all combustible and woody material, even rotten wood, and their distribution. Debris ranges in size from branches and treetops, to logs and fallen trees.

- Scattered branches and tops-scattered material is found where the fuels are one to five metres apart, and 10% to 20% of the fuel is in contact with other material in this debris class. A majority of the fuel is close to the ground and,
- Continuous branches and tops-continuous debris is found at least every one metre, and more than 20% of the material is in contact with other material in this debris class. Debris may be elevated; an under-layer of branches and twigs with an over-layer of needles creates air pockets and the debris dries out more quickly.

Forest Stand Description

The forest stand description reflects the general composition of the surrounding area forest and the density of the upper canopy. Forest stand descriptions should be determined by a combination of air photo interpretation and local knowledge.

- Fuel Type-a recognizable fuel complex of sufficient homogeneity of characteristics and aerial extent, that steady state equilibrium fire behaviour can be predicted, and, be expected to be maintained over a considerable period of time,
- Deciduous-refers to moderately well stocked stands of semi-mature to mature deciduous trees; 75% of the upper canopy is deciduous,
- Coniferous-refers to well-stocked stands of mixed maturity conifers; full crown closure or not and,
- Ladder Fuels-low brush, branches, and, immature trees that provide access for ground fire to the upper canopy of the forest stand.

Add one point to this factor rating if ladder fuels are present.

Other Vegetation

Refers to fuels in the area other than mature trees. It includes grasses, shrubs, brush, and immature trees that are not part of the canopy. Other vegetation and fuel types within the interface area should be determined through the use of aerial photographs and local knowledge.

- Domestic-includes lawns, shrubbery, golf courses, farmlands, etc., which are maintained by human activity,
- Wildland-wild, natural grasses, shrubs, brush, and scattered, downed woody materials and,
- Broom-introduced species, especially common on disturbed sites, and very hard to get rid of. Considered alone because of its properties as fuel type. It is a very flammable shrub because of its oiliness.

Topographic Features

The general topography of an area includes the slope of the ground measured from the horizontal and whether the slope is even or gullied. The general topography and terrain of the interface areas should be determined using aerial photography and by ground survey.

- Even slopes-have a smooth or gently rolling texture.
- Gullied slopes-have cuts running up the slope, which can provide funnels for up-slope, wind-driven fire spread.

Values Protected

The values at risk, including both structural and timber values, if a fire were to ignite and spread. Proximity to wildland is assumed. The values protected should be determined using aerial photograph and ground surveys.

Recreational Use

Recreational use levels are determined by old fire pits, well-tramped trails, signs of 4x4, motorcycle or bicycle use, local knowledge, and the size of the local population. A

combination of aerial photography, recreation maps, local knowledge and ground surveys should be used to determine recreation use levels within the interface zones. No obvious use-no access and no signs trails.

- Infrequent use-difficult access and few trails.
- Frequent use-signs of obvious use, easy access routes, well-tramped trails, evidence of camping, as well as any area within one kilometre of a high use area.
- High use-as above, also include parks, private recreation sites and areas with permanent fire pits.

Add two points to this factor rating if the area has a history of recreational fire starts.

Fire Potential on Adjacent Lands

Consider the risk of accidental ignition by such land usage as nearby schools, garbage dumps, campgrounds, parks, industry, or airports. An area fire history should approximate the number of human-caused fires in the past. Risk of accidental ignition should be determined through air photo interpretation, local knowledge of land-use, and ground surveys.

Availability of Water

The distance to available water is measured from the actual location that the forested area meets the development, to the first accessible location of the available water source. Air photos should show water sources such as lakes, rivers, and oceans. Municipal planning maps will show hydrant coverage.

The following criteria are used to assess available water:

- The water source must be present year round,
- Fire hydrants and/or standpipes must be in working condition with adequate flow,
- High volume community wells or irrigation systems can be considered if they are accessible for quick hook-up by firefighters,
- Residential wells should NOT be considered and,
- Seasonal creeks should NOT be considered.

Subtract one point from this factor rating if the area is provided with an independent water system usable by firefighters.

Response Time to Fire

The time it takes for emergency response (fire department, wildland crews, etc.) to respond to the fire. Local knowledge should be used to determine the response time to fires.

Access for Emergency Vehicles

Refers to the ease of accessibility for emergency equipment to respond to a fire. Air photo interpretation and ground surveys should determine access for emergency equipment. Consider locked and unlocked fire gate accesses.

- Pumpers and tankers-Very limited in their mobility, normally limited to paved or major gravel roads. Most full tanker trucks have trouble negotiating adverse grades over 15%. Loaded tanker trucks will also have trouble negotiating curves with a radius of less than 30 metres where the curve occurs in conjunction with a gradient over 10%. Tanker truck accessibility is considered good if it can get within 100 metres of a fire location. If a bridge is present, consider weight restrictions.
- Air/Foot-Ground crews or air attack should be considered where vehicles cannot travel to within 100 metres of a fire location.

Fire History

Refers to the number of fires within the area over the previous five years.

Frequent High Winds Over 30 km/h

The stronger the wind, the faster the spread of fire. Utilize local knowledge and historical weather information.

Extensive Areas of Steep, South, or West Exposure Slopes

Southern aspects receive the most direct sun, are the driest, and provide the best conditions for fires to ignite and spread. Western aspects receive direct sunlight during the heat of the day, creating easy afternoon burning conditions. The steepness of a slope can also affect fire spread. Wind currents are normally uphill and this tends to push heat and flames into new fuels. Convection heat rising along a slope causes a draft that further increases the rate of spread. Air photo interpretation and local knowledge should be used to determine south and west exposure slopes. Ground surveys should determine the point rating.

Large-Scale Industrial or Construction Projects Anticipated

Creates disturbance of the land and increases the risk of accidental ignition through the use of machinery and increased human activity. Examples include residential development, industrial park expansion, new garbage dump site, and road construction. Local knowledge and air photo interpretation should be used to determine what major projects exist in the interface area. Ground surveys and the above resources should determine what, if any, major industrial projects are anticipated or currently happening.

Large-Scale Recreational Activity Project Anticipated

Increased risk of accidental ignition due to increase in human activity in immediate area, as well as adjacent lands. Examples include park development, new campsites and increased tourist traffic from such activities as hiking, fishing and hunting. Local knowledge and advertised projects should determine what projects are happening in the interface zones. Utilize the same resources as above, and possibly community and special interest groups.

Fuel Loading Increase Due to Logging or Land Clearing Activity

Increased risk of accidental ignition due to equipment use. Increased ground fuel accumulations due to slash. A combination of air photo interpretation, local knowledge and ground surveys should be used to determine amounts of logging or land clearing activity in the interface area.

Utilities Within the Interface Area

Consider hydro rights-of-way, overhead wires, gas pipelines, etc., within the interface area or adjacent areas. Air photos and topographic maps should be used to determine where and what utilities exist in the interface area. Ground surveys and topographic maps should determine the point ranking for this factor.

Source: Wildland Fire Hazard Assessment

British Columbia Ministry of Forests Protection Branch May 2004

Appendix 8.2
Definitions for Wildland Interface Fire Hazard Mitigation

- **Fuel** – Combustible structures and wildland vegetative materials. It includes dead plants, parts of living plants, duff, and other accumulations of flammable vegetation.
- **Fuels Management** – The practice of planning, manipulating or reducing fuels to obtain conditions that permit protection forces to meet fire suppression objectives.
- **Highly Flammable Fuels** – Plants differ in how readily they ignite and how hot or long they burn. Flammability depends on plant size, arrangement of branches and leaves.
- **Ladder fuels**– Shrubs or small trees of intermediate height, act as ladders carrying the flames from the forest surface up into the tops of trees.
- **Thinning**- Cutting trees from a young stand so that the remaining trees will have more room to grow to marketable size. The primary intent is to improve growth potential for the trees left after thinning but in this case it is also to remove potential ladder fuels.
- **Pre-Fire Mitigation** – Prior to wildland fire ignition, a systematic application of risk assessment, fire safety, fire prevention, and fire hazard reduction techniques may be undertaken to reduce wildland fires, damages and cost of suppression.
- **Silviculture**-manipulation of forest vegetation to accomplish a specified set of objectives. It controls forest establishment, composition, and growth.
- **Slope** – A piece of ground that is not flat or level, but may rise or fall in percent; where one percent of slope means a rise or fall of one foot of elevation within a distance of 100 feet; 45% would equal 45 feet of rise in 100 feet.
- **Wildland** – An area that has low-density development. It can include hobby farms cattle ranches and forests managed for timber production.
- **Wildland Interface** – The geographical meeting point of two diverse systems, wildland and structures. At this interface, structures and vegetation are sufficiently close that a wildland fire could spread to structures or a structure fire could ignite vegetation.

Appendix 8.3 Saltspring Island Wildland Interface Hazard Plot Characteristics

Factors	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
Fire Weather	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	
Area Descript	4	4	4	4	2	4	4	4	4	4	6	4	4	4	6	4	4	4	4	4	4	6	6
Litter	3	1	3	3	3	3	3	1	3	1	1	1	1	3	5	3	3	3	1	1	2	1	
Woody Debris	3	2	2	5	2	4	3	4	4	3	2	2	2	5	6	3	3	3	2	1	2	3	
Forest Stand	5	5	5	5	5	5	6	6	6	6	6	4	3	6	5	6	5	6	5	3	5	6	
Under-Story	4	5	6	5	4	4	5	5	4	4	4	4	5	4	4	4	4	5	4	2	3	2	
Topo. Features	3	4	2	2	4	5	3	2	5	4	6	4	2	2	4	5	2	2	6	2	6	2	
Values	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Rec. Use	4	4	4	4	5	4	4	4	5	4	7	4	5	4	5	4	4	4	4	4	4	5	2
Fire Potent.	4	4	4	4	4	4	3	4	5	4	2	4	3	2	4	2	4	2	4	2	4	4	
Avail. Water	6	6	6	2	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Resp. Time	2	2	2	0	0	2	0	0	0	2	3	0	0	0	0	3	3	0	2	2	4	4	
Access	4	4	4	4	4	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Fire History	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	
Wind over 30 km	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Steep, South, West Expos.	3	5	5	6	6	3	5	3	6	3	6	0	1	5	6	5	5	5	5	2	6	1	
Future Indust. D.	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	1	4	0	3	
Future Rec. Proj.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Future Fuels	2	2	1	2	2	3	2	2	2	2	1	1	2	2	2	1	2	2	1	2	2	2	
Utilities in interface	1	1	1	1	1	1	1	1	1	1	0	2	1	1	1	1	1	1	1	1	0	1	
Total Points	76	83	83	80	82	87	84	82	88	84	91	76	75	84	93	86	86	83	86	76	91	83	

Appendix 8.4 Fire Resistant Plants

(The MOF Protection Branch Website)

Fire Resistant Plants

Trees

Maple (Acer species)	Birch (Betula species)
Trembling Aspen (Populus tremuloides)	Cottonwood (Populus trichocarpa)
Willow (Salix species)	Mountain Ash (Sorbus species)

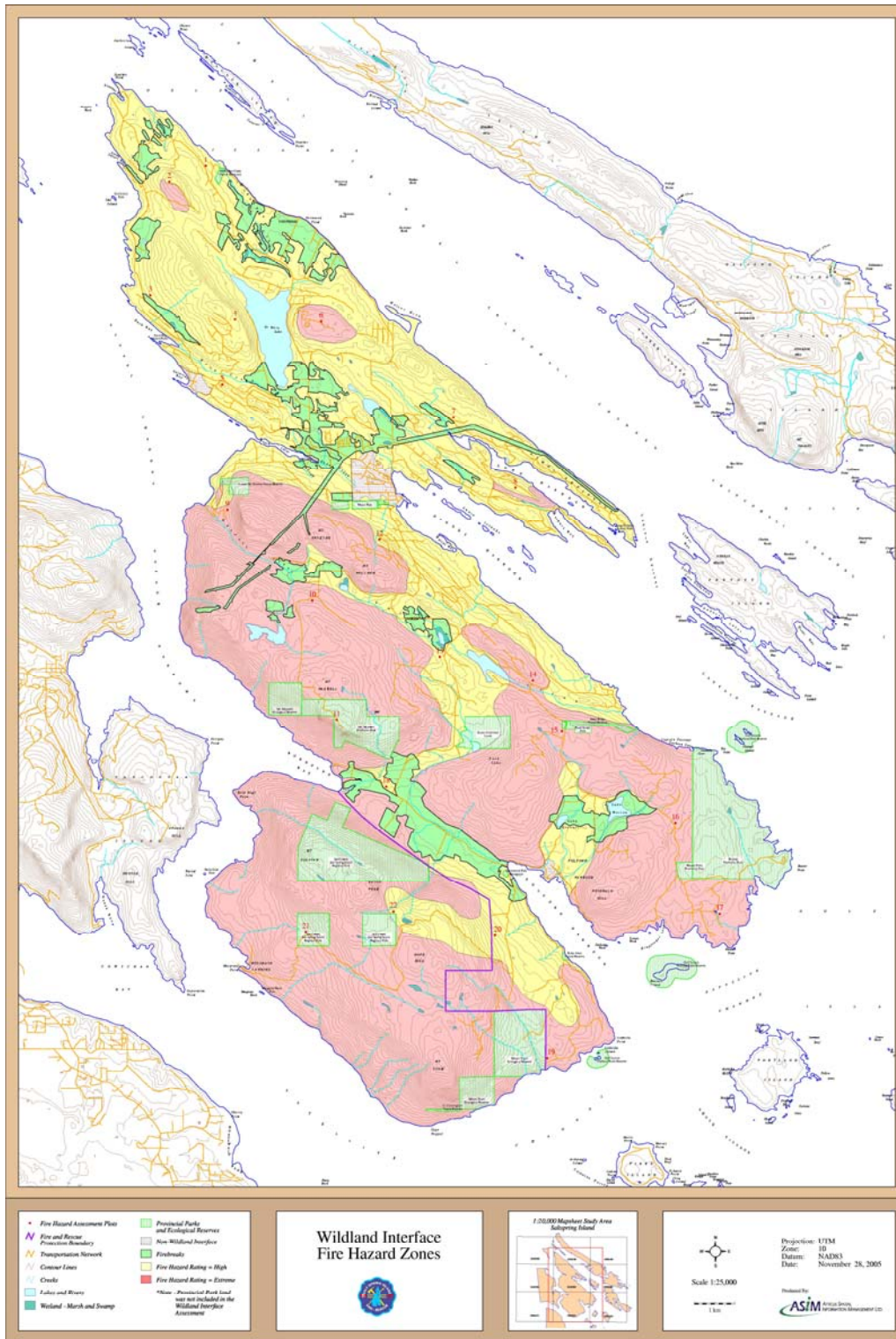
Shrubs and Woody Vines

Kinnikinnick (Arctostaphylos uva-ursi)	Snowbrush (Ceanothus species)
Cotoneaster (Cotoneaster species)	English Ivy (Hedera helix)
Honeysuckle (Lonicera species-low shrubs/vines)	Buckthorn (Rhamnus species)
Virginia Creeper (Parthenocissus quequefolia)	Sumac (Rhus species)
Rose (Rosa species - bush/hedges)	Lilac (Syringa species)
Periwinkle (Vinca species)	Currant/Gooseberry (Ribes species)

Herbaceous Perennials

Yarrow (Achillea species)	Columbine (Aquilegia species)
Thrift (Armeria species)	Wormwood (Artemesia species)
Snow-in-summer (Cerastium tomentosum)	Coreopsis (Coreopsis species)
Dianthus (Dianthus species)	Blanket Flower (Gaillardia species)
Hardy Geranium (Geranium species)	Daylily (Hemerocallis species)
Coral Bells (Heuchera)	Candytuft (Iberis species)
Iris (Iris species & hybrids)	Red-hot Poker (Kniphofia species)
Lavender (Lavendula species)	Flax (Linum species)
Penstemon (Penstemon species & hybrids)	Salvia (Salvia species & hybrids)
Stonecrop/Sedum (Sedum species)	Hen & Chicks (Sempervivum species)
Lamb's Ear (Stachys byzantina)	Yucca (Yucca species)
Poppy (Papaver species)	

Appendix 8.5 Map of Saltspring Island Wildland Interface Fire Hazard Zones



Brief Legend Summary of Saltspring Wildland Interface Fire Hazard Map

Yellow-High Hazard Zone

Pink-Extreme Hazard Zone

Bright Green-Firebreaks

Green Check-Provincial Parks