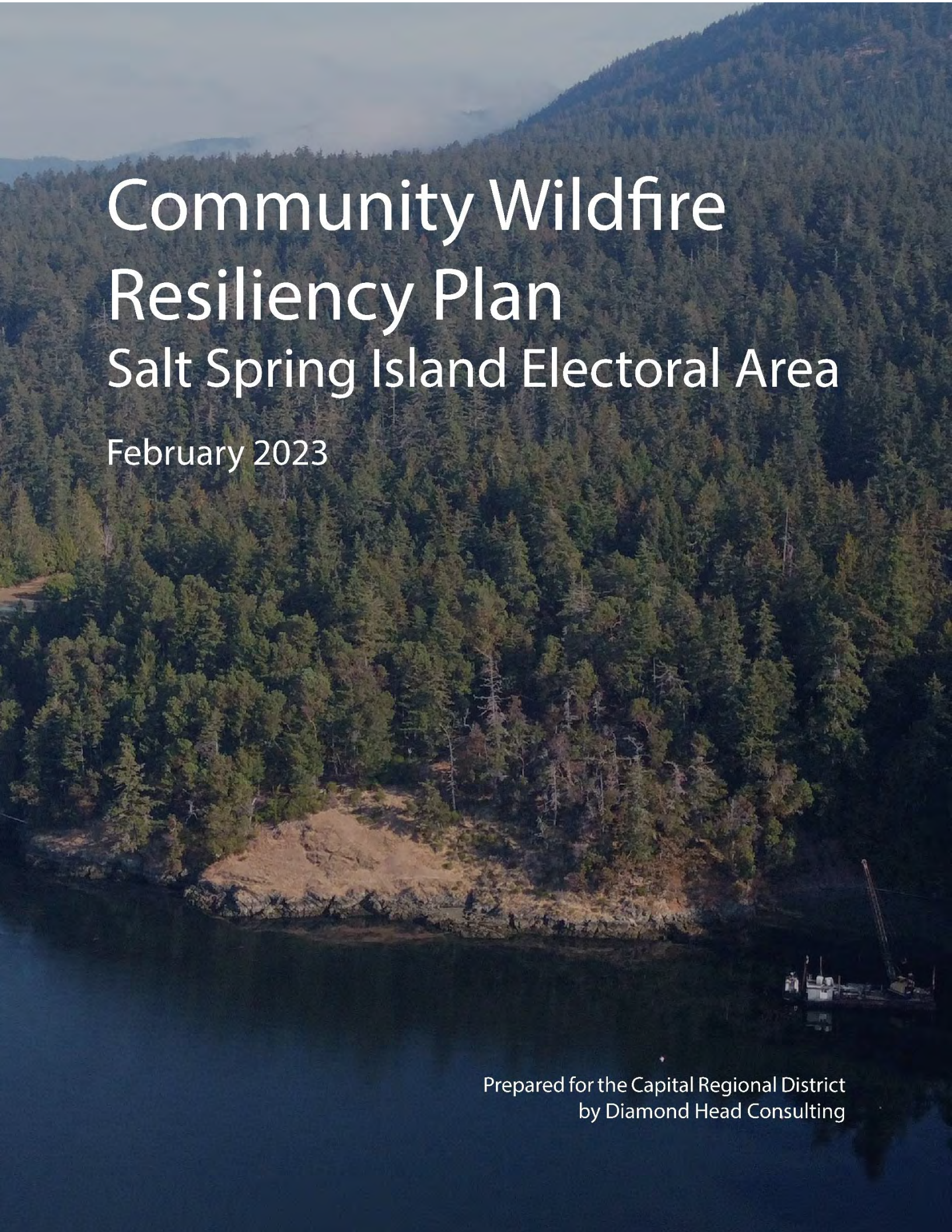

Community Wildfire Resiliency Plan

Salt Spring Island Electoral Area

February 2023

Prepared for the Capital Regional District
by Diamond Head Consulting

Community Wildfire Resiliency Plan for Salt Spring Island Electoral Area in the Capital Regional District

February 2023

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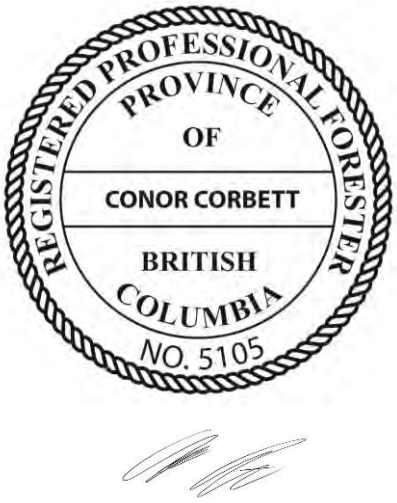
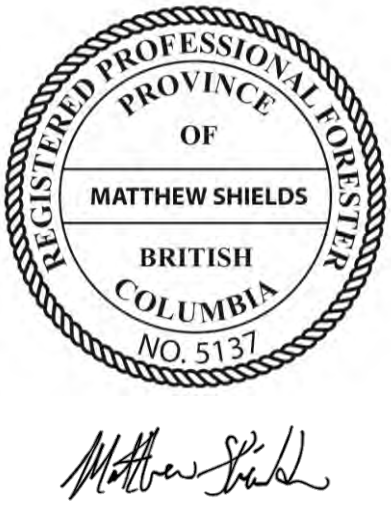


Conor Corbett, R.P.F.

Date signed: February 17, 2023

I certify that the work described herein fulfills the standards expected of a registrant of the Association of British Columbia Forest Professionals and that I did personally supervise the work.



Matthew Shields, R.P.F.

Date signed: February 17, 2023

I certify that I have reviewed this document and, while I did not personally supervise the work described, I have determined that this work has been completed to the standards expected of a registrant of the Association of British Columbia Forest Professionals.

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Tables and Figures

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Frequently Used Acronyms

AOI	Area of Interest
BC	British Columbia
BCWS	British Columbia Wildfire Service
CFFDRS	Canadian Forest Fire Danger Rating System
CFBPS	Canadian Fire Behavior Prediction System
CFS	Community Funding and Supports
CRD	Capital Regional District
CRI	Community Resiliency Investment
CWPP	Community Wildfire Protection Plan
CWRP	Community Wildfire Resiliency Plan
DP	Development Permit
DPA	Development Permit Area
EMBC	Emergency Management British Columbia
EMP	Emergency Management Plan
FCFS	FireSmart Community Funding and Supports
FRPA	Forest & Range Practices Act
GIS	Geographic Information Systems
HRVA	Hazard, Risk, and Vulnerability Analysis
LRMP	Land and Resource Management Plan
MOE	Ministry of Environment
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
NSSWD	North Salt Springs Waterworks District
OCP	Official Community Plan
PSTA	Provincial Strategic Threat Assessment
SSI	Salt Spring Island Electoral Area
SSIEAA	Salt Spring Island Electoral Area Commission
SSIFR	Salt Spring Island Fire Rescue
SWPI	Strategic Wildfire Prevention Initiative
UBCM	Union of British Columbia Municipalities
WRR	Wildfire Risk Reduction
WUI	Wildland-Urban Interface

Executive Summary

The Capital Regional District (CRD) prepared this Community Wildfire Resiliency Plan for Salt Spring Island (SSI) Electoral Area. This plan examines wildfire risk in the wildland-urban interface (WUI) of SSI and makes recommendations for the CRD to help build FireSmart communities.

SSI is characterized by extensive coniferous forests and relative isolation. Although located close to the communities of the Victoria region, the island is limited by its ferry only access. Most residents live in the wildland-urban interface (WUI), where forests intersect with homes and businesses. The distinction between forests and development is sometimes clear – like the boundary between patches of forest, farms, and conventional suburban development – and sometimes indistinct where houses are set amid the trees. These forms of development are called “interface” and “intermix” respectively and create different kinds of risk to communities. Much of the infrastructure critical to the functioning of these communities, including water wells and electrical utilities, fire stations, communications, and community buildings, is also located within the WUI.

In the WUI, wildfire consultants conducted wildfire risk assessments on public land, examining structures and the characteristics of forest vegetation. These assessments and data from the Provincial Strategic Threat Analysis (PSTA) were used to map the wildfire risk in relation to known values throughout the WUI. The analysis shows that much of the public land base is characterized by a moderate wildfire risk. Development in these areas has placed buildings and infrastructure near forests that can sustain fires during the typical fire season. Moderate wildfire threat means that a forest is expected to readily support wildfire of low to moderate intensity during the peak fire season. The risk associated with fires of moderate intensity should not be underestimated. These are fires that can support the torching of trees, send embers into nearby neighbourhoods, and present considerable suppression challenges, even if the most aggressive wildfire behavior is unlikely. Wildfire risk on private land was not modelled; however risk on private land is likely moderate, similar to adjacent public land. Risk on private land cannot be modelled under the grant funding terms for this project.

There are proactive measures that can be taken to reduce wildfire risk through education to increase public awareness, expanding FireSmart programming for residents and CRD operations, emergency planning and interagency cooperation, and fuel management on public lands. The direct management of interface areas that are on private land are beyond the jurisdiction of local government. Public education and awareness of wildfire risk and options for mitigation and preparedness is therefore a critical component of this Community Wildfire Resiliency Plan. The FireSmart program and its resources are the foundation for raising public awareness in SSI. Adapting FireSmart guidance to local circumstances is the overarching task of initiatives proposed in the Action Plan included in this document.

This Community Wildfire Resiliency Plan has been developed to acknowledge existing wildfire risk in the communities. Risk is increasing with climate change and will continue to do so, making the cyclical and repeat nature of community wildfire planning necessary and apparent. Recommendations in the Action Plan are framed with suggested priorities and implementation timeframes. The project partners recognize this Plan as a fundamental first step towards improving the resilience of SSI to the impacts of wildfires.

Introduction

Overview

This Community Wildfire Resiliency Plan (CWRP) examines wildfire risk in the Salt Spring Island (SSI) Electoral Area and makes recommendations for managing that risk. The purpose of the plan is to identify pathways toward a building a community resilient to wildfire, focusing on actions that are within the Capital Regional District's (CRD) mandate and capacity. Wildfire resiliency is not a single destination with a defined roadmap: although the recommendations made by the plan can each improve wildfire resiliency, many involve multiple values or long timeframes which deserve further consideration.

To be resilient means to recover from difficulty. In SSI, wildfire can cause great difficulties for people and communities. Emergency preparedness, wildfire response, vegetation management, community planning, and personal readiness are all important elements of building resiliency to wildfire. Being resilient doesn't mean that wildfire will never impact SSI; instead, it means that communities will emerge from a wildfire disaster intact and recognizable.

This plan is the result of a partnership between provincial and local governments that has allowed communities to access funding for community wildfire prevention since 2004. Funding for this plan was provided through the ***Community Resiliency Investment Program (CRI)***. The CWRP assesses risk within the ***wildland-urban interface*** (WUI), an area of land where natural vegetation and urban development are in proximity. The WUI is where wildfire can travel from wildland vegetation into communities of SSI and is where there is the highest concern for potential wildfire activity. To create the CWRP, professional foresters visited public lands in the WUI to create accurate maps of wildfire risk. Although wildfire risk is not assessed for private land, the recommendations of the CWRP are a resource for all residents of SSI.

The ***Community Resiliency Investment Program*** is a program funded by the government of British Columbia to reduce the risk of wildfires and mitigate their impacts on BC communities.

Wildland-urban interface is the area around communities where development is among or abuts forest, and consequently where development faces greater wildfire risk.

Plan Goals

Wildfire is a process intrinsic to the ecosystems of SSI. The patchwork of forests and grasslands surrounding homes and communities are vulnerable to fire whether it is caused by lightning or by human ignitions. The goals of the CWRP respond to this reality in several ways and set an agenda that influences each following section of the plan. They represent *what the plan sets out to do*. Table 1 sets out the goals of the CWRP.

Table 1. Goals of the CWRP

Goals	
Public Health and Safety	Public safety is enhanced through all activities to prevent, prepare for, or manage wildfire.
Protection of infrastructure	Community infrastructure, including private property, public structures, and facilities, is protected from wildfire.
Interagency Co-operation and Policy	Wildfire management planning, preparedness, prevention, suppression, ecosystem rehabilitation, and education occurs in co-operation with all relevant agencies and neighbouring local governments and First Nations.
Public Awareness, Education and Advocacy	Public understanding, support and awareness of wildfire risk management is increased through effective education, advocacy, and communication.
Sustainable Planning	Growth and development planning considers wildfire risk and mitigation as best practice.
Environmental Protection and Enhancement	Ecosystems that support biodiversity and environmentally sensitive features are protected and enhanced by wildfire management activities.
Adaptive Management	The effectiveness of wildfire management initiatives is monitored and continuously improved by reviewing actions and decision-making processes.
Financial Responsibility	Wildfire resiliency initiatives are pursued within sustainable budgets. Where appropriate, the CRD will seek external partnerships to expand funding available for wildfire resiliency initiatives.

Plan Objectives

The following objectives provide context on *how the plan will achieve its goals*. The primary objectives are to:

- Provide an updated understanding of wildfire risk within the WUI based on the provincial data available and site assessments.
- Identify high and extreme risk areas where the CRD should prioritize action to reduce wildfire risk and/or protect homes and infrastructure.
- Examine opportunities to adjust CRD bylaws, policies, or programs to support improved wildfire preparedness and prevention.
- Help build capacity in fire suppression and response through identifying ways this plan can support the wildfire preparedness of local fire departments.
- Engage community members with information on wildfire risk management and respond to community concerns.
- Consider where partnerships with residents, communities, organizations, or other governments may be needed to improve wildfire preparedness and/or address wildfire hazard.

Plan Development Summary

This CWRP is one in a series of three for the CRD, one for each electoral area. These plans are funded by the 2021 Union of British Columbia Municipalities CRI program grant. The previous community wildfire protection plan for SSI was created in 2005. The CRI program has since created updated guidance for preparing a CWRP. The CRD issued a request for proposals in spring of 2022 for the development of a new plan meeting the Province's updated standards. The contract for preparing the plan was awarded to Diamond Head Consulting Ltd. in May 2022. Field assessments took place in the summer of 2022. Stakeholder information sessions were held in September 2022, with direct engagement occurring throughout the project with specific stakeholders. A draft plan was submitted for review by stakeholders in January 2023. After final revisions, the final plan was submitted for consideration by the CRD Board.

The first three sections of the plan following this introduction consider the context of SSI and present the findings of the wildfire risk assessment. The community's planning context and background for the creation of the CWRP is presented in *Relationship to Other Plans* (p.16). A description of the community, including more detail on how the WUI is defined as well as a brief discussion of socioeconomic and environmental features within the plan area is contained in *Community Description* (p.18). The results of wildfire threat assessments and local wildfire risk mapping are presented in *Wildfire Risk Assessment* (p.46). This section also contains information on the historic fire regime and climate change factors that may influence future wildfire risk.

The following section bridges between the *Community Wildfire Risk Assessment* and the seven FireSmart disciplines, providing an *Introduction to FireSmart* (p.71) for readers who may not be familiar with FireSmart programming and concepts. This section also contains advice for the CRD on how to organize FireSmart programming and initiatives under the role of a regional FireSmart Coordinator.

The next seven sections identify community resources and needs in each of the seven FireSmart Disciplines:

- *Education* (p.78). This section examines how the CRD can improve or enhance outreach with residents or communities to increase awareness of wildfire risk and support for wildfire management.
- *Legislation and Planning* (p.89). This section addresses the major pieces of law and policy that are of relevance to wildfire management and discusses how they could be amended or expanded to support wildfire prevention and preparedness.
- *Development Considerations* (p.96). This section looks at the regulation of development by municipal bylaws. Influencing development patterns is a useful way to shape FireSmart communities for the long-term.
- *Interagency Cooperation* (p.100). Making recommendations for the ongoing effort to engage multiple stakeholders and partner institutions is the focus of this section.
- *Cross-Training* (p.104). This section concerns opportunities and challenges in ensuring more wildfire training for relevant emergency response personnel and neighbourhood FireSmart representatives.
- *Emergency Planning* (p.108). This section considers how parallel emergency planning processes and procedures can incorporate wildfire risk and reflect wildfire preparedness.
- *Vegetation Management* (p.112). This section discusses the costs and benefits of fuel management at the site, neighbourhood, and landscape scale to reduce wildfire risk. Opportunities of high priority for FireSmart landscaping treatments are identified for critical infrastructure and neighbourhoods, or for the development of a fuel management prescription by a Registered Professional Forester.

These sections are followed by the *Action Plan & Implementation* (p.121), which provides notes about potential actions discussed in the preceding sections and prioritizes recommendations for implementation. The Action Plan can stand alone with the Executive Summary as a guide to improving wildfire resiliency in SSI. 32 recommendations to improve wildfire resiliency in the community are provided, organized by the appropriate FireSmart discipline and suggested priority.

Appendices (p.130) to the plan provide additional details, including a glossary of terms and a description of how public input was received and incorporated.

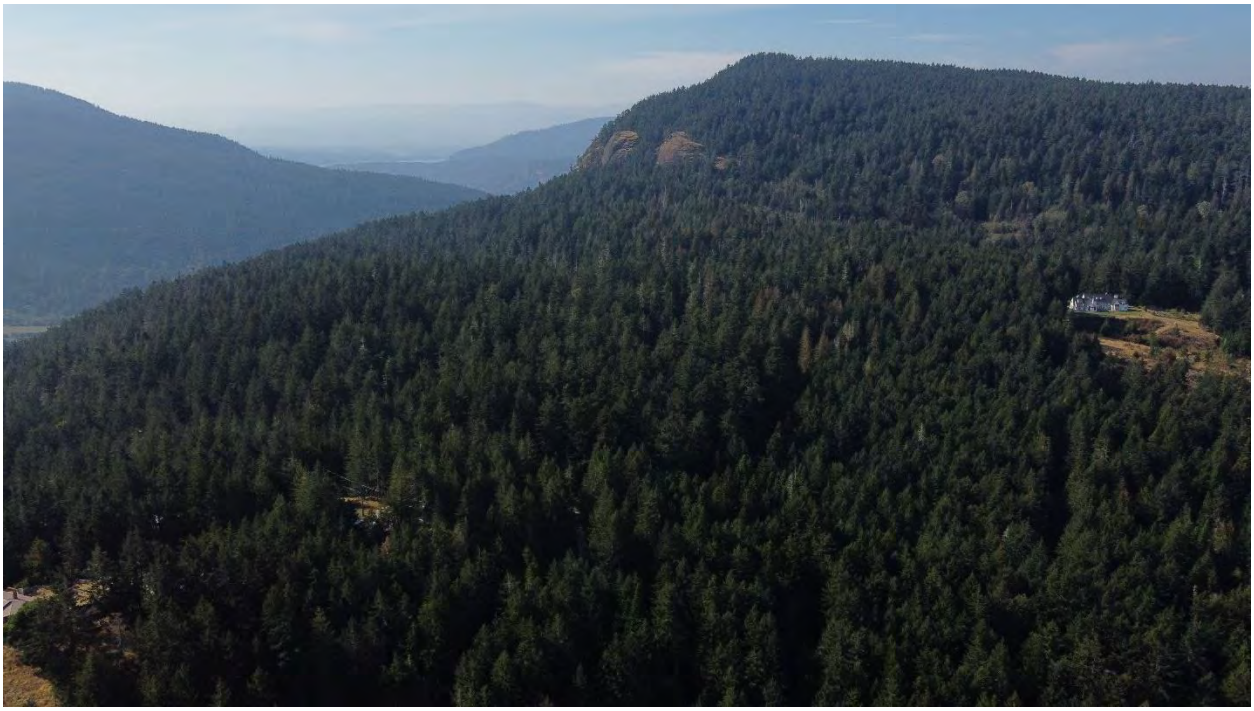

Photo 1. Forests of SSI.

Relationship to Other Plans

The Community Wildfire Resiliency Plan (CWRP) is a strategic document that informs Capital Regional District (CRD) priorities for emergency services, operations, and community planning. The plan recommendations are not mandates, but suggestions that can be worked into the CRD's policies, programs, and activities. Implementation of the plan depends on changes to informal procedures, stated policy, new planning processes, and in some cases amendments to local government bylaws. The CRD's plans for government operations, emergency management and evacuation, corporate strategies, climate action, parks and urban forestry are all relevant to this plan. The plans of other governments, such as provincial or indigenous resource management plans, may also be of relevance to aspects of wildfire management.

Linkages to Existing Community Wildfire Plans

A previous Community Wildfire Protection Plan was prepared for Salt Spring Island in 2005, under the previous Strategic Wildfire Prevention Initiative Standards.

Table 2. Linkages to existing community wildfire plans.

Plan	Description	Relationship to CWRP
Community Wildfire Interface Fire Protection Plan for the Improvement District of Saltspring Island, BC (2005)	This is the community wildfire plan currently in place for the community of Salt Spring. 11 recommendations accompany the plan. This plan was created at the improvement District level, and as such many recommendations are not within the mandate of the CRD. Due to a lack of staff continuity, it is not clear how many of these recommendations were implemented.	The plan provides context for the present CWRP and informs current recommendations. This plan may remain relevant for actions/goals internal to the CRD.

Linkages to Other Plans

The CRD acts as the primary local government for its unincorporated areas. Regional districts operate on a special service basis, providing only the services that are approved by their communities and using taxes/levies only to support this spending. Communities in unincorporated areas can also form Improvement Districts for specific taxation purposes, such as running a volunteer fire department or for water servicing. Salt Spring Island Fire Rescue operates as an improvement district, as does North Salt Spring Waterworks. The Gulf Islands are also unique in that a separate entity, the Islands Trust, is responsible for land use and community planning. This organization was created in 1974 under the Islands Trust act to preserve and protect the Gulf Islands and their unique amenities.

Table 3. Relationship of the CWRP to local government plans.

Plan	Description	Relationship to CWRP
Salt Spring Island Official Community Plan (Bylaw No. 434, 2008)	This plan is prepared by the Islands Trust and provides goals and policies to regulate land use and development in the Planning Area and is supported by an enacting bylaw.	Section A.5.2.13 includes a policy to locate developments away from areas subject to wildfire. This is supplemented by objectives A.7.1 and A.7.2.8. The guidelines for Amenity Zoning Applications also include a policy of locating development away from areas subject to wildfire (H.3.1.6 and H.4.1.7).
Emergency Management Plan	The CRD Corporate Emergency Plan was updated in 2020. The plan is updated periodically and considers the organization and hierarchy within the CRD during an emergency event, as well as the setup of the Emergency Operations Centre. This document includes a Hazard, Risk, and Vulnerability Assessment and Consequence Analysis, which identified wildfire as a high likelihood, high consequence event.	The Emergency Plan identifies processes and procedures the CRD will follow to secure infrastructure and provide emergency services to residents during a wildfire. The CWRP can inform emergency planning about wildfire risk, helping the CRD to make resource allocation and response decisions.

In addition to local government plans, higher government land use plans can apply to all or specific portions of SSI. The Vancouver Island Summary Land Use Plan (2000), established by order, guides forest practices in several “special management zones”, none of which are located within SSI. Besides provincial land use planning, orders and notices established through the *Land Act*, *Forest and Range Practices Act, Oil and Gas Activities Act, Environment and Land Use Act*, and *Wildlife Act* can also influence the priorities and recommendations of the CWRP due to constraints they may place on the crown land base. The British Columbia Wildfire Service may also create landscape level “tactical fuel management plans” or risk management plans for specific provincial landscape units. No such plans are currently in place for SSI.

Community Description

Area of Interest

The Area of Interest (AOI) defines the community boundaries for the Community Wildfire Resiliency Plan (CWRP). The AOI represents how the Capital Regional District (CRD) is organized around its communities and where recommendations from the plan may apply. For this plan, the AOI is the entirety of Salt Spring Island, which is also the entire SSI electoral area.

Salt Spring Island is a particularly unique area in BC. It is the largest of the Gulf Islands by area, and also has the highest population. Extensive forests remain throughout the Island, with only small amounts cleared for development and agriculture. Ganges is the main townsite for the Island, and there are scattered clusters of higher density communities such as Vesuvius and Fulford Harbour. Most of the land developed for housing is in the central and northern portions of the Island, with more continuous natural forests located in the provincial parks in the southern portions of the island. The terrain is rugged, with hilly terrain punctuated by steeper mountainous terrain in the southern reaches of the Island at Mount Tuam, Mount Bruce, and Mount Maxwell.

Wildland-Urban Interface

Within the AOI, this plan pays special attention to a zone called the wildland-urban interface (WUI). The WUI is the area where combustible forest fuels are found adjacent to homes, businesses, farm structures, or other buildings and infrastructure. Since SSI is dominated by large areas of forest vegetation, most of the area can be considered as part of the interface. This plan defines the WUI as the area within one km of a density of six buildings (or “structures”) per square km. This creates a ring around the most populated areas of SSI, where most buildings and people would be at risk if a wildfire were to occur. The distance of one km has been selected to align this CWRP with guidance from the Province and BC Wildfire Service, which use structure density classes to help plan wildfire response and prevention.

The shape and appearance of the WUI depends on the form of development that characterizes the community. The WUI can be thought of as having two broad types that influence wildfire response. The first is simply called “interface” and refers to landscapes where the boundary between forests and developed areas can be seen at the scale of a neighbourhood or a community. Interface conditions imply a distinct boundary between homes and forests, and often result where development includes multiple-lot subdivision and land clearing, or where forests are separated from communities by farmland. The second type of WUI is called “intermix”, which refers to landscapes where the boundary between forests and urbanized areas is indistinct and may only be apparent at the scale of an individual property. In these landscapes, homes and infrastructure are set among forest vegetation. This type of development is common in rural areas where subdivision or farming haven’t resulted in land clearing. SSI lacks significant clearing from development or agriculture, and is thus mostly characterized by intermix conditions. This is typical of communities in the Gulf Islands. Figure 1 shows examples of these two conditions.

Interface conditions are where the boundary of urbanized and forested areas is visible at the scale of whole neighbourhoods.

Intermix conditions are where the boundary of urbanized and forested areas is visible at the scale of single houses or groups of houses.

Interface near Ganges

Intermix near Vesuvius

Figure 1. Visual comparison of "interface" and "intermix" conditions.

The shape of the boundary between homes and forests influences the pathways to home ignition and appropriate mitigation strategies. Forests and vegetation provide fuel to wildfires, although not all forests are equally hazardous. Homes in the intermix are surrounded by forest vegetation and are at risk of ignition through direct contact with flame, radiant heat from nearby fire, and wind-borne embers or firebrands. Homes in the interface next to the forest boundary also face these three ignition sources, while homes toward the interior of a neighbourhood or subdivision remain at risk of wind-borne embers alighting on building surfaces or landscaping. Managing the landscape around buildings and using fire-resistant construction can help people living in the interface to avoid damage to property during an oncoming wildfire. Since a significant number of wildfires are of human origin, managing the fuels between humans and forests also helps to contain human-caused fires before they spread into the surrounding landscape and become catastrophic events.

The AOI defines the assessment boundaries for the CWRP. The plan focuses on the WUI portions of SSI, which comprises a majority of the Island. Small uninhabited areas in the southwest near Musgrave Landing are the only areas not in the WUI. The overall terrestrial area of SSI is 18,200 hectares, while the WUI for this plan is 16,001 hectares. In addition, this plan focuses in particular on public land in the WUI, as this is the only land that the CRD can directly manage for wildfire risk mitigation. Public land comprises 21% of the AOI. Table 4 provides a simplified summary of ownership by area.

Table 4. Ownership summary in AOI

Jurisdiction	Area within the AOI (ha)	Area within the AOI – water excluded (ha)	% of area within the AOI (water excluded)
AOI	**21,643**	**16,001**	**94%**
CRD Owned Land	206	206	1.3%
Federal/Crown Federal	30.2	30.2	0.2%
Other	149.8	149.8	0.9%
Private	12,638	12,638	79%
Provincial Crown Land	1,765	1,765	11%
Unknown	236.2	236.2	1.5%

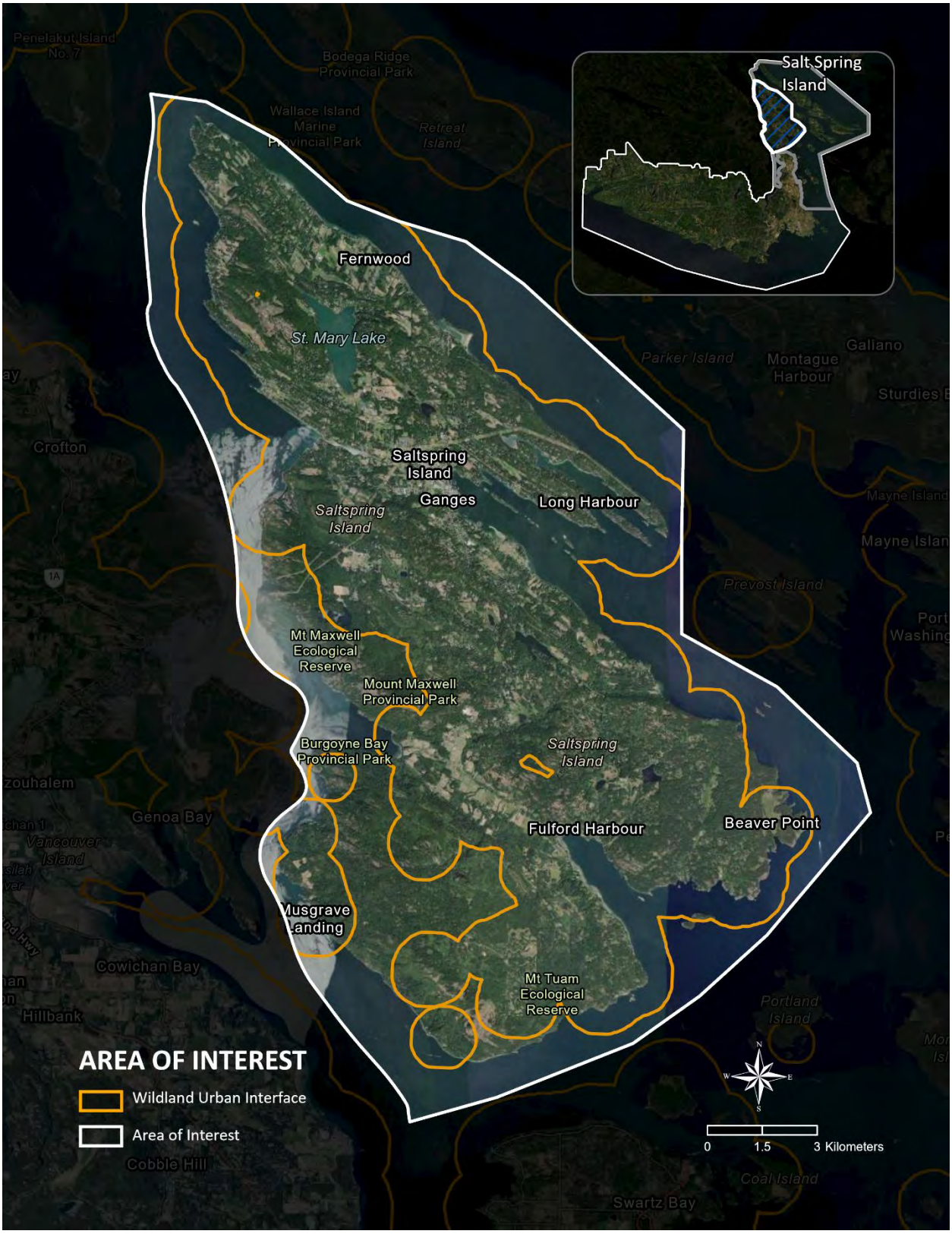

Figure 2. Area of interest for the plan and WUI.

Community Information

Demographics and Housing

The growth of SSI and how housing is developed can have a large impact on the resilience to wildfire. This is because patterns of development influence wildfire risk, and a rising population puts additional demands on local emergency responders. If carefully planned, growth can help SSI become resilient to wildfire by replacing outdated construction with modern building standards, introducing FireSmart development patterns, and adding new neighbours to shoulder the effort of community organizing and planning.

SSI constitutes a single census subdivision for Statistics Canada. The population of SSI at the 2021 Census was 11,365[1]. The number of private dwellings was 6,105, with 5,120 of these reported as being permanently occupied. The proportion of seasonal residences is higher than the provincial and regional average, but below the average of the other southern Gulf Islands. The population of SSI is characterized by high proportion of retirees, with a higher median age than the province and the CRD. As a popular summer destination, there is a large increase in visitor population during fire season. This is typical of the southern Gulf Islands, which are popular retirement destinations. Detailed community demographic information is found in Table 5.

The CRD completed a first Housing Needs assessment for SSI in 2020, which reviewed data from the 2016 census and other available market information to assess the suitability of SSI's housing stock to levels of demand for rentals and home ownership. The report identified a lack of suitable rental housing and affordable housing. Seniors, people with disabilities, and families are most affected by the lack of housing. This report also identifies a dramatic increase in homelessness in the last five years.

Demographics will influence risk and appropriate emergency planning and response. SSI has a unique composition in many ways. Household income throughout the Gulf Islands is higher than the CRD and provincial average. Population density is higher than the other Gulf Islands, but remains much lower than the CRD average. This rural, low density population is typical of island communities, and is often associated with an extensive and dispersed wildland-urban interface. These islands are also difficult to manage in emergency situations, as movement of responders and evacuation (if required) is hampered by the dispersed population and reliance on ferries for access. In addition, older populations will have higher proportions of the mobility limited.

[1] Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released October 26, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 24, 2022).

Table 5. Community Information for SSI.

Community Information	Salt Spring Island	Southern Gulf Islands	Capital Regional District	Province of British Columbia
Total Population (2021)	**11,365**	6,101	415,451	5,000,879
Land area (km^2)	**183**	191.1	2,338.22	920,686.00
Population density (persons/km^2)	**63.6**	31.9	177.7	5.4
Number of private dwellings	**6,105**	5,151	198,435	2,211,694
Number of dwellings occupied by usual residents	**5,120**	3,180	185,206	2,041,834
Average household income ($)	**111,200**	90,200	106,900	108,600
Average household size (persons)	**2.2**	1.9	2.2	2.4
Households by tenure – owner	**4080 (67%)**	2720 (53%)	116,530 (63%)	1,363,190 (61%)
Households by tenure – renter	**945 (15%)**	460 (9%)	68,425 (37%)	669,450 (30%)
Prevalence of low-income, after tax (LICO-AT) (%)	**4**	4.2	4.5	5.8
Median age (years)	**56.4**	61.6	45.5	42.8
Data Sources:		*Statistics Canada. 2022. (table). Census Profile. 2021 Census of Population. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released October 26, 2022. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 24, 2022).*		

Fire and Emergency Response

Fire protection in SSI is provided by Salt Spring Island Fire Rescue (SSIFR). SSIFR operates through an improvement district. SSIFR is operated by a mix of professional full-time firefighters and volunteer firefighters. Three fire halls are located throughout SSI. A majority of the island is within the SSIFR fire protection area.

Although SSIFR is a well-trained and supplied fire department, interface wildfires will often overwhelm even the most comprehensive fire departments, due to the volume of structures that typically require protection. Mutual Aid agreements are critical to allow resources sharing between fire departments during a large emergency. Although mutual aid agreements are in place with neighbouring island community fire departments (North/South Galiano, Pender, Saturna, and Mayne), assistance fwill be significantly delayed by travel times. The BCWS will be able to respond much faster using their aircraft, however they are limited in their ability to suppress structural fires which may occur in an interface incident. The nearest BCWS fire base is quite close, in Cobble Hill on Vancouver Island.

Table 6. SSI Fire Rescue Resources

Organization	Major Resources for Fire Response
Salt Spring Island Fire Rescue	- 10 full-time and 33 paid-on-call firefighters trained to NFPA 1001 full-service standard. - 16 additional recruits and field technicians - All members are trained to ICS-100 and S100; many members have S215 and WSPP 115 training. Some members have previous experience as wildland firefighters. - Engine 1 (1000-US gallon tank, 1000 gpm pump), - Engine 2 (500-gallon tank, 1250 gpm pump), - Engine 3, (500-gallon tank, 1500 gpm pump) - Reserve Engine (1000-gallon tank, 1000 gpm pump), - Tender 1 (1500-gallon tank, 400 gpm pump, portable pump), - Tender 2 (3000-gallon tank, 1000 gpm pump, portable pump), - Tender 3 (3000-gallon tank, 1000 gpm pump, portable pump), - Reserve Tender (1500-gallon tank, 400 gpm pump) - Brush 2 (wildland truck 200-gallon tank, 200 gpm pump, wajax portable pump) - Squad 1 (wildland capable brush, 200gpm tank, 100gpm pump) - SPU trailer (two wajax portable pumps, two porta-tanks, 100+ sprinklers)

All fire departments are registered with the Office of the Fire Commissioner, meaning they must meet standards for training set in the *BC Fire Service* Playbook. Departments are trained to the "full-service operations standard" under the *Playbook*. This means that a department can respond to the variety of exterior and structural fires that can occur in the community, including wildfires. Some members of the SSIFR have additional training relevant to wildfire, including courses for wildland response with the BC Wildfire Service, leadership training, and higher-level certification in the incident command system. SSIFR has achieved Superior Tanker Shuttle Accreditation with the Fire Underwriters Survey of Canada. This means that it can provide the water delivery capacity equivalent to municipal water service in areas without fire hydrants. However, the accreditation does not guarantee response times or water availability during a widespread emergency.

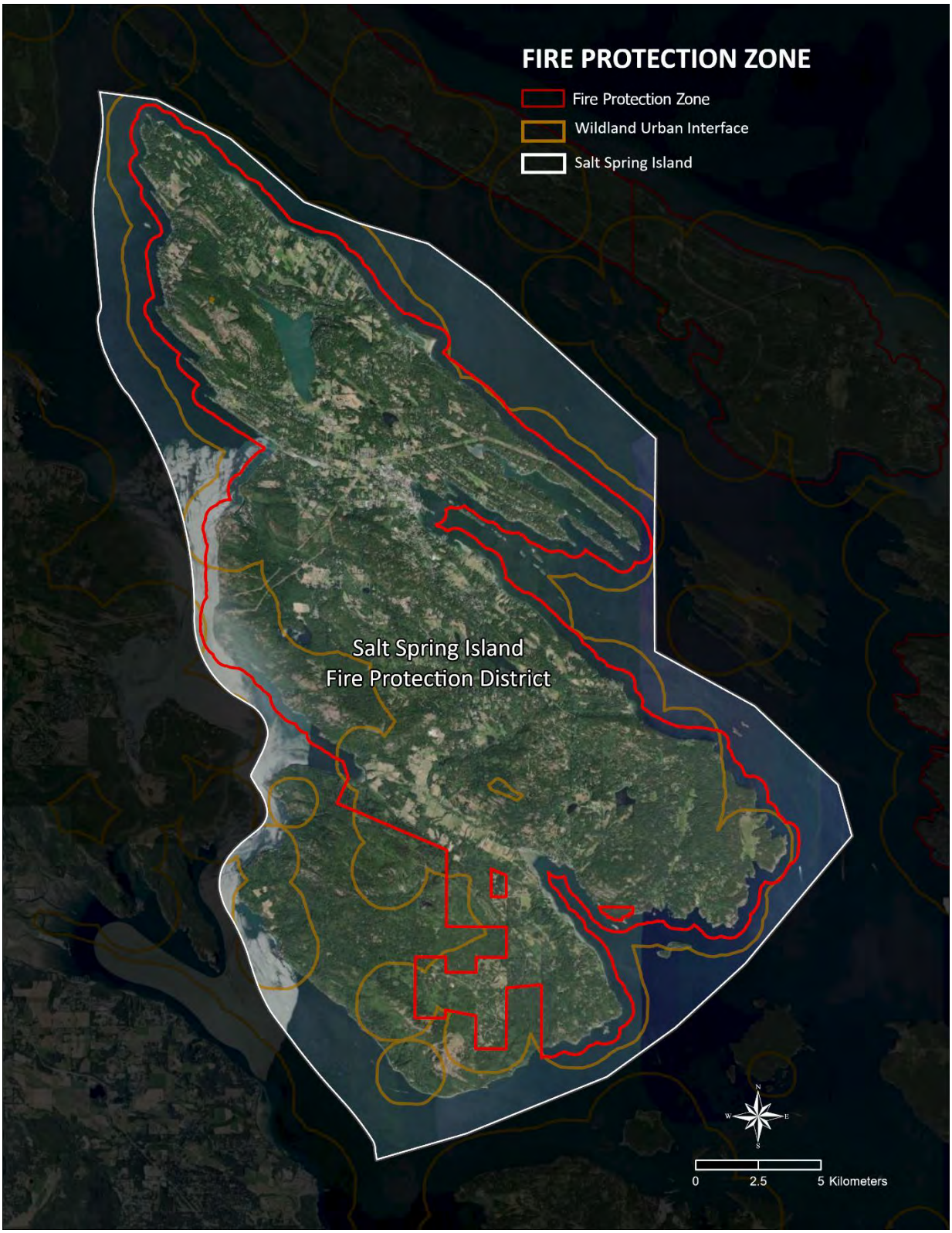

Figure 3. Salt Spring Island Fire Protection District

Values at Risk

Human Life and Safety

Protection of human life is the top priority in the event of wildfire in the urban interface. While an imperfect measure, wildfire planning in British Columbia uses the density of "structures", typically buildings with civic addresses, as a proxy for population density. Areas with an average density of more the six structures per square kms form the core of the WUI. Structure density is mapped in Figure 4 and Figure 5.

The relationship between structure density and wildfire risk can be complicated by local geography. Intermix areas tend to have lower density of structures, leaving room for native forest vegetation between homes and buildings. This is often associated with higher risk for this form of development where relatively high-threat forest fuels predominate. Interface developments may have low or high density of structures, depending on the landscape design and other land uses accompanying the construction of homes. At low structure densities, the layout of private property in intermix and interface areas may be quite similar: the difference is the yards of homes in intermix areas are treed while the yards of homes in interface areas will be substantially clear of native forest vegetation. While high structure densities are typically found toward the centre of towns and settlements, recent decades have seen more homes be located on the outskirts of communities adjacent to forests. This has occurred for several reasons, including rising land prices and the opposition of existing homeowners to new housing in their communities. This places more people at a higher risk of wildfire than building new homes in central locations.

Development conditions and structure density affect all aspects of fire management response and can strongly influence fire behavior. The connection between how communities are built and fire risk is discussed in greater detail in *Introduction to FireSmart* (p.89) and *Development Considerations* (p.96).

Human Health

In addition to the direct risks to life and safety, large uncontrolled wildfires can cause other human health impacts over a wide area. Residents of SSI are familiar with the negative impact of poor air quality from wildfire smoke, which has been experienced on BC's South Coast during several recent fire seasons. Heavy smoke disproportionately affects vulnerable populations of the elderly, and people with pre-existing medical conditions like asthma.[2]. Smoke can also worsen the outcome of acute respiratory diseases like COVID-19.

[2] BC Centre for Disease Control. 2021 (October). "Wildfire Smoke" [webpage]. http://www.bccdc.ca/health-info/prevention-public-health/wildfire-smoke. Accessed October 21, 2021.

By focusing on the wildfire or smoke event as a discrete emergency, the long-term negative effects of wildfire on physical and mental health may be underrated. People who have been evacuated, lost property, been injured, or seen loved-ones struggle with health issues during an emergency may have significant and lasting trauma that inhibits their day-to-day routine and makes ordinary tasks and experiences difficult. Mental health issues such as depression and anxiety can linger in a community that has experienced wildfire long after the original emergency[3].

Photo 2. Smoke can reduce air quality and cause human health problems.

[3] Belleville, G., M.-C. Ouellet, & C.M. Morin. 2019. Post-traumatic stress among evacuees from the 2016 Fort McMurray Wildfires: Exploration of psychological and sleep symptoms three months after the evacuation. *International Journal of Environmental Research and Public Health. 2019*(16):1604 (14pp).

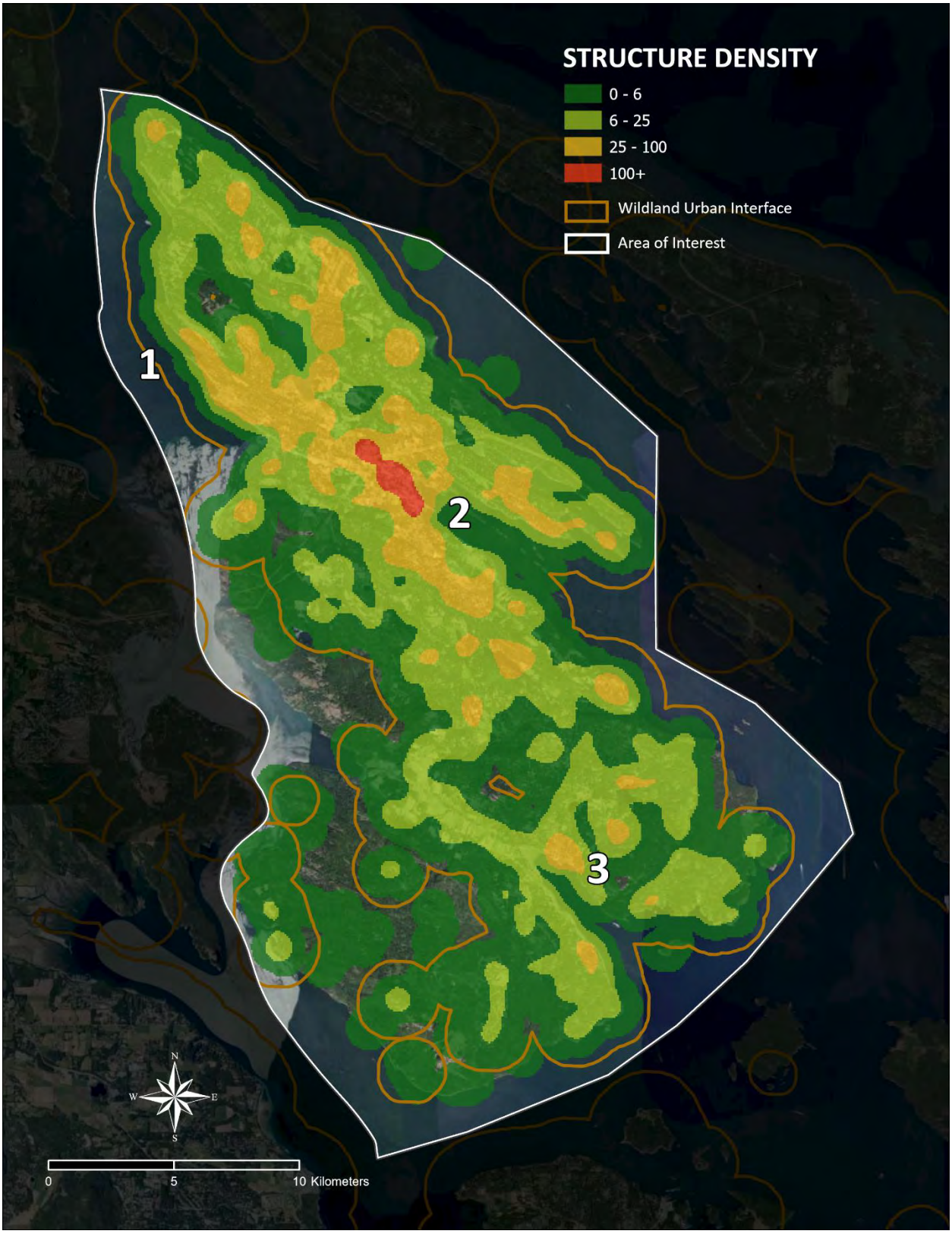

Figure 4. Structure density within the project area. The WUI represents a buffer of one km around areas of 6 structures per km^2 or higher.

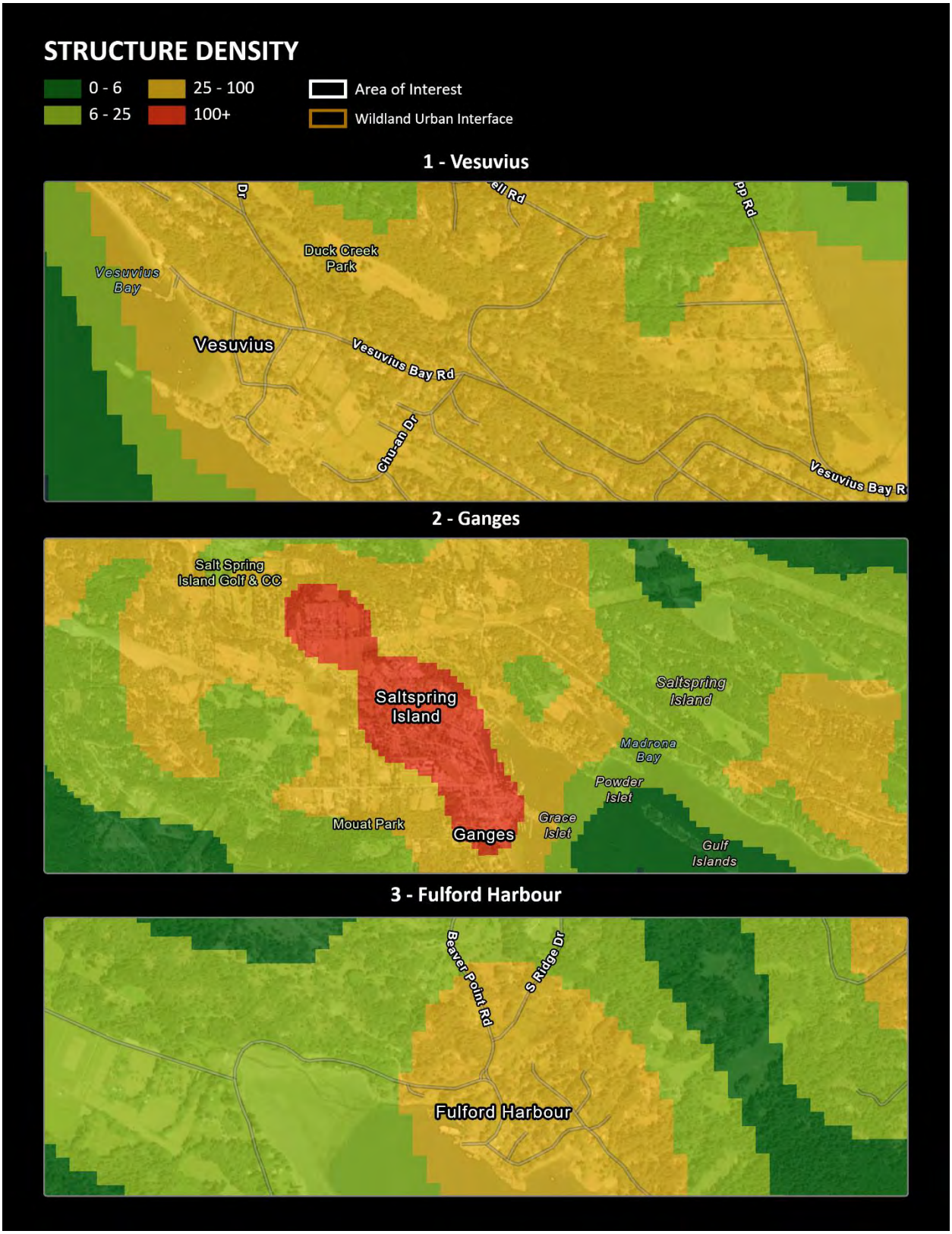

Figure 5 Structure density within main communities on SSI.

Environment and Protected Areas

Ecosystems in BC are defined using the Biogeoclimatic Ecosystem Classification (BEC) system.[4] SSI is part of a unique ecosystem in Canada, the Coastal Douglas-fir BEC zone. The mild, borderline Mediterranean climate allows animals and plants to thrive that are not found elsewhere in Canada. In addition, SSI's location amid the Salish Sea means the area also hosts travelling and resident marine wildlife whose habitats can be impacted by what happens on shore. Birds like the federally protected Marbled Murrelet, dependent on coniferous forests, cliffs, and marine fishing grounds, bridge the divide between land and sea each day. Approximately 23% of SSI is within parks and protected areas.

Photo 3 Garry Oak meadows are unique to the CDF ecosystem.

SSI is home to many parks which protect land under different legal mechanisms. There are several large provincial parks, such as Mt Maxwell, Ruckle, Burgoyne Bay, and Mount Erskine Provincial Parks. The areas are managed by BC Parks for environmental protection as well as public recreation. There are also several ecological reserve, such as Mount Tuam, which are set aside primarily for protection as unique natural features. These ecological reserves are also managed by BC Parks, but are usually less developed for public use.

CRD owned parks in SSI are managed by the CRD with input from Salt Spring Parks and Recreation Commission (SSIPARC). This commission will be replaced with a new Local Community Commission in 2023, which will set the strategic direction based on staff direction. CRD park Assets include moderate sized community parks, such as Mouat Park outside Ganges, and trails throughout SSI. Any action regarding wildfire mitigation will need to be included in the parks and recreation service planning .

[4] See the Wildfire Risk Assessment for more details on the BEC system.

Wildlife, Species at Risk, and Protected Ecosystems

The BC Conservation Data Centre (CDC) records BC's most vulnerable vertebrate animals and vascular plants, each of which is assigned to a provincial red or blue list according to their provincial conservation status rank. Species or populations at high risk of extinction are placed on the red list and are candidates for formal endangered species status. Blue-listed species are considered vulnerable to human activity and natural events. See Table 7 for a summary of these species and communities. Figure 6 and Figure 7 depicts publicly available locations of these species and ecological communities.

Table 7. Species and ecological communities with designated provincial conservation status in SSI. [5]

Name	Type	Conservation Status
grand fir / dull Oregon-grape	Ecological Community	Red
slimleaf onion	Vascular Plant	Blue
red alder / slough sedge [black cottonwood]	Ecological Community	Red
arbutus / hairy manzanita	Ecological Community	Red
Great Blue Heron, *fannini* subspecies	Vertebrate Animal	Blue
rigid apple moss	Nonvascular Plant	Red
Western Bumble Bee	Invertebrate Animal	Blue
Moss' Elfin, *mossii* subspecies	Invertebrate Animal	Red
slender sedge - white beak-rush	Ecological Community	Red
phantom orchid	Vascular Plant	Red
Common Wood-nymph, *incana* subspecies	Invertebrate Animal	Red
Northern Painted Turtle - Pacific Coast Population	Vertebrate Animal	Red
wine-cup clarkia	Vascular Plant	Red
Common Sharp-tailed Snake	Vertebrate Animal	Red
Ozette coralroot	Vascular Plant	Blue
banded cord-moss	Nonvascular Plant	Blue
Propertius Duskywing	Invertebrate Animal	Red
Dun Skipper	Invertebrate Animal	Blue
Oregon ash	Vascular Plant	Red
Northern Pygmy-owl, *swarthi* subspecies	Vertebrate Animal	Blue
Macoun's meadow-foam	Vascular Plant	Red
fern-leaved desert-parsley	Vascular Plant	Red
butterfly bearing lomatium	Vascular Plant	Red
coast manroot	Vascular Plant	Red
white meconella	Vascular Plant	Red
Western Screech-Owl, *kennicottii* subspecies	Vertebrate Animal	Blue
Surf Scoter	Vertebrate Animal	Blue
Threaded Vertigo	Invertebrate Animal	Blue
slender popcornflower	Vascular Plant	Red
white-lip rein orchid	Vascular Plant	Blue
trembling aspen / Pacific crab apple / slough sedge	Ecological Community	Red
Douglas-fir - arbutus	Ecological Community	Red
Douglas-fir / dull Oregon-grape	Ecological Community	Red
Douglas-fir / Alaska oniongrass	Ecological Community	Red

[5] B.C. Conservation Data Centre: CDC iMap [web application]. 2022. Victoria, British Columbia, Canada. Available: http://maps.gov.bc.ca/ess/sv/cdc/ (Accessed Sept 7, 2022)

leafless wintergreen	Vascular Plant	Blue
Garry oak / California brome	Ecological Community	Red
Garry oak / oceanspray	Ecological Community	Red
Northern Red-legged Frog	Vertebrate Animal	Blue
coastal Scouler's catchfly	Vascular Plant	Red
Zerene Fritillary, bremnerii subspecies	Invertebrate Animal	Red
twisted oak moss	Nonvascular Plant	Blue
western redcedar / vanilla-leaf	Ecological Community	Red
western redcedar / salmonberry	Ecological Community	Red
small-flowered tonella	Vascular Plant	Blue
Macrae's clover	Vascular Plant	Red
Howell's violet	Vascular Plant	Red
yellow montane violet	Vascular Plant	Red
giant chain fern	Vascular Plant	Blue

In addition to provincial conservation status, several specific wildlife species with federal protections under Canada's *Species at Risk Act (SARA)* are known or believed to inhabit the project area. These include Barn Owl, Dun Skipper, Marbled Murrelet, Sharp-tailed Snake, and Western Painted Turtle. In addition, two plants, Batwing Vinyl Lichen and Phantom Orchid, are also known or believed to inhabit the project area.

Table 8. Known occurrences of species with federal protections in SSI. [6]

Name	Type
Western Painted Turtle Pacific Coast population	Animal
Sharp-tailed Snake	Animal
Batwing Vinyl Lichen	Plant
Gray's Desert-parsley	Plant
Yellow Montane Violet praemorsa subspecies	Plant
Small-flowered Tonella	Plant
Marbled Murrelet	Animal
Macoun's Meadowfoam	Plant
Dun Skipper vestris subspecies	Animal
Barn Owl	Animal
White Meconella	Plant
Coastal Scouler's Catchfly	Plant
Phantom Orchid	Plant

[6] B.C. Conservation Data Centre: CDC iMap [web application]. 2023. Victoria, British Columbia, Canada. Available: http://maps.gov.bc.ca/ess/sv/cdc/ (Accessed February 16, 2023)

Wildfire can have positive and negative relationships with biodiversity, depending on the scale of time and space. The ecosystems of SSI developed in the context of sporadic wildfire, with plants and animals that have adapted to wildfire disturbance[7,8]. In the Salish Sea lowlands, Indigenous people used prescribed wildfire pre-colonization to maintain desirable meadow forage and food plants like camas[9,10]. Wildfires can support biodiversity by re-establishing a diversity of forest ages and tree sizes, the infrastructure of diverse ecosystems, within an area. Conversely, large, high intensity fires can reduce biodiversity by destroying ecosystems and habitat features over large areas. Despite this, large fires can also play an important role in preserving the long-term health of an ecosystem by acting as a check on the proliferation of forest pathogens and other diseases of animals and trees. Because of urban development, climate change, and extensive modification of ecosystems, it is important to protect remaining reserves of high-biodiversity habitat or ecological communities from loss to wildfire when possible, or ensure wildfire affecting these areas is of a scale and intensity that supports the ecological community as a whole.

There is evidence (see the fire history section for more discussion) that the natural fire regime has been distorted by human fire suppression. For the past several decades, fire agencies have aggressively actioned all wildfires, in many cases eliminating wildfire as an ecosystem process. This phenomenon is known as ***fire exclusion***, and can result in significantly altered ecosystem characteristics. In particular, the elimination of low severity ground fires, which historically have been frequent in areas of the CDF, has led to the development of dense patches of non-native grasses, shrubs. This has led to Douglas-fir encroachment in areas normally dominated by Garry Oak.[11] As such, fire exclusion has resulted in less habitat available for some at-risk species in BC.[12] This points to the importance of restoring wildfire via prescribed burning in fire excluded landscapes, or mimicking wildfire disturbance through forest thinning and surface vegetation management.

[7] Murphy, S. F., M. G. Pellatt, & K. E. Kohfeld. (2019). A 5,000-year fire history in the Strait of Georgia Lowlands, British Columbia, Canada. *Frontiers in Ecology and Evolution*. 10 April 2019.

[8] Lucas, J. D. & T. Lacourse. (2017). Holocene vegetation history and fire regimes of *Pseudotsuga menziesii* forests in the Gulf Islands National Park Reserve, southwestern British Columbia, Canada. *Quaternary Research, 79* (3)-366-376.

[9] Beckwith, B.R. (2004). The Queen Root of this Clime: Ethnoecological Investigations of Blue Camas (*Camassia quamash, C. leichtlinii*; Liliaceae) Landscapes on Southern Vancouver Island, British Columbia. PhD dissertation, University of Victoria.

[10] Turner, N. J., D. Duer, & D. Lepofsky. (2013). Plant management systems of British Columbia's First Peoples. *BC Studies*, no. 179 (Autumn 2013), 107-133

[11] Hoffman, Kira M.; Wickham, Sara B.; McInnes, William S.; Starzomski, Brian M. (2019). Fire Exclusion Destroys Habitats for At-Risk Species in a British Columbia Protected Area. *Fire*, 2 (3), 48.

[12] Hoffman et al, 2019.

Photo 4. Fire scars on a cedar tree in the CDF ecosystem.

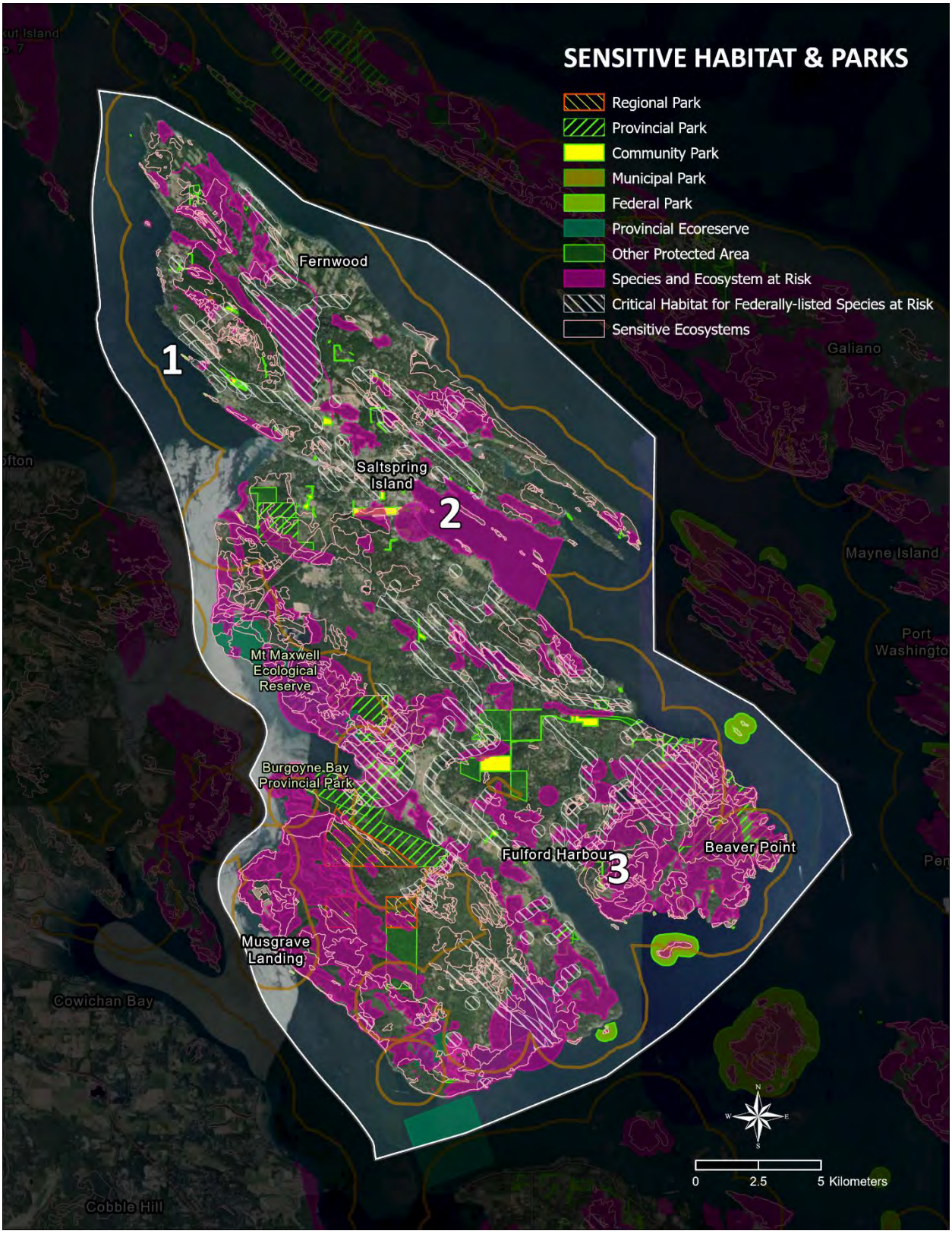

Figure 6. Protected areas and known locations of protected species or habitat.

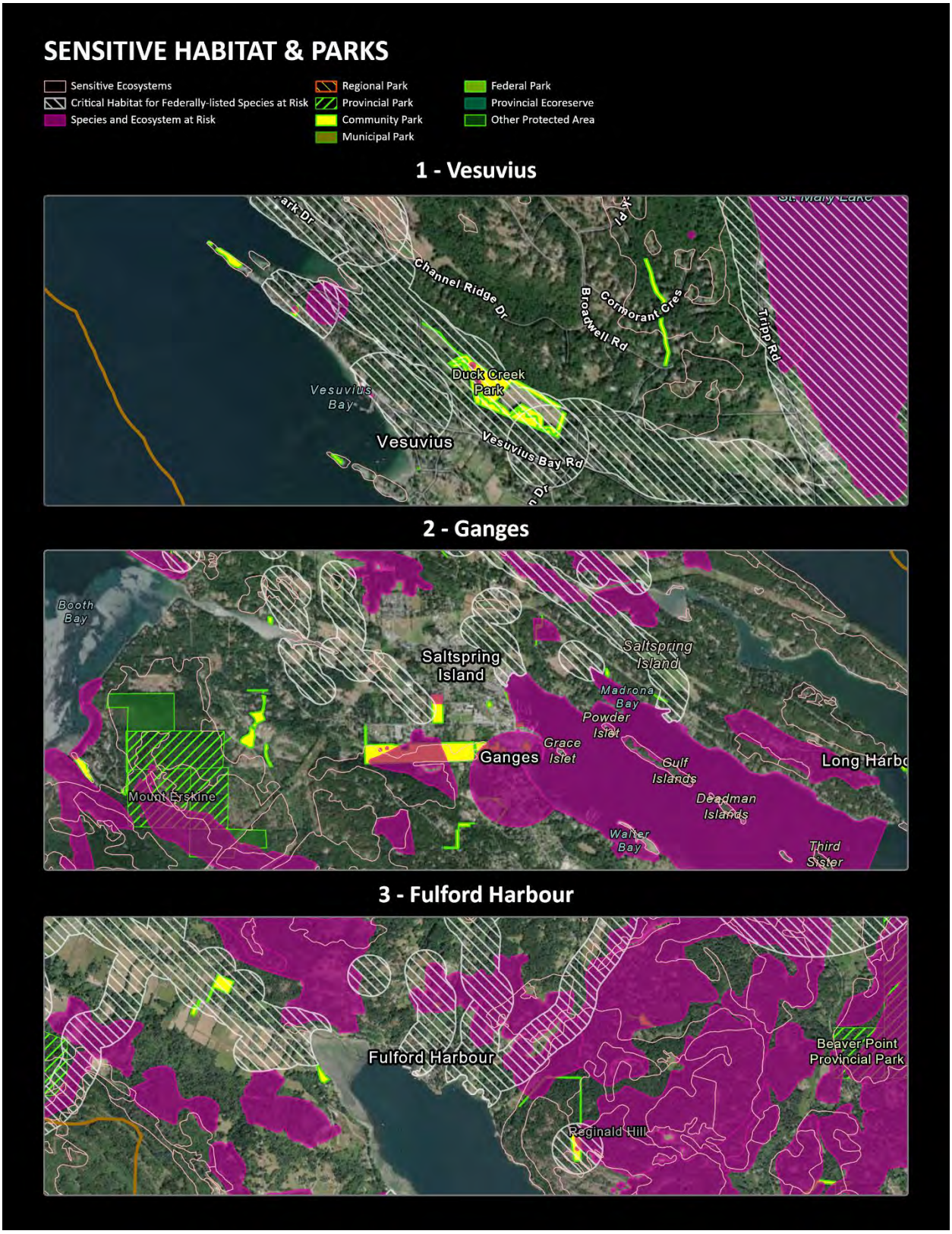

Figure 7. Protected areas and known locations of protected species or habitat near main communities of SSI.

Cultural and Archaeological Values

The landscape of SSI contains thousands of years of indigenous history and culture. This lengthy history between Indigenous peoples and the land has fostered a relationship that continues up to the present day. The island was an important source of natural resources for the indigenous people, and no agreements were ever made transferring land to colonists. The area we now call Salt Spring Island includes traditional territory for the Saanich, Cowichan, and Chemainus First Nations. Indigenous people have lived in this landscape since time immemorial and continue to advocate for the return of unceded lands and settlement of modern treaties which would restore parts of their territories. Actions to advance wildfire management in Indigenous traditional territory must involve local nations to include Indigenous values and stewardship priorities.

The protection of pre-colonization cultural sites is supported by the Province through the *Heritage Conservation Act*. This *Act* allows the Archaeology Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development to maintain a spatial database of archaeological and historical (post-colonization) sites related to indigenous culture and history. These can include cache pits, trails, fishing sites, cooking features, lithics (stone tools), grave sites, and findings of human remains. Because of the sensitive nature of many of these sites, their locations cannot be published. Within SSI, 189 archaeological sites have been documented within provincial databases. Additional archaeological sites are likely present and known to nation members and local archaeologists. Activities with physical impacts on the land, such as fuel management, within 50 m of these sites must engage a qualified archaeologist to ensure sites are adequately protected under the *Act*.

Wildfire can cause loss of cultural values by causing damage to ecosystems and soils as well as historic and archaeological remains. While physical damage to cultural sites as the result of wildfire management is unacceptable, activities like fuel modification can help preserve cultural values by reducing the likelihood of high intensity, damaging wildfire. In other cases, wildfire management activities like prescribed burning or clean-up of fine fuels can be planned to align with or even enhance cultural values and practices.

Hazardous Values

During a wildfire, some land-uses or economic activities are associated with higher risk because they involve flammable materials, high temperature machinery, or chemicals hazardous to human health if improperly handled but are nonetheless important to the economic and social function of the community. In larger communities, hazardous values include railways, industrial facilities, gas stations, military installations, and landfills. In SSI, the most significant stores of hazardous values are likely to be fuel or other supplies located within commercial fuel stations. As the risks associated with storing flammable materials can never be fully eliminated, any properties with a propane tank or stores of fuel are the location of potentially hazardous values. During a wildfire, any known or unidentified location of hazardous values presents a danger to emergency responders and the public.

Other Resource Values

Wildfires can be large, landscape-scale events that create long-term impacts on sections of the economy which rely on forest resources or access to land, including eco-tourism, forest harvesting, fish and game, non-timber forest products, and mineral extraction.

A loss of mature forests to wildfire in the area would be felt emotionally by residents and visitors, even when consistent with natural ecosystem processes. These impacts may be measurable in reduced property values or tourism and overnight stays. Tourism is an important part of the community's economy, with several popular provincial park campgrounds and tourist attractions.

Critical Infrastructure

Critical infrastructure are the publicly owned assets, whether by the CRD, the Province, local Improvement Districts, or First Nation, that underpin the health and safety of the community and allow governance to take place. Critical infrastructure also includes public assets identified in a Hazard, Risk & Vulnerability Assessment undertaken by a local government. In developing the CWRP, facilities deemed critical to the delivery of emergency services (like evacuation planning or fire protection) were considered, regardless of whether these facilities are owned by the CRD. The nature of government in the unincorporated communities means that the CRD is directly responsible for few of these pieces of critical infrastructure. Additional sites and facilities have been included in consideration of field review by the consulting team and input from community members.

Electrical Power

Electrical power is provided to most of SSI by overhead transmission lines. The electrical distribution network relies almost exclusively on above-ground transmission lines fastened to wood utility poles. Wooden poles are vulnerable to fire, and in many locations these lines are within a few metres of forests. Power lines are also a source of ignition because branches and foliage that fall onto charged electrical lines can readily catch on fire. One major high voltage powerline crosses the AOI, and forms an important connection between Vancouver Island and the mainland. High-voltage lines are somewhat less likely to become sources of ignition because wider rights-of-way reduce the chance of vegetation contacting charged lines. BC Hydro inspects and manages vegetation along its utility corridors.

Electrical networks can be compromised in the event of a large wildfire. Not only can wildfire ignite electrical infrastructure but burned trees can fall on lines and disrupt service. Ensuring emergency operations have access to a sufficient supply of back-up power is an important part of wildfire preparedness.

Communications Infrastructure

Primary connections to telephone and internet service in most of the Electoral Area are provided via the same overhead connections as are used for electrical power. Some rural residences are served by satellite telecommunications providers.

Cellular telephone service and text-based messaging services are frequently residents' primary means of communication. Cell service is provided by the three major Canadian telecommunications companies to all parts of the Electoral Area. Smaller providers may have incomplete network coverage in the area. Prominent cellular towers are found on Mount Tuam, Mount Bruce, and Hope Hill.

Radio communication is an important part of emergency response. Fire halls in SSI incorporate a radio broadcast transmitter for maintaining land-mobile communications between fire departments and crews responding to an emergency. Radio repeaters are also located in similar locations to the aforementioned cell towers, as well as at the RCMP detachment on Lower Ganges Road.

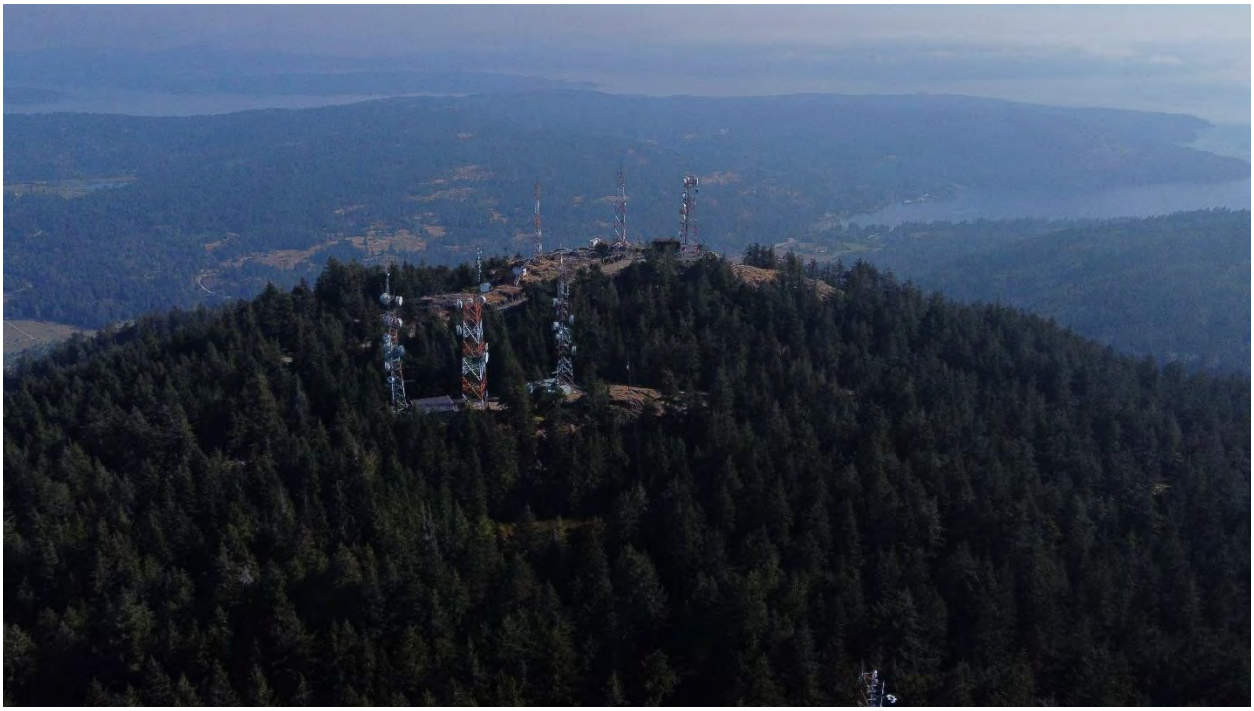

Photo 5. Communications infrastructure on Mount Bruce in SSI.

Public Buildings and Facilities

A small number of institutions and public buildings are crucial for maintaining the function of government and community services. These buildings can include municipal halls or offices, physical emergency operations centres, fire halls, schools, hospitals, and transportation facilities. Ensuring the safety of public buildings and institutions during a wildfire is important for emergency response and the continuation of community recovery after an event. During an emergency, these facilities may also be used as muster locations, reception centres, or relief and supply points. Table 9 lists the facilities of critical importance to the CRD's emergency plans. This list has been duplicated from CRD emergency planning documents.

Table 9. Critical Infrastructure within SSI.

Type	Facility or Building Name	Location	UTM Easting	UTM Northing
Ambulance	BCEHS Station #103	275 Park Drive	462555.5926	5411911.334
Communications	CREST Tower	Mt Bruce Summit	462601.7523	5401632.26
Communications	CREST Tower, SSIFR Hall 3	110 Vesuvius Bay Rd.	461158.3488	5413534.694
Communications	Telus Towers	N/W of Canvasback Place (2)	458880.4914	5415967.387
Communications	Telus Towers	Mount Bruce summit	462601.7523	5401632.26
Communications	Telus Towers	Fulford Harbour Ferry Terminal	466926.8582	5401892.896
Communications	Rogers Tower	Mount Tuam summit	464284.0408	5397313.673
Communications	Freedom Mobile	Hope Hill summit	463837.0706	5400125.467
Communications	CRD Repeater, HAM , CBC	Blain Rd. & Lower Ganges Rd	462478.8138	5412179.432
Electricity	BC Hydro Substation	500 Lower Ganges Ro	462018.0329	5412306.201
Electricity	3 - 138 kV Transmission Line North	North end of SSI	N/A	N/A
Electricity	1 - 230 kV Transmission Line	North end of SSI	N/A	N/A
EOC	SSI EA EOC	343 Lower Ganges Road (basement)	462677.0953	5412036.296
EOC	SSI EA EOC	124 Rainbow Rd.	463265.025	5411430.521
Fire	Salt Spring Island Fire/Rescue #1	105 Lower Ganges Road	463364.1381	5411217.714
Fire	Salt Spring Island Fire/Rescue #2	2470 Fulford-Ganges Road	465207.585	5402459.654
Fire	Salt Spring Island Fire/Rescue #3	110 Vesuvius Bay Road	461158.3488	5413534.694
Health	Salt Spring Island Health Centre	164 Kings Lane	462507.0138	5412404.866
Health	Lady Minto / Gulf Islands Hospital	135 Crofton Road	462713.6973	5412237.959
RCMP	RCMP Detachment	401 Lower Ganges Road	462443.2461	5412226.759
SAR	Canadian Coast Guard Station	99 Fulford-Ganges Rd.	463500.1866	5411248.374
SAR	Marine Search and Rescue	795 Vesuvius Bay Rd.	458029.8015	5414426.045
SAR	SAR	261 Fulford-Ganges Road	463315.1609	5410657.606
School	Fernwood Elementary School	150 Fernwood Road	460493.0516	5417269.547
School	Fulford Elementary School	203 Southridge Drive	467139.0816	5402713.319
School	Gulf Island Senior Secondary	232 Rainbow Road	462783.1707	5411535.391
School	Salt Spring Elementary	122 Rainbow Rd.	4632650.25	5411430.521
Transportation	Ganges Harbour Airport	Ganges Harbour	463545.111	5411396.625

Transportation	Harbour Air (formerly Salt Spring Air)	#3102 - 115 Fulford-Ganges Road	463500.1866	5411248.374
Transportation	Ferry	Vesuvius Ferry Ramp	458026.3959	5414465.461
Transportation	Ferry	Long Harbour Ferry Ramp	467325.1263	5411046.932
Transportation	Ferry	Fulford Harbour Ferry Ramp	466943.7053	5401902.616
Transportation	Vesuvius Dock	795 Vesuvius Bay Rd	458029.8015	5414426.045
Transportation	Fulford Harbour Marina	End of Fulford-Ganges Road	466930.2564	5401861.26
Transportation	Government Pier	Fernwood Rd & N. Beach Rd.	460923.6819	5418163.253
Transportation	Government Dock	Burgoyne Bay Provincial Park	461685.1041	5404564.661
Transportation	Government Dock	99 Fulford-Ganges Rd.	463500.1866	5411248.374
Transportation	Ganges Harbour Marina	126 Upper Ganges Road	463232.8434	5411922.178
Transportation	Lower Ganges Harbour Marina	161 Lower Ganges Road	463307.2445	5411460.268
Transportation	Centennial Park Dock	Fulford-Ganges Rd & L. Ganges Rd.	463482.1945	5411175.862
Water	Beddis Water Svc. - Sky Valley Reservoir	331 Sky Valley Road	465955.1941	5407496.199
Water	Beddis Water Treatment Plant	Cusheon Lake Road	465869.1414	5407110.628
Water	Sky Valley Lower Res.	Btwn. 336 & 362 Sky Valley Road	466055.6651	5407382.944
Water	Cedar Lane Water System	Near Mansell and Kangro Roads	463634.3647	5413288.689
Water	Cedars of Tuam Water System	600 blk. Isabella Point Road	467429.3248	5399506.587
Water	Fulford Water System	169 South Ridge Drive	467078.9187	5402674.435
Water	North Salt Spring Waterworks Distr.	761 Upper Ganges Road	461261.9556	5413420.37
Water	North Salt Spring Water Treatment Plant	Tripp Road	459920.8938	5415085.341

Water Supply & Waste Treatment

Water supply is complicated within SSI. There is no single water provider, but rather several different systems for different areas throughout the area, as well as many private wells. The CRD operates five relatively small water systems on SSI: the Beddis, Cedar Lane, Cedars of Tuam, Fulford, and Highland/Gernwood water systems. Small improvement districts for water supply include Mt. Erskine, Mt. Belcher, Scott Point, and Harbour View. The largest water system is the North Salt Spring Waterworks District (NSSWD), which provides water to most residents on the Island. The NSSWD operates independently as an improvement district, and also operates several other water systems on the Island. Extensive areas of land are managed specifically to preserve water quality within the NSSWD. Significant investments have occurred recently, including the construction of a new water treatment plan, to ensure there is sufficient drinking water for residents within the waterworks district.

A majority of the land within the NSSWD is privately owned and/or protected to preserve drinking water quality. Most of this land is forested and within small watersheds. NSSWD has identified wildfire as a key concern for water quality, and is proactively managing land to address wildfire risk. To that end, the NSSWD works with Transition Salt Spring, a local organization working on climate action. Work within the NSSWD lands has included a wildfire risk analysis, community engagement, and planning understory and debris management to reduce wildfire risk. This work, although independent of the CRD's jurisdiction, is largely aligned with the overall goal of the CRD of increasing wildfire resilience to the region.

Photo 6. The NSSWD is the largest water service provide in SSI.

In recent years SSI, along with other parts of coastal British Columbia, has experienced severe water shortages during the summer due to a combination of reduced summer precipitation, warmer temperatures, and increased water use. This also limits water availability for fire suppression, often during periods of the highest wildfire danger. Additionally, many areas have limited water pressure for fire suppression, or poor fire hydrant coverage. SSIFR has detailed maps identifying areas of limited water availability, and has developed procedures and equipment for alternative water delivery, discussed further in the Emergency Planning section.

Liquid waste is handled for most properties by septic systems. Some areas have combined sewerage services relying on collective septic fields. The CRD provides sewer services to Ganges and treats waste water.

Wildfire has a complex relationship with water supply. Fires tend to increase surface runoff by removing insulating, absorbent organic matter at the soil surface and increasing so-called "splash impact" of raindrops on newly exposed mineral soils[13]. This impacts the rate of groundwater recharge, as well as affecting surface water sources with sedimentation and excess mineral nutrients downslope of burned areas.[14]. There have been cases where debris flows that have damaged homes and infrastructure were attributed to wildfire damage to soils[15]. The temperature and duration of heat in the soil can also impact the rate of groundwater recharge. At low to moderate temperatures, fire can create a water repellent layer in the subsoil that restricts infiltration, while at higher temperatures this layer may form but then be weakened or removed[16,17]. In SSI, protecting drinking water supply and existing septic systems means protecting local hydrology from the potential impacts of wildfire and erosion.

[13] Paige, G., & Zygmunt, J. (2013). The Science Behind Wildfire Effects on Water Quality, Erosion. *Living with Wildfire in Wyoming*. (p. 31-34). University of Wyoming: Laramie, WY.
[14] Emelko, M., & Sham, C. (2014). Wildfire Impacts on Water Supplies and Potential for Mitigation: Workshop Report. (p. 36). Waterloo, ON: Canadian Water Network and Water Research Foundation.
[15] Jordan, P., K. Turner, D. Nicol, & D. Boyer. (2006). Developing a risk analysis procedure for post-wildfire mass movement and flooding in British Columbia. *1st Specialty Conference on Disaster Mitigation, 23-26 May 2006, Calgary, AB, DM-013* (pp. 1-10). Montreal, QC: Canadian Society for Civil Engineering.
[16] Robichaud, P. R., J.W. Wagenbrenner, F.B. Pierson, K.E. Spaeth, L.E. Ashmun, & C.A. Moffet. (2016). Infiltration and interrill erosion rates after a wildfire in western Montana, USA. *Catena* 142 (2016) 77-88.
[17] Wieting, C., B.A. Ebel, & K. Singha. (2017). Quantifying the effects of wildfire on changes in soil properties by surface burning of soils from the Boulder Creek Critical Zone Observatory. *Journal of Hydrology: Regional Studies*. *13* (2017) 43-57.

Figure 8. Public facilities considered critical infrastructure.

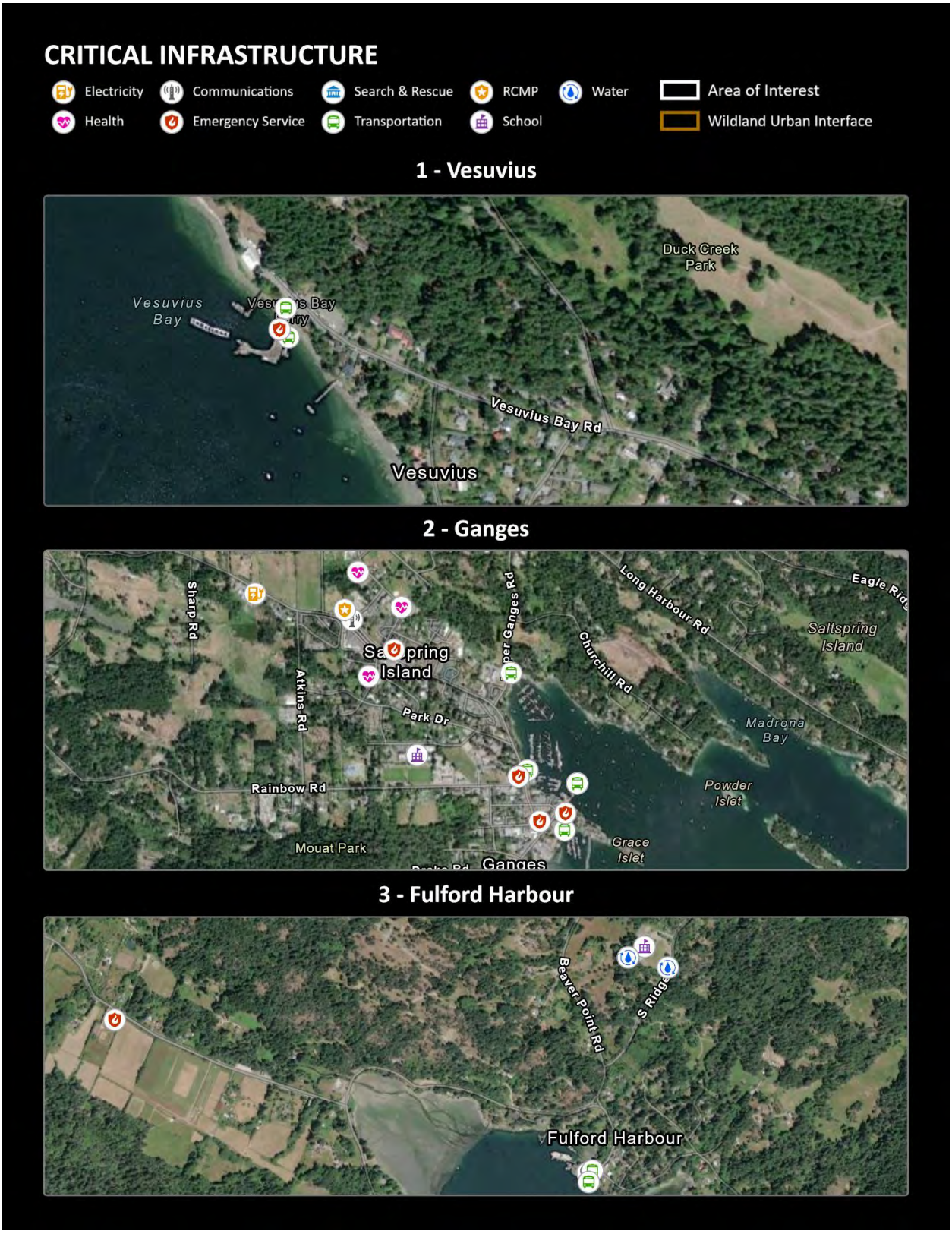

Figure 9. Public facilities considered critical infrastructure in main communities of SSI.

Wildfire Risk Assessment

Crucial to building wildfire resiliency is understanding where wildfire risk is the highest, so that investments made by the CRD are effective, sensible, and balanced with other community values and interests.

In this Community Wildfire Resiliency Plan (CWRP), the terms ***wildfire threat*** and ***wildfire risk*** refer to different components of Salt Spring Island's (SSI) vulnerability to wildfire. Both threat and risk have been modelled using data collected from forests in SSI. Wildfire threat refers to the potential fire behavior that a natural area could sustain. Rating wildfire threat means looking at the factors of fuel loading, type, and distribution, slope and aspect, and weather conditions. Wildfire threat has no relationship to how close a forest is to populated areas or other values. Wildfire risk builds on wildfire threat by considering the proximity of forests to populated areas and other values.

Wildfire threat is a ranking of potential fire behavior based on fuel conditions, weather conditions, slope, aspect, and other biophysical factors.

Wildfire risk is a measure of the probability of a wildfire occurring combined with the consequences or impacts it would cause.

Wildfire Environment

This section describes the components of wildfire threat in SSI. These components are topography, forest fuels (vegetation, debris and organic soil), and weather.

Topography

Topography influences wildfire behavior in several ways. In hills or mountains in the northern hemisphere, fuel loading is often less on south and west aspects because these are the warm aspects with higher amounts of solar exposure and consequently drier microclimates less supportive of vegetation. Higher fuel loading is found on cooler north and east aspects, which at this latitude are more protected from direct solar exposure. Conversely, southern aspects are often warmer and drier. Therefore, while warm aspects burn more frequently on average, during the most extreme fire weather cooler aspects can often support more severe fire behavior. On any considerable slope, wildfire spread is faster in the uphill direction. Hot air from a fire below will rise uphill, preheating forests above the head of the fire and drying fuels in advance of the flame. On steep slopes, flames also bathe the nearest upslope fuels to accelerate combustion. For these reasons, areas of steeper slopes are expected to have higher potential wildfire behavior.

Terrain in SSI is steep and hilly, with few flat areas. The terrain is particularly steep and rugged on the slopes of Mount Tuam and Mount Bruce in the south of the island. Steep south and western slopes can be found in these areas.

Fuels (vegetation)

Forest fuels are the dead and living vegetation and burnable soils within the Electoral Area. Fuel conditions vary with the composition of tree species, live and dead proportions, density of understory shrubs and other plants, and other ecosystem characteristics. Fuels dominated by coniferous trees and shrubs are typically more flammable than deciduous forests due to their relatively low moisture content. Some plants produce volatile chemicals that readily burn, such as oils produced by scotch broom or gorse. Grasses burn quickly due to the large ratio of surface area to volume in their leaves, and often dieback during dry seasons in a process called curing. Deciduous broadleaved fuels, conversely, are more resistant to ignition due to their higher moisture content. Deciduous fuels may be left unburned during a wildfire that torches surrounding coniferous forests.

Forest fuels belong to one of four layers. First are ground fuels – this is the organic matter in the soil (soil carbon). Next are surface fuels, which includes all the dead branches, leaf litter, and low plants on or just above the surface of the ground. Above this, ladder fuels are the large shrubs, branches, and small trees that extend between the surface fuels and the overall height of the tree canopy. Lastly, crown fuels are the foliage, branches, and other vegetation lodged within the tree canopy.

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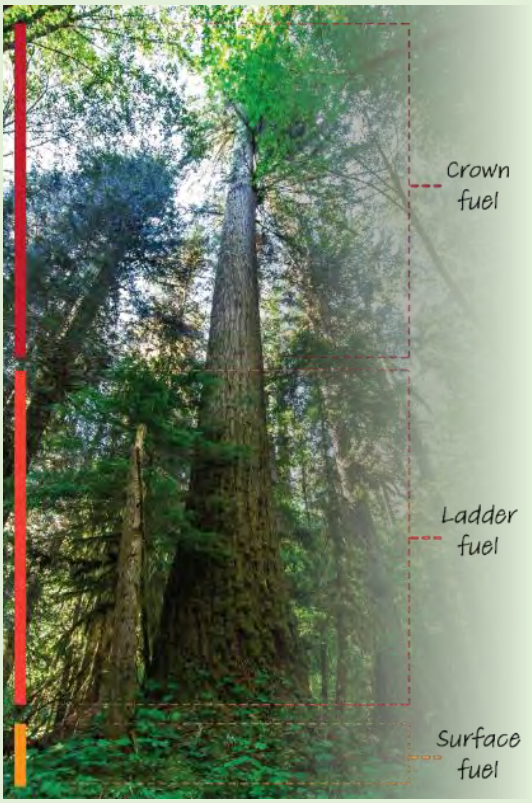

Photo 7. Forest fuel layers.

The combination of fuels from each of these layers is a strong influence on how quickly wildfire can grow and build intensity. The difference in behavior between high intensity and low intensity fires is significant for preparedness planning and response. For example, BC Wildfire Service ground crews will action a fire burning with an intensity of more than 2,000 kilowatts per metre (kw/m). This is a measure of energy being put out by head of an advancing fire. In forested environments, fires with high intensities can climb into tree crowns via ladder fuels. If conditions are right, ignition in the tree canopy will become an active ***crown fire*** – one where fire is spreading along the ground and through the crown simultaneously. These fires consume whole forests, from the soil to the tops of the trees, send embers far ahead on the wind to light new blazes, and are too dangerous to fight directly.

Crown fire is a wildfire that involves fuels in the tree canopy. It can be "active", meaning fire is advancing through tree crowns simultaneously with surface fire spread, or "passive", meaning surface fire intensity is great enough to cause torching of single trees or small tree patches.

Photo 8. A wildfire with active crown fire. (Example from outside the CRD)

Crown fire becomes more likely where hazardous coniferous fuels have low ***vertical*** and ***horizontal separation***. Amid the amazing variety of forests, some combinations of species, sites, and climates naturally produce ecosystems that have less separation between the fuel layers (vertical separation) or neighbouring tree crowns (horizontal separation). The fuel characteristics of forests also change drastically over time as the ecosystem develops. In Canada, a standardized system of assigning real forests to 16 simplified fuel types is used to help model wildfire threat and risk. These are the fuel types of the Canadian Fire Behavior Prediction System. Although the fuel types were developed with the rest of Canada in mind, practice in British Columbia and applied research by the Canadian Forest Service and BC Wildfire Service has resulted in several standard rules for assigning forests fuel types.

Vertical* and *horizontal separation refer to fuel distribution within a forest and are used to help classify forests into standardized fuel types.

Most native coniferous forests in Coastal BC are represented by the C-5 fuel type. This represents a coniferous forest with relatively high horizontal and vertical separation of fuels, where a high intensity of surface fire would be required under normal weather conditions to create an active crown fire. As a result, C-5 forests on flat ground are typically rated to have moderate wildfire threat (potential wildfire behavior). Young forests are typically denser and may have less separation between fuel layers and neighbouring tree crowns. In this area these forests are assigned the C-3 fuel type, which is associated with high wildfire threat. Other common fuel types in this area are M-2 (mixed wood) and D-1 (deciduous). Stands with a high proportion of deciduous trees are expected to have reduced wildfire threat. The wildfire threat in M-2 stands is significantly affected by the proportion of conifers found in them. Table 10 provides a breakdown of fuel types by total area. Figure 10 and Figure 11 show the distribution of fuels in SSI.

Table 10. Summary of fuel types within SSI.

Fuel Type Name	Area (ha)	General description
C-3	41.9	Young conifer stands with high stem densities, generally younger than 40 years and less than 15 m in height.
C-5	9,805	Mature, low to moderate density stands of native conifers, generally over 40 years in age and over 15 m in height.
D-1/2	1,962.6	Deciduous stands with fewer than 25% coniferous composition.
M-1/2	1,577.8	Mixedwood stands having between 25 and 75% coniferous and deciduous composition.
N	1.8	Non-fuel areas – pavement, rock, extensive sand.
O-1a/b	2,326.4	Grass fuel types, also used to represent agricultural fields and large lawns.
W	5,927.9	Bodies of water, including freshwater and the ocean.

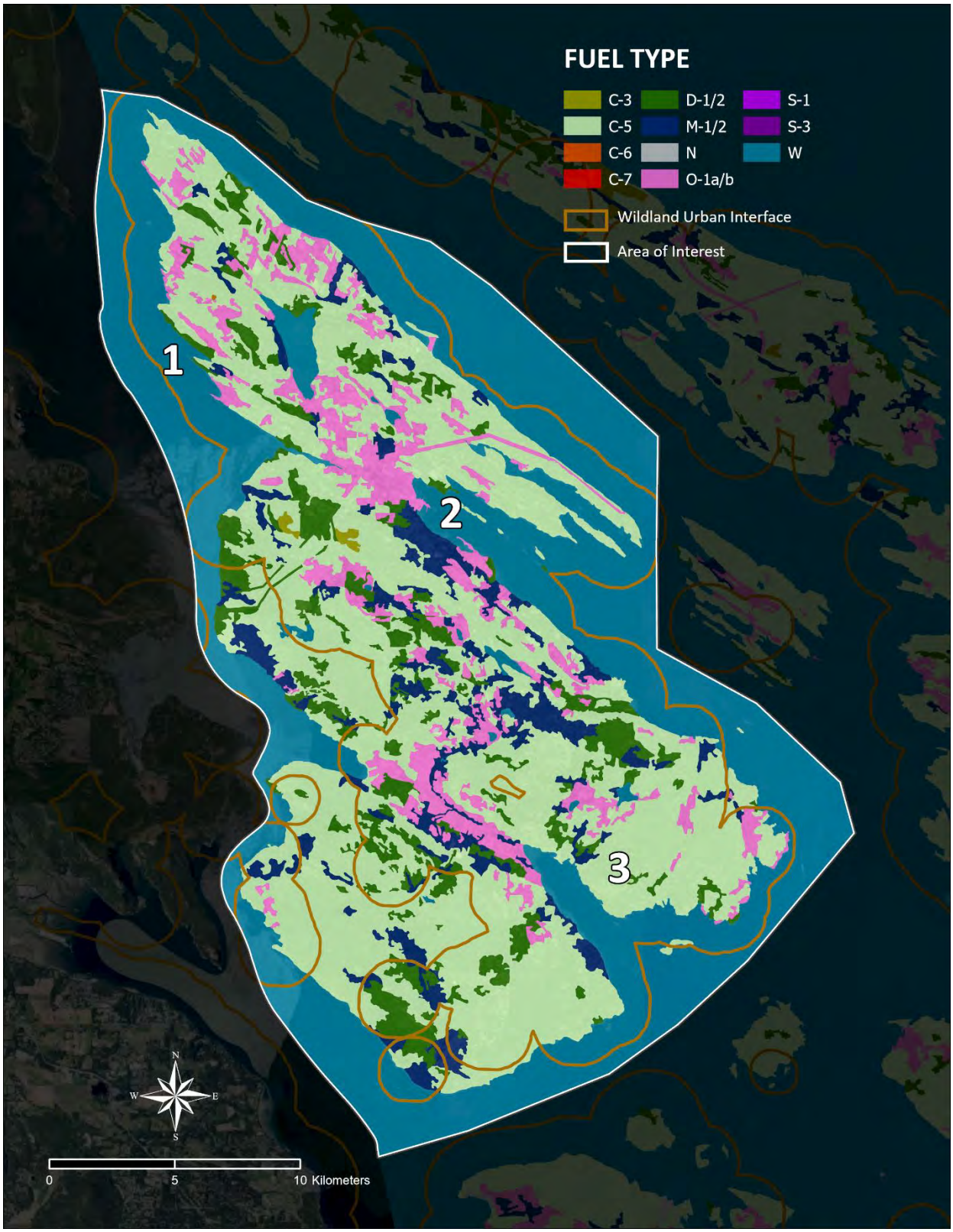

Figure 10. Fuel types in SSI

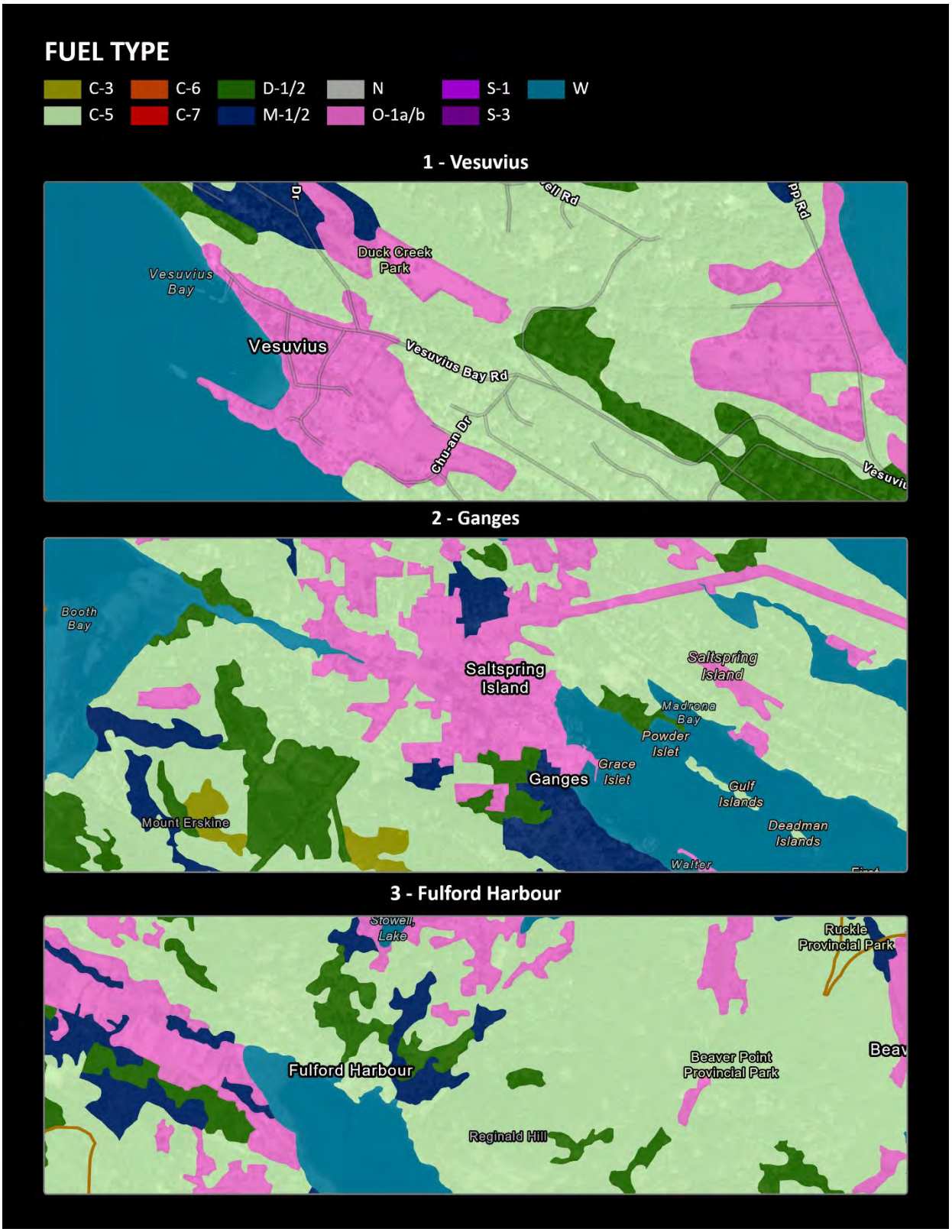

Figure 11. Fuel types in SSI near key communities.

Weather

Weather in the AOI is strongly moderated by the Pacific Ocean. Sea breezes cool the air during the summer, and the marine influence results in high relative humidity year round. Average daily highs for Salt Spring have ranged between 6°C (December) and 23°C (July & August). Most precipitation arrives in fall, winter, and spring, with sharply reduced precipitation in June to September. High relative humidity results in increased fuel moisture, and therefore reduced wildfire spread potential as opposed to drier continental climates.

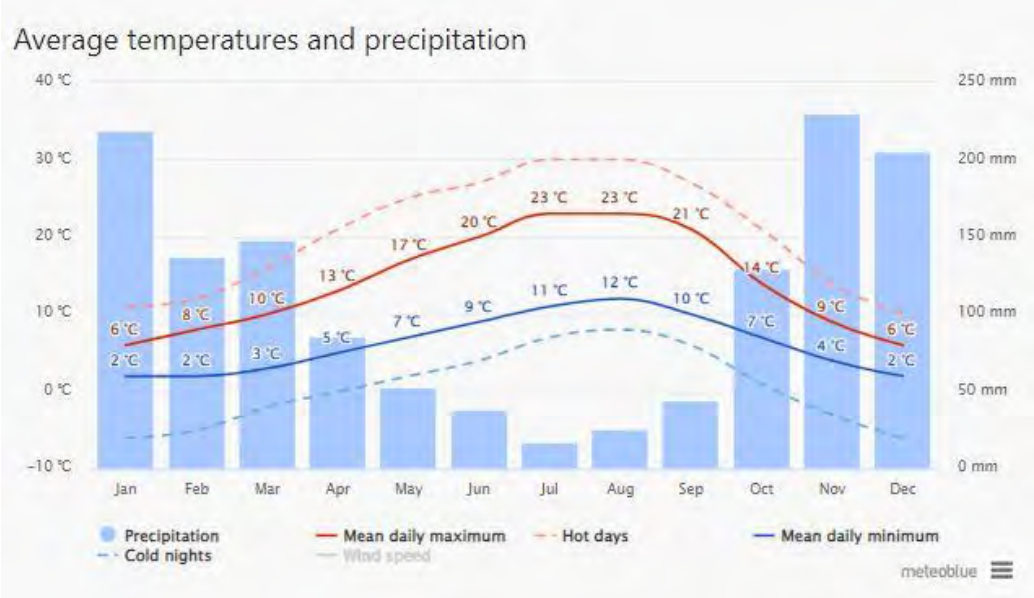

Figure 12. 30-year modelled climate averages for Salt Spring (meteoblue).

Winter is the windiest time of year when the North Pacific storm track sends high winds and moisture to the area from the south. These events are often experienced here as southerly winds. Storms also come from the north, though these tend to be weaker. Winds are subdued in the summer months when the area experiences high air pressure and mostly stable skies. The peak fire season is mostly characterized by many warm, blue days. A notable exception are the infrequent “outflow” winds, where high pressure over the BC Interior forces warm, dry air out to the coast. These events result in lower relative humidity, high temperatures, and higher winds. These outflow winds create very atypical conditions on the coast of BC. During these winds, wildfires are much more likely to ignite and spread rapidly than during typical fire season conditions. Further south in Washington and Oregon similar east-to-west summer airflows have been linked historically to catastrophic fire events with hundreds of thousands of hectares burned[18].

[18] Abatzoglou, J.T., D.E. Rupp, L.W. O’Neill, & M. Sadegh. (2021). Compound extremes drive the western Oregon wildfires of September 2020. *Geophysical Research Letters 48*(8):

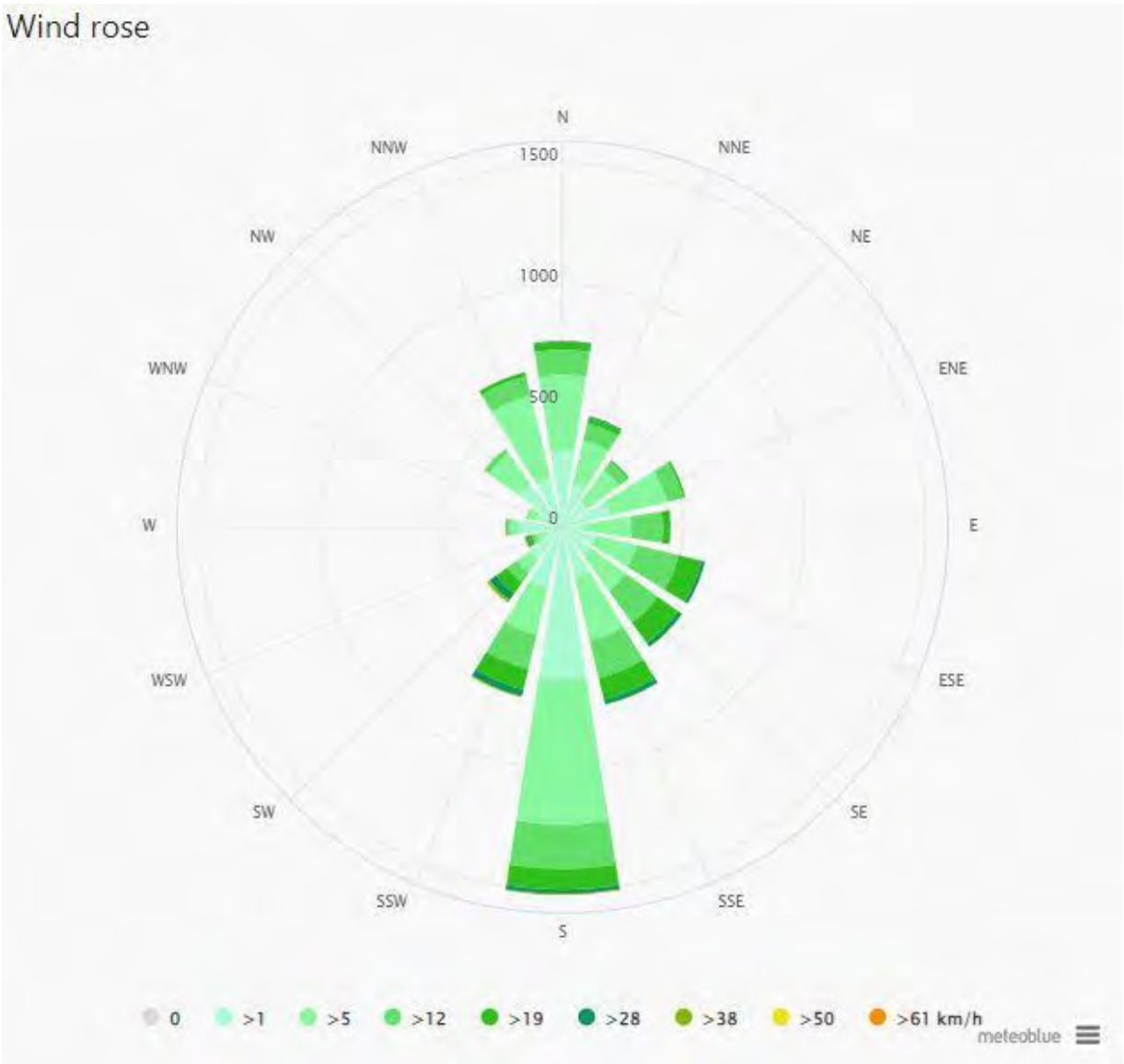

Figure 13. Wind rose diagram for Salt Spring (meteoblue). The diagram shows cumulative hours (the wind rose radius) at an average windspeed from each cardinal direction during the average year (1990-2020).

Fire Weather Rating

Fire Weather Rating is the use of weather measurements to assess likely fire behavior for a defined forecast period. The BC Wildfire Service monitors weather throughout the province. Fire weather is an essential component in most fire prediction models and is used to help determine a community's landscape level wildfire threat. In Canada, temperature, relative humidity, wind, and 24-hour precipitation are tracked daily and recombined to calculate several index components of fire weather. While these variables are tracked annually, during most of the rainy season weather measurements fail to meet thresholds for the publication of calculated fire weather indices. The Canadian Forest Fire Danger Rating System carries rules about when in the year fire weather ratings need to be updated daily so the public and emergency responders can plan activities to mitigate fire risk. This is an estimate of the fire season, which is the period in the year during which wildfire activity is reasonably foreseeable. Historically wildfire season begins May 1 and lasts until September 30.

Table 11 shows weather averages during the core fire season (May-September) for the nearest Environment Canada weather station, which is located at St Mary's Lake. Data shown cover the period between 1976 and 2020, inclusive. Comparison statistics from 2021 are presented separately to illustrate weather during a recent year with elevated fire danger. The statistics show fire season weather is characterized by an extended period of hot, dry conditions in the area. In 2021, a year that featured highly active wildfire seasons in the rest of the province, prolonged drought occurred throughout July and August alongside higher-than-average temperatures.

Table 11. Average weather (1976-2020)

	Weather Attribute	May	Jun	Jul	Aug	Sep
1976-2020	Maximum Daily High (°C)	29.5	31.5	35	33	33.5
	Daily Average High (°C)	16.7	19.7	22.4	22.5	19.2
	Monthly Average Rainfall (mm)	43.0	43.4	23.2	28.0	33.1
2021	Maximum Daily High (°C)	24.5	39.5	32	36.0	25.5
	Daily Average High (°C)	17.7	24.5	26.5	24.8	19.4
	Monthly Rainfall (mm)	7.3	11.8	0	3.8	47.7

Climate Change and Wildfire Behavior

Climate change is causing changes to temperatures and precipitation patterns that impact forest health and wildfire risk. In 2021, SSI faced a late-June heatwave that brought temperatures rarely recorded and touched off a long summer of drought. The 2021 "Heat Dome" was assessed by climate scientists to have been made 150 times more likely by human caused climate change[19]. The CRD has modelled anticipated climate impacts for each regional district in British Columbia using the RCP 8.5 (high emissions) greenhouse gas emissions scenario[20]. The estimates present what the climate could soon look like if little action is taken to reduce greenhouse gas emissions. By the 2050s, the CRD could see annual average high temperatures increase by 3.3°C. Rainfall is expected to increase by 5% annually but this increase will be uneven: summers are expected to become much drier, with a projected summer precipitation decrease of 18%. The average figures for temperature and precipitation conceal an expected increase in the frequency of extreme events, such as the June 2021 heatwave. A shift to more intense rainfall events could counterintuitively contribute to predicted dryness, because intense precipitation events more often exceed the water infiltration capacity of soils and cause increased surface runoff rather than downward recharge of soil moisture.

Predictions for warmer, drier summers are ingredients for a longer wildfire season. Patterns observed in other parts of BC and North America suggest that hotter, drier conditions are likely to result in an overall increase in wildfire frequency[21,22]. Warmer temperatures in spring and fall will extend the duration of the fire season, extending periods of high wildfire risk[23].

Climate change affects the forest fuels as well as fire weather ratings. Climate change affects forest health by creating mismatch between trees and the physical environment, which creates the conditions for outbreaks of insects and tree diseases[24]. More frequent or prolonged droughts reduce tree health and vigor, also increasing susceptibility to pathogens and pests[25]. Declining forest health tends to

[19] Philip, S.Y., S.F. Kew, G.J. van Oldenborgh, W. Yang, G.A. Vecchi, F.S. Anslow, S. Li, S.I. Seneviratne, L.N. Luu, J. Arrighi, R. Singh, M. van Aalst, M. Hauser, D.I. Schumacher, C.P. Marghidan, K.I. Ebi, R. Bonnet, R. Vautard, J. Tradowsky, D. Courmou, F. Lehner, M. Wehner, C. Rodell, R. Stull, R. Howard, N. Gillett, & F.E.L. Otto. (2021). Rapid attribution analysis of the extraordinary heatwave on the Pacific Coast of the US and Canada June 2021. World Weather Attribution. [Unpublished]. Accessed October 21, 2021. https://www.worldweatherattribution.org/western-north-american-extreme-heat-virtually-impossible-without-human-caused-climate-change/

[20] Capital Regional District. 2017. Climate Projections for the Capital Region.

[21]Kirchmeier-Young, M.C., N.P. Gillett, F.W. Zwiers, A.J. Cannon, & F. Anslow. (2019). Attribution of the influence of human-induced climate change on an extreme fire season. *Earth's Future, 7*: 2-10.

[22] Taylor, S., Régnière, J., St-Amant, R., Spears, J., & Thandi, G. (2010). High resolution simulations of fire weather indices and wildfire risk in British Columbia with climate scenarios. Victoria: Canadian Forest Service.

[23] Abatzoglou, J., & Williams, A. (2016). Impact of anthropogenic climate change on wildfire across western US forests. *Proc Natl Acad Sci USA* 113(42):11770–11775.

[24] Woods, A. J., Heppner, D., Kope, H. H., Burleigh, J., & Maclauchlan, L. (2010). Forest health and climate change: A British Columbia perspective. *The Forestry Chronicle, 86*(4), 412-422.

[25] Sturrock, R., Frankel, S., Brown, A., Hennon, P., Kliejunas, J., Lewis, K., Woods, A. (2011). Climate change and forest diseases. *Plant Pathology, 60*(1), 133-149.

increase forest fuel loads because it increases tree mortality and morbidity Forest health damage agents can be biotic, like mountain pine beetle, or abiotic, like an unusual windstorm or frost. For example, in the Coastal Douglas-fir biogeoclimatic zone the widespread decline of western redcedar has been observed due to drought stress. This has increased fuel loads in some cedar forests, particularly the fine fuel load of small branches and dropped foliage that contribute to increased surface fire intensity. Stressed and declining cedars were observed throughout SSI during field assessments (Photo 9). At the same time, longer growing seasons may increase fuel production by allowing more photosynthesis.

Despite uncertainty about the pace of climate change and the drive toward mitigation, BC's fire season has lengthened in recent years. The moist winter climate creates high volumes of foliage and woody material which are potential fuels during summer droughts. It is reasonable to expect that climate change impacts on forest health and weather patterns will result in an increase in wildfire intensity and frequency in the Electoral Area.

Photo 9. Stressed and declining cedar trees in Mouat Park.

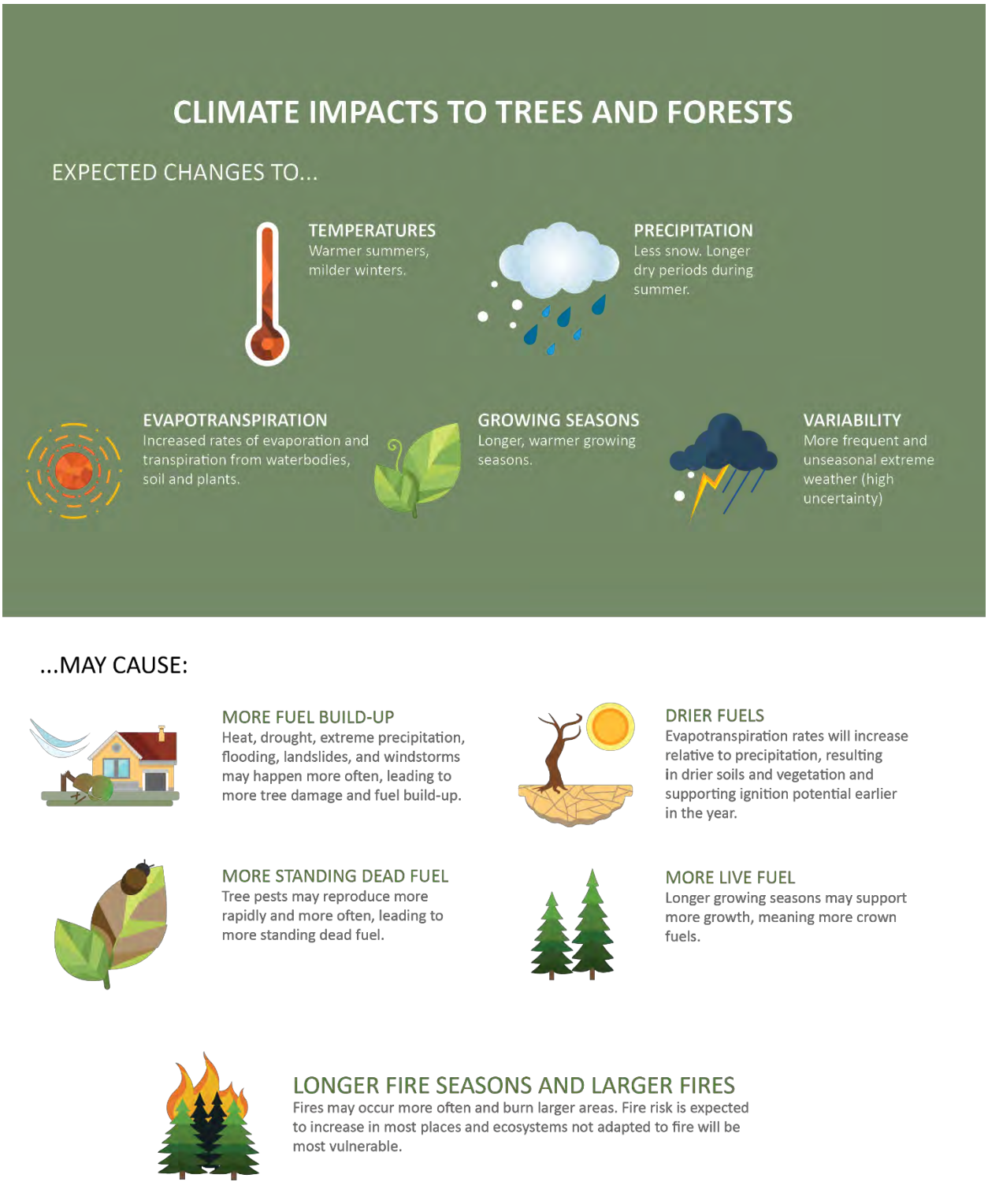

Figure 14. Potential impacts of climate change on wildfire behavior.

Fire History

Climate and Ecosystems

SSI is within a zone of climate characterized by cool, wet winters and warm summers with long dry periods. The climate helps shape the ***biogeoclimatic ecosystem classification (BEC)*** and ***fire regime***. The Biogeoclimatic Ecosystem Classification system is used in British Columbia to describe ecosystems by vegetation, soil, and climate. The entire province is divided into regional or landscape-scale classifications called "zones", which each present a dominant vegetation community as the result of interactions between soils, climate, and ecology. In SSI, wildfire is a disturbance that is directly related to the kind of ecosystems found here. The pattern of returning fire in the landscape is called the fire regime. Understanding fire regime helps contextualize risk and appropriate responses for management.

Biogeoclimatic ecosystem classification (BEC) is the province-wide system used to relate climate, physical geography, and plant communities.

Fire regime is the pattern of returning fire in a landscape, dependent on climate, ecological, and anthropological factors.

SSI is mostly within the Coastal Douglas-fir (CDF) BEC zone, with small higher elevation areas in the Coastal Western Hemlock (CWH) zone. The CDF is the smallest BEC zone in BC. The CWH portions of the AOI are the driest variants of the CWH, and are similar in climate and forest composition to the CDF. The CDF BEC zone occurs in the rain shadow of the Insular (Vancouver Island) mountains and is the driest, mildest area of British Columbia's temperate coastal rainforest. The CDF is characterized by warm, dry summers with an extended fire season. Table 12 compares climate averages for the ecosystems in the AOI.

Table 12. Climate data for weather stations in the CDFmm and CWHxm1 zones.

Biogeoclimatic Zone	Avg. Annual Precipitation (mm)	Avg. Summer Precipitation (mm)	Avg. Annual Temperature (°C)	Summer Heat to Moisture Index*
CDFmm	1038	198	9.8	89
CWHxm1	1427	285	9.3	62
CWHxm2	2087	355	8.3	49

* Summer heat to moisture index is the mean warmest month temperature divided by the mean summer precipitation, multiplied by one thousand.

Forests in SSI are warmer and drier than most forests found on the coast. Aridity during the early fire season is increased on the island by the lack of any water from montane snowmelt. These relatively dry conditions result in the characteristic forests of pure Douglas-fir (*Pseudotsuga menziesii*), broken up by patches of broadleaved arbutus (*Arbutus menziesii*) on rocky outcrops. In wetter areas, these forests can be mixed with red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera var. trichocarpa*), bigleaf maple (*Acer macrophyllum*), grand fir (*Abies grandis*), and western redcedar (*Thuja plicata*).

Disturbance Regime

All ecosystems are influenced by periodic disturbances that vary in size, severity, and frequency. Examples of common disturbances include wildfire, windthrow, ice and freeze damage, water, landslides, insect, and disease outbreaks as well as human caused events such as logging. Historically, agents of disturbance were viewed as unhealthy and a threat to the integrity of the forest as a timber resource. Today, foresters and ecologists alike recognize the role of periodic disturbance in maintaining healthy and diverse forests and ecosystems.

All BEC subzones have been separated into natural disturbance types (NDT) according to the Forest Practices Code Biodiversity Guidebook. These natural disturbance types are classified into five categories based on the size and frequency of natural disturbances that occur in those ecosystems:

- NDT 1 Ecosystems with rare stand-initiating events
- NDT 2 Ecosystems with infrequent stand-initiating events
- NDT 3 Ecosystems with frequent stand-initiating events
- NDT 4 Ecosystems with frequent stand-maintaining fires
- NDT 5 Alpine Tundra and Sub-alpine Parkland ecosystems

The ecosystems of the AOI are considered to belong to NDT 2 – ecosystems with infrequent stand-initiating events. This means that, before colonization, most new forests in the area would have sprouted after fires of moderate to severe intensity. "Stand-initiating" refers to the act of destruction that removes the existing forest and frees up space and resources for a new forest stand to grow in its place. Species like Douglas-fir and shore pine are relatively shade intolerant, meaning they cannot grow competitively under the shade of other trees. For this reason, the landscape forests of SSI need stand-initiating fire disturbance to reset ecosystems and allow new trees to grow. Pre-colonization ***fire return intervals*** in coastal Douglas-fir forests are estimated to be 200 years. Fires would have been of moderate size (20 to 1000 ha) with unburned areas resulting from local geography and chance. Forests would have taken the appearance of a mosaic of even-aged stands with scattered veteran, fire-scarred trees[26]. Site-specific studies have shown through charcoal analysis that the fire interval was more frequent than 200 years in some coastal forests[27, 28].

Fire return interval is the time between fires in a defined area, typically measured at the landscape scale.

[26] Province of British Columbia. (1995). Biodiversity Guidebook. *Forest Practices Code of British Columbia*, p. 22.
[27] Murphy, S.F., M.G. Pellatt, & K.E. Kohfeld. (2019). A 5,000-year fire history in the Strait of Georgia lowlands, British Columbia, Canada. *Frontiers in Ecology and Evolution 7*(90).
[28] Lucas, J.D. & T. Lacourse. (2013). Holocene vegetation history and fire regimes of *Pseudotsuga menziesii* forests in the Gulf Islands National Park Reserve, southwestern British Columbia, Canada. *Quaternary Research 79*(2013): 366-376.

NDT regimes are assessed at the landscape level and do not account for site level changes in fire return interval. This is particularly relevant in the CDF, where the fire return interval historically was much shorter for Garry Oak dominated grass meadows. Studies have estimated the fire return interval in Garry Oak meadows to be between 27 and 41 years, indicating wildfire was much more common historically in these forests.[29] These historically were low severity ground fires, often likely lit intentionally by indigenous people to create optimal habitat for important organisms.

Photo 10. CDF forest burned near North Cowichan, BC.

[29] Pellatt, M., Ze'ev, G. (2014). Environmental change in Garry oak (*Quercus garryana*) ecosystems: The evolution of an eco-cultural landscape. *Biodiversity and Conservation* 23:2053.

Changes in fire return interval

Ecologists believe the present landscape of Douglas-fir forests and other mixed tree species took shape in the past 4500 years, following a period of pronounced warmer climate. The influence of Indigenous land management is evident in charcoal and pollen records from the CDF zone, showing a practice of cultural burning with low severity fire that caused meadows to persist despite a cooling of the climate, more favourable to closed-canopy Douglas-fir forest[30]. These cultural burns were small fires set in the spring and fall to reduce the build up of debris in forests, clear productive meadows of new conifer trees, and enhance valuable food crops and game forage among other purposes. In fact, there are accounts from early settlers noting the use of fire in coastal areas of BC.[31] Indigenous burning was seen as threatening by settlers, despite settlers using fire to clear land for farming. Cultural burning was restricted by the colonial government's Bush Fire Act of 1874. This ushered in a period of increasing government control over the land base and oppression of Indigenous people and cultural practices. The 20th century was dominated by a "put-it-out" philosophy that emphasized the suppression of all fires in a bid to protect timber resource and forest communities. The effectiveness of this approach is now being questioned as British Columbia's worst fire seasons accumulate in recent decades.

[30] Brown, K.J., N.J.R. Hebda, G. Shoups, N. Conder, K.A.P. Smith, J.A. Trofymow. (2019). Long-term climate, vegetation and fire regime change in a managed municipal water supply area, British Columbia, Canada. *The Holocene 29*:1411-1424.

[31] Turner, N. "Time to Burn" Tradiotional Use of of Fire to Enhance Resource Production by Aboriginal Peoples in British Columbia. In Boyd, R. (Ed.), *Indians, Fire, and the Land.* Oregon State University Press.

Recorded fires in the project area

The BC Wildfire Service provides information on historic fires throughout British Columbia. Wildfires not actioned by the BCWS, such as those supressed by local agencies such as fire departments or CRD watershed protection, are not included in the BCWS data. However, SSIFR tracks wildfires in their Fire Protection District, which has been provided and is referenced below. Since 1950, there have been 236 wildfires recorded by the BCWS in SSI. Previous to 1950, only large fires requiring significant suppression action were recorded. Forest stands in many areas of coastal British Columbia originate after several hot, dry years between the 1880s and 1920s, during which land clearing, lumbering, railways, camping, and mining activities provided many sources of ignition[32]. Between 1920 and 1950, there were 30 large fires on SSI with an average size of 92 hectares. Since 1950, there has only been two large fires requiring a significant wildfire suppression response, one in 1961 that was 467 hectares, and another in 2009 that was 5 hectares. However, there has been approximately 236 recorded individual wildfires that did not require a significant response. These are usually small fires of less than 0.1 hectares that are quickly extinguished. In addition to the BCWS recorded wildfires, SSIFR has noted 70 wildfires since 2010 have occurred in the SSIFR District, all of which are human caused. SSIFR has noted that a majority of wildfire are caused by escaped open burning. However, an educational campaign over the last ten years appears to have resulted in reductions in these fires.

Human intervention in the forest, both deliberate and unintentional, has impacted the fire regime in this area. Of the fires recorded by the BC Wildfire Service since 1950, 213 have been caused by humans, 10 by lightning, and 13 are of unknown cause. Prohibition of indigenous cultural practices, growing opposition to slash-burning in expanding communities, and effective fire suppression have all limited fire behavior since the major fires of the early 20th century. While there are still many ignitions in the interface owing to campfires, recreation, and other human causes, most are extinguished by firefighters, community members, or unsuitable weather conditions

Table 13. Fires by cause (1950-2020).

Decade	Lightning	Person	Unknown
1950s	2	46	0
1960s	2	36	0
1970s	0	12	0
1980s	2	18	0
1990s	3	22	0
2000s	1	58	10
2010s	0	84*	3
Total	**10**	**383***	**13**

***14 recorded by BCWS between 2011 and 2020. SSIFR recorded 70 fires in this time period within the SSIFR District, all person caused**

[32]Parminter, J.V. (1978). An Historical Review of Forest Fire Management in British Columbia. [Thesis]. Vancouver: University of British Columbia.

Urban development in the forest interface has impacted forest stands by compacting soils, changing how water flows through the landscape, and opening stands to new wind and sun exposure. While these physical impacts can decrease forest health[33] and contribute to forest fuel conditions, the larger impact of urban development is to increase the potential sources of ignition within the forest by placing people, machines, and buildings – and the activities that involve sources of heat or energy – close to forest fuels. Warmer, drier conditions caused by climate change in combination with more sources of ignition are increasing the risk associated with the interface of these temperate rainforests.

Provincial Strategic Threat Analysis

The Provincial Strategic Threat Analysis (PSTA) is a wildfire risk mapping exercise conducted at a provincial scale. This analysis is intended to be used as a starting point for assessments of local wildfire threat, which can then be refined and focused through a CWRP. The PSTA includes several spatial layers, including wildfire threat and fuel typing. The CWRP involves updating these components of the PSTA by integrating local weather and making field corrections to fuel typing for public land in the area of interest.

The analysis includes information and maps that describe fuel types, historical fire density, and the potential for embers to land in an area (spotting impact), head fire intensity, and a final calculated wildfire threat score. Scores are then used to assign locations within the province into one of ten Fire Threat Classes. Threat Class 7 is a threshold used to describe where the most severe wildfire behavior is expected. Areas of the province that fall into these higher classes are most in need of wildfire planning and mitigation. Areas rated as Class 7 or higher are where fire intensity, frequency and spotting can potentially cause catastrophic losses in any given wildfire season wherever ratings overlap with values at risk. Class 6 areas are also considered prone to dangerous crown fires at lower frequencies.

This analysis was completed at a coarse scale by the BCWS to allow efficient processing of large areas. The PSTA identified the majority of the public land area as moderate threat (92% of public land). Overall, 80% of SSI's land area is privately owned and cannot be rated by this analysis.

Table 14. Summary of wildfire threat from PSTA

PSTA Threat Rating (class)	Area (ha)*	% of area
Extreme (9-10)	0	0%
High (7-8)	40.7	<1%
Moderate (4-6)	2,351.5	11%
Low (1-3)	165.4	<1%
No Data (Private Land)	12,400.7	57%
Water	5,958.7	28%

*Minor differences in area totals between PSTA data and other tables result from different data resolutions.

[33] Zipperer, W.C. & R.V. Pouyet. (1995). Urban and suburban woodlands: a changing forest system. Syracuse, NY: United States Forest Service, US Department of Agriculture.

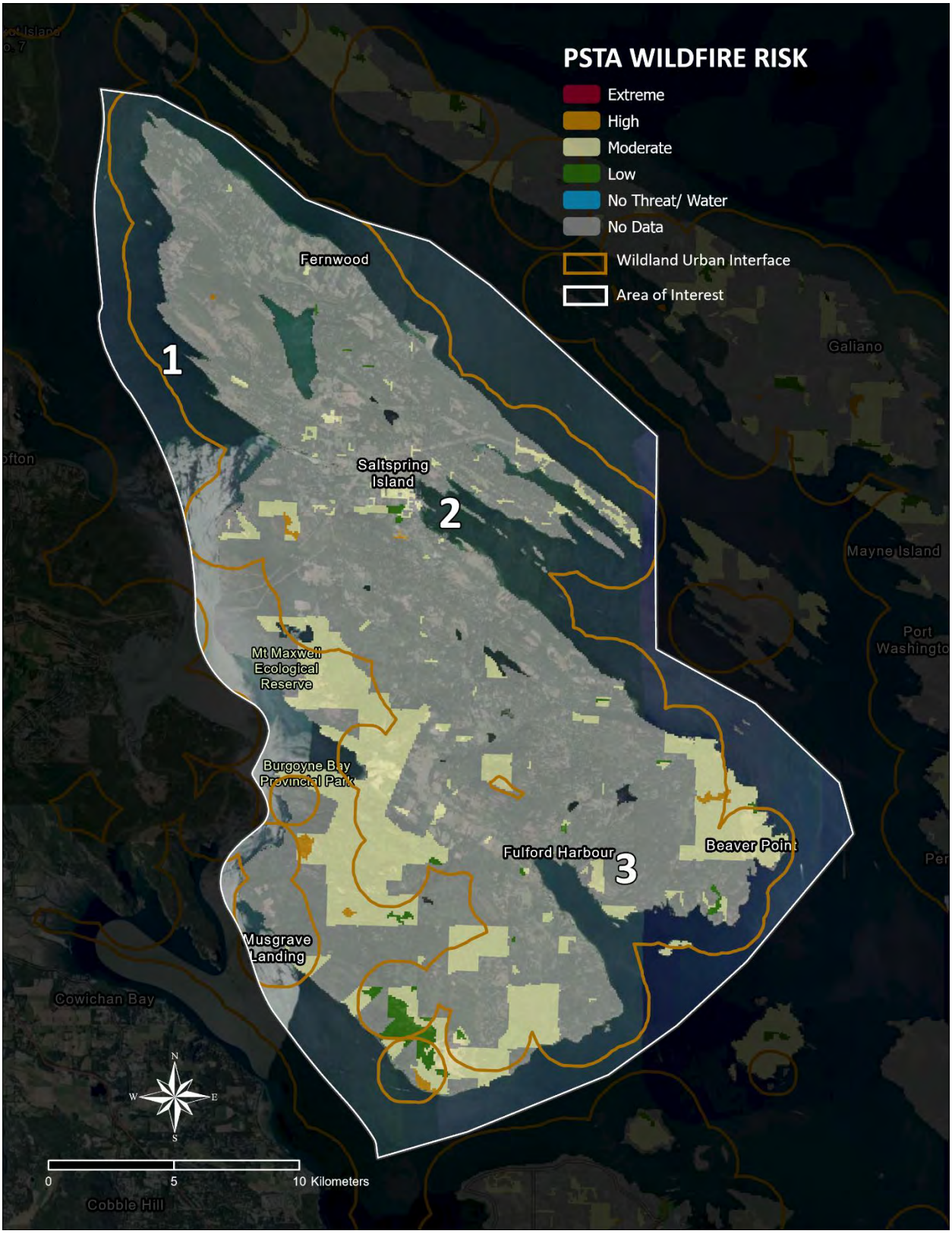

Figure 15. Wildfire threat ratings from Provincial Strategic Threat Analysis (PSTA)

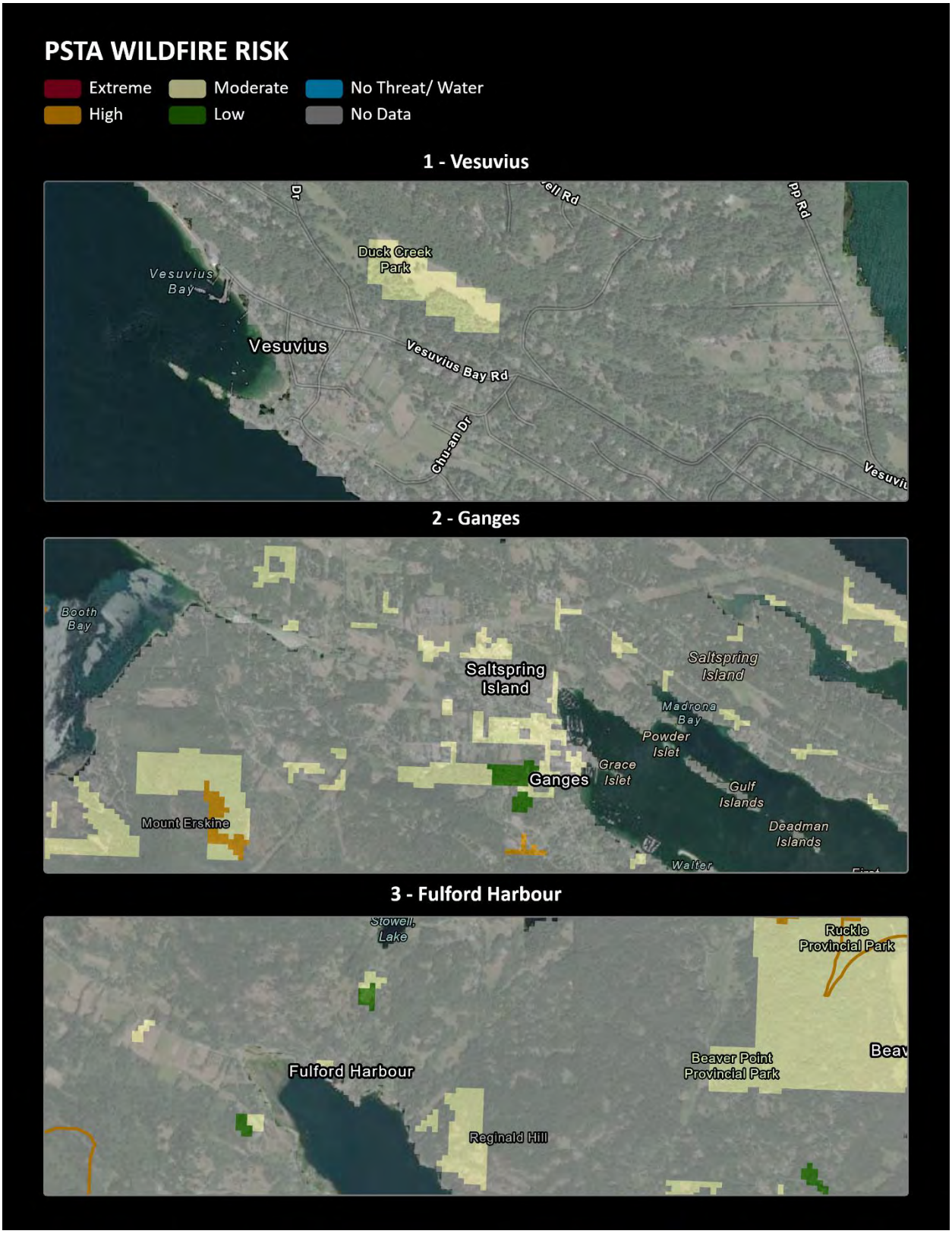

Figure 16. Wildfire threat ratings from Provincial Strategic Threat Analysis (PSTA) near key communities.

PSTA is completed as a province-wide spatial layer with a 50-m pixel size. This tool is useful for higher-level wildfire analysis and strategic emergency planning but lacks detail to support a local analysis of wildfire risk. Often errors or mismatches are identified when focusing on a specific area within this dataset. A key component of the CWRP process is refining provincial data into maps of local wildfire threat based on local topography and validation of provincial fuel type information.

Wildfire Threat Assessment

Field checks of provincial data on public land were completed in August of 2022. These site visits were focused on parcels owned, leased, or otherwise maintained by the CRD within the WUI, though other public lands were also visited. The goal of these site visits was to assess the wildfire threat, ground truth the provincial data, and identify feasible potential fuel treatment areas. Sites were identified for assessment in advance using desktop analysis which considered the following:

1. PSTA – High and Extreme wildfire threat areas
2. Structure Density – areas near high structure densities
3. Critical infrastructure – sites identified in collaboration with the CRD as critical for emergency response and governance.
4. Crown and municipal land – only public land was visited. Privately owned land was not visited.
5. Locally identified areas – areas recommended for field checks by CRD staff and fire department personnel.

Figure 17 and Figure 18 show the results from the updated local wildfire risk.

Table 15. Summary of wildfire risk.

Wildfire Risk	Area (ha)	% of land area
Extreme	0	0%
High	150	1%
Moderate	3933.5	26.1%
Low	143.1	1%
Freshwater*	70.3	0.5%
No Data (Private Land)	10737.7	71%

*ocean water is not included in the wildfire risk summary

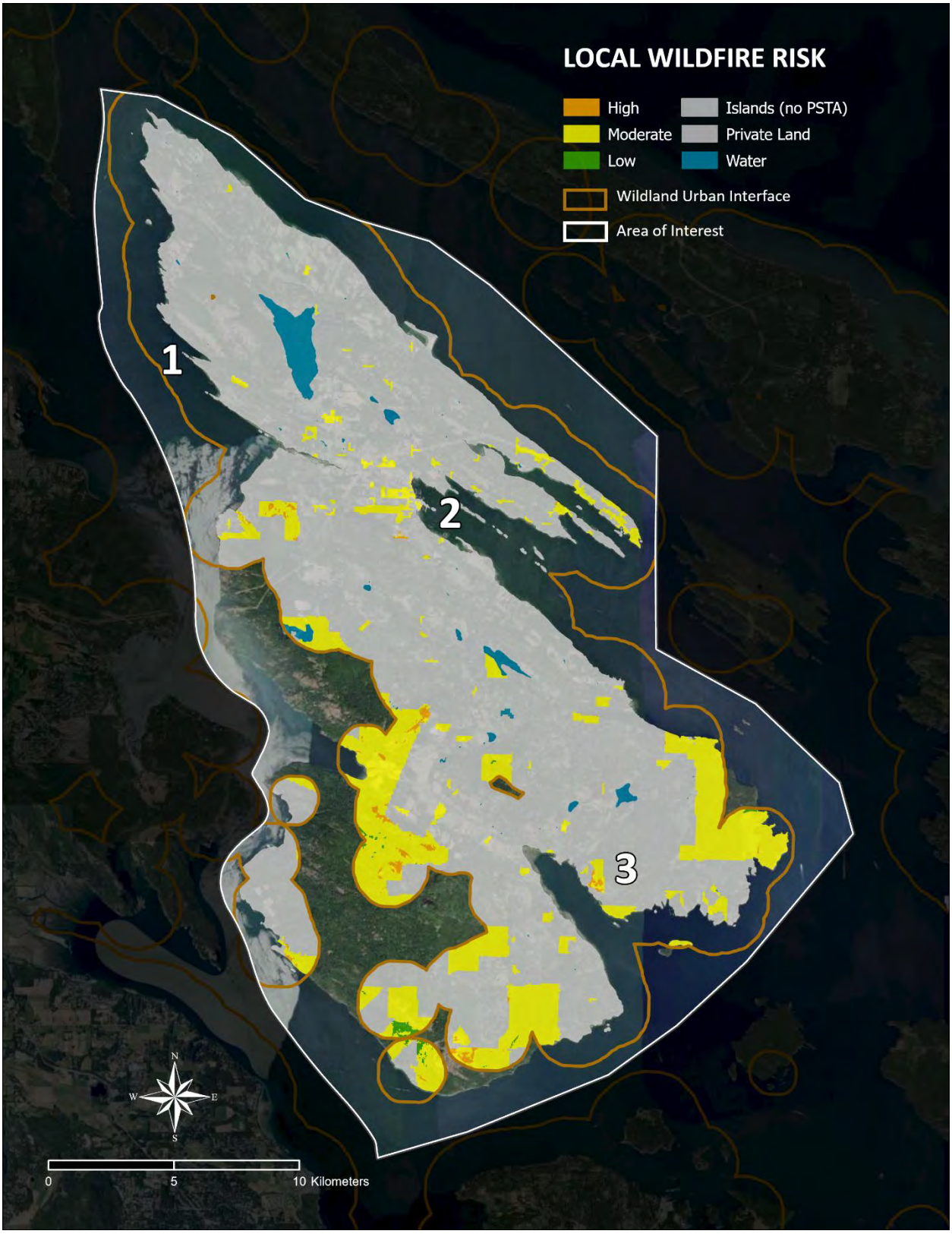

Figure 17. Wildfire threat and risk resulting from the local threat assessment.

Figure 18. Wildfire threat and risk resulting from the local threat assessment.

Local Wildfire Risk Summary

Wildfire risk expresses where wildfire behavior is expected to threaten homes and other values. Risk is estimated based on the local wildfire threat assessments and conducting a geospatial analysis, combined with modelling of expected fire spread patterns. The highest areas of wildfire risk are adjacent communities, near higher threat fuels, and downwind of typical spread patterns. For a detailed description of the wildfire risk analysis, see Appendix B: Local Wildfire Risk Process.

Wildfire risk in SSI is moderate. The key factor driving wildfire risk is the extensive intermix development in all the communities, where most homes and values are within 100m of the forest. However, although the WUI is extensive, the area of high and extreme risk is small. This is because a majority of the forests in the WUI are older conifer forests with a moderate wildfire behaviour potential. These forests are capable of supporting fire during a typical fire season but have reduced likelihood of supporting a fire of high intensity. These forests require extreme fire weather and ignition conditions before they are expected to support active crown fire.

A complete understanding risk requires us to consider factors affecting the trajectory of a potential wildfire. These include the availability of access routes to and from affected areas for the public and emergency responders, as well as the availability of water supply for firefighting and level of training or response within communities that are geographically isolated from each other.

As an island, SSI is inherently isolated from adjacent communities. However, even within the island communities can be further isolated, with many communities having single access/egress. In addition, roads in SSI are narrow, winding, and hilly. There are already traffic issues when there are above average users on roads, typically during ferry arrivals and departures. A large wildfire evacuation would be extremely challenging and potentially dangerous, and significant congestion is likely. The most vulnerable areas are communities in the far north and far south, such as Fernwood and Musgrave Landing. Southern portions of the island outside of the SSI Fire Protection District are at very high risk due to the lack of local fire protection. Isolated communities in SSI are likely at the highest relative risk.

Water supply for wildfire suppression is complicated by the complex water supply network on the Island. Natural water sources are limited, and often ephemeral and dry during times of high wildfire hazard. Hydrants are infrequent in SSI and may not be operational. Areas that lack hydrant coverage are at a higher risk, as structure protection in the event of a wildfire will be limited by water supply.

Hazard, Risk, and Vulnerability Analysis

Hazard, Risk and Vulnerability analysis is undertaken by local governments in British Columbia as part of their efforts to develop an Emergency Management Plan. This process results in a report which rates different kinds of disasters and emergencies by their likelihood and consequence, and deals with similar concepts to wildfire threat (the potential for a disaster to occur) and wildfire risk (the consequences of that potential disaster). The SSI Emergency Program is in the early stages of a review of the local HRVA and emergency plan, and this CWRP will be used to inform this planning process.

Introduction to FireSmart

FireSmart is a nation-wide program for wildfire preparedness and prevention. Each province has established a committee to prepare FireSmart guidance for landowners, residents, developers, local government, and emergency responders to help them understand wildfire risk and preparedness concerns and to support implementing actions to manage wildfire risk. FireSmart is a system of knowledge shared throughout Canada's wildland-urban interface (WUI) – training is available for individuals to become ambassadors for wildfire preparedness in their own communities.

FireSmart is organized into seven "disciplines" or topic areas which address different aspects of wildfire preparedness:

- Education (p.78)
- Legislation and Planning (p.89)
- Development Considerations (p.96)
- Interagency Cooperation (p.100)
- Cross-Training (p.104)
- Emergency Planning (p.108)
- Vegetation Management (p.112)

The following seven major sections of the Community Wildfire Resiliency Plan (CWRP) discuss each of these disciplines in turn and consider recommendations the Capital Regional District (CRD) may pursue to improve wildfire preparedness. Where available, examples of programs, initiatives, policies, or actions that fit within each discipline are provided along with further sources of information. See the Action Plan (p.121) for a summary of recommendations and suggested priorities.

The CWRP uses FireSmart terminology to discuss risk and recommendations in the community. If you are unfamiliar with FireSmart, this section provides an overview of FireSmart concepts and ideas. For additional detail, you may wish to review the resources of BC's FireSmart Committee to better understand the program's focus and language. You can find this information online at firesmartbc.ca/.

FireSmart – How it Works

FireSmart programming and materials make recommendations for building and landscaping based on wildfire science. The focus of this program is on homes, but recommendations are generally applicable to any building in the wildland-urban interface (WUI). During a wildfire, homes are ignited by:

- Sparks or embers landing and accumulating on vulnerable surfaces such as roofs, verandas, eaves, and openings. Embers can also land on or in nearby flammable materials such as bushes, trees or woodpiles causing a fire close to a structure.
- Extreme radiant heat from flames up to 30 m away from a structure that melts or ignites siding or breaks windows.
- Direct flame from nearby forest vegetation.

Figure 19. Pathways to home ignition in the WUI.

FireSmart assessments divide the area around the home into three “priority zones”, which radiate out from the structure and reflect the different ignition pathways.

The **Non-Combustible Zone** is the area immediately adjacent to a structure, out to 1.5 m. A non-combustible surface should extend around the entire structure and any attachments, such as decks. Creating a non-combustible surface can be as easy as clearing vegetation and combustible material down to mineral soil.

Zone 1 is the area within 1.5 and 10 m of the home or building. In this area life and property are at higher risk from radiant heat. It has been shown through analysis of recent large-scale wildfires that the most important factors in protecting structures are the exterior construction materials and immediate

landscaping next to homes[34]. FireSmart guidance emphasizes the use of non-combustible or fire-resistant building materials for decks and outbuildings along with landscaping plans that reduce the potential for direct exposure of the home to radiant heat or flame in this area. Cleaning up debris, garbage, or storage from around the home is also of primary importance in this area.

Zone 2 includes the area from 10 m to 30 m from a structure. Wildfire in forests within this zone can subject the building to radiant heat and may produce an ember shower onto the building. Forest fuels are generally treated aggressively in this area to prevent a crown fire from establishing and reduce the intensity of radiant heat and ember production. Treatments may include removal of ground fuel, thinning of trees, and lift pruning of retained trees.

Zone 3 includes the area from 30 m out to 100 m. People and structures are at risk from ember transport associated with a wildfire in this area. FireSmart guidance in this area can recommend forest stand thinning, fuel management, and the designation of access and egress. The goal in this area is to prevent a crown fire, but the distance from the home means fuel management is generally not as aggressive as treatments in Zone 2.

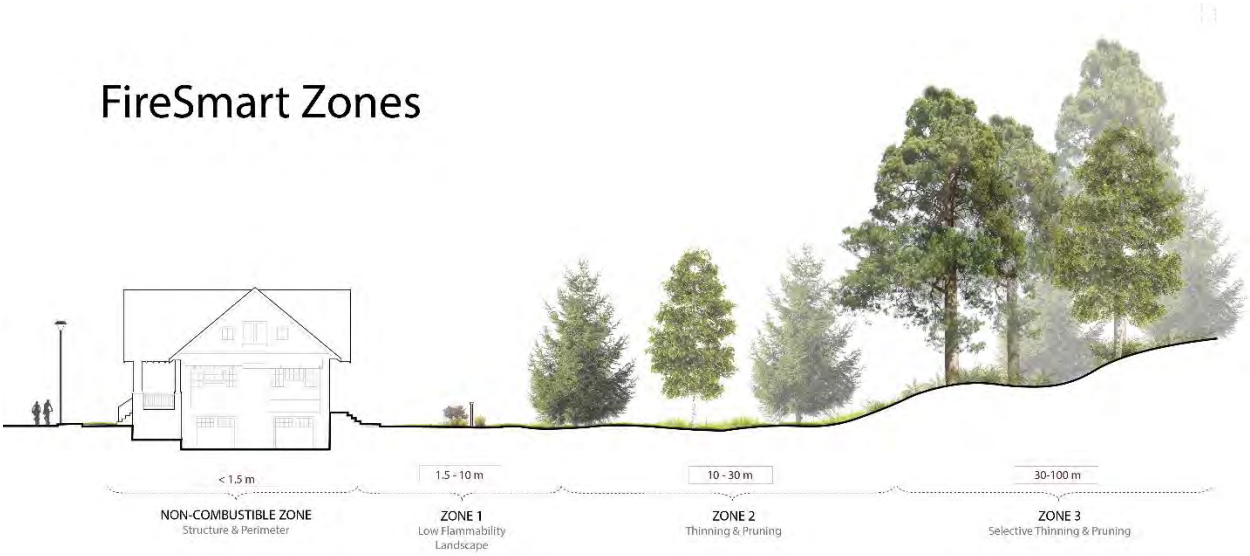

Figure 20. The FireSmart zone system.

The fire resistance of homes in the interface can be improved by achieving FireSmart standards for building materials, ignition sources and combustible fuels within each of these zones. If a wildfire does threaten the area, suppression capability is improved with good access to the interface area, defensible spaces around values, and a good water supply.

[34] Westhaver, A. 2017. Why some homes survived: Learning from the Fort McMurray wildland/urban interface fire disaster. *Institute for Catastrophic Loss Reduction* (ICLR) research paper series – number 56. (March 2017).

It is important to note that the FireSmart zones and guidance are developed at a provincial scale to provide general guidelines for mitigating wildfire vulnerability. These are not designed or intended to be a one size fits all approach, but rather a starting point for assessment and mitigation. The guidance often requires tailoring to fit specific fuel circumstances and wildfire contexts. Certain practices that may reduce wildfire risk in one ecosystem may be ineffective in other ecosystems. Standard FireSmart recommendations in the priority zones should be contextualized within the broader wildfire environment of the area. Slight deviations may be required based on site characteristics such as moisture regime and fuel loading. The guidance of a Local FireSmart Representative can assist in contextualizing traditional FireSmart guidance within the SSI forests.

FireSmart – Goals and Objectives

The overall goal of FireSmart is to encourage private landowners to adopt and conduct FireSmart practices to minimize potential wildfire damage to life and property. Specific objectives include:

1. Reduce the potential for an active crown fire to move through private land.
2. Reduce the potential for ember transport through private land and structures.
3. Create landscape conditions around properties where fire suppression efforts can be effective and safe for responders and resources.
4. Treat fuels adjacent to structures to reduce the probability of ignition from radiant heat, direct flame contact, and/or ember transport.
5. Implement measures that reduce the probability of ignition of structures, infrastructure, and other assets.

CRD and SSIFR FireSmart Program

Broad regional resilience planning in the CRD electoral areas is conducted though CRD Protective Services. This department conducts meetings with local fire departments, coordinates emergency plans such has evacuation plans, disaster preparedness plans, and Hazard, Risk, and Vulnerability Analysis. This CWRP has been commissioned by CRD Electoral Area Fire and Emergency Programs, and applicability of this CWRP will be maintained by this Emergency Program.

FireSmart programming in SSI is provided through a partnership between CRD Electoral Area Fire and Emergency Programs and Salt Spring Island Fire Rescue (SSIFR). The CRD has a contract FireSmart Ambassador position to facilitate FireSmart program delivery throughout all three unincorporated electoral areas. The CRD also provides funding to SSIFR for local FireSmart initiatives, which are in turn facilitated by a Local FireSmart Representative that is a member of SSIFR. SSIFR has trained 20 Local FireSmart Representatives to conduct residential assessments, facilitate a rebate program for FireSmart mitigations, and to provide FireSmart education sessions on SSI.

Key Aspects of FireSmart for Local Government

FireSmart is the chosen frame for the Province's support of community wildfire planning at a local government scale. The province supports local governments to prepare Community Wildfire Resiliency Plans and conduct other FireSmart initiatives via the Community Resiliency Investment Program. The Community Resiliency Investment Program is administered by the Union of British Columbia Municipalities. This program allows local governments to access additional funding for wildfire risk management. The program encourages local government to:

- Update or develop a Community Wildfire Resiliency Plan.
- Develop policies and practices for FireSmart design in public projects.
- Conduct FireSmart risk assessments on public buildings and critical infrastructure.
- Amend high-level strategic community plans to accommodate wildfire risk analysis.
- Train employees in fire management and emergency response.
- Collaborate across jurisdictions on wildfire matters.

Program requirements change each year. Requirements and guidelines for funding for the current year and recent past program years can be found on the website of the Union of British Columbia Municipalities.

The 2024 CRI intake, which occurs in fall 2023, requires communities have several initiatives in place to be eligible for fundings. CRI has signalled that these new requirements will remain for subsequent program years. These initiatives are therefore critical to building and maintaining community resiliency to wildfire and overlap with several of the FireSmart disciplines. Applicants are required to have:

1. A current CWRP that is acceptable to the BCWS Wildfire Prevention Officer.
2. A FireSmart Coordinator position.
3. A Community FireSmart and Resiliency Committee.

These three initiatives are critical for maintaining CRI program eligibility but moreover as the strategic basis for the Regional District's programming in all seven FireSmart disciplines.

Pillars of a Community FireSmart Program

Maintaining the CWRP

Wildfire risk is not static. Forest composition changes, altering fuel conditions and wildfire behaviour potential. Climate is changing, which will likely increase the probability of severe wildfire. Finally, communities change, often increasing values at risk in the interface. Our understanding of wildfire risk is also evolving with new understanding of the science behind fire behaviour and structure vulnerability. CWRPs therefore must be updated to ensure they remain accurate to wildfire risk and relevant to the community's context and needs. Five years is recommended as the time between plan updates to adequately monitor drivers of change and changing local needs.

The Role of a FireSmart Coordinator

Navigating all the aspects of FireSmart can be challenging for local government and private landowners. Local governments often lack the capacity to implement the FireSmart programming in addition to existing departmental responsibilities. To help with this issue, the CRI program encourages local governments to apply for term contract funding for a FireSmart Coordinator. Many of the responsibilities of a FireSmart Coordinator are already filled at the local level by the SSIFR existing FireSmart program. A FireSmart Coordinator role is recommended at a higher level, not as a replacement for the existing program, but to coordinate FireSmart work throughout all three electoral areas. The purpose of this coordinator would be largely administrative, coordinating grant funding, regional coordination, and supporting more complex wildfire resiliency initiatives. This position could be housed within the Protective Services department. Hands-on tasks, such as education, assessments, and public events would remain within the scope of the SSIFR FireSmart Coordinator and representatives at a local level, with the coordinator providing background support. The primary responsibilities that could be assigned to this coordinator are summarised in Table 16. The CRI program has made funding available for this initiative through its FireSmart Community Funding and Supports stream.

Table 16. Roles of the FireSmart Coordinator

FireSmart Activity Category	Role of FireSmart Coordinator
Education	• Support the development of a detailed communications strategy for FireSmart • Distribute FireSmart materials through community partners and online.
Community Planning	• Support neighbourhoods to apply for FireSmart Canada Neighbourhood Recognition, including by supporting facilitation and FireSmart events and demonstration projects.
Development considerations	• Comment on wildfire issues within a development permit process on behalf of the Emergency Services department, when referrals received from the Islands Trust.
Interagency co-operation	• Coordinate FireSmart initiatives between electoral areas and external partners as applicable, such as by representing the CRD in working groups or committees.
Emergency planning	• Provide comment on wildfire issues during emergency plan and response preparation.
Other	• Report on program implementation, progress, and community feedback regarding FireSmart to the Emergency Planning Coordinator and Manager, Emergency Services. • Prepare grant applications

Develop a Community FireSmart and Resiliency Committee

A Community FireSmart and Resiliency Committee brings together emergency planners, first responders, and with community representatives and the CRD to plan and implement FireSmart initiatives in areas of identified need. This should be conducted at the electoral area level for SSI. A previous committee was in place until 2019 as a joint initiative between SSIFR and the SSI Electoral Area Emergency Program, however, this committee was discontinued due to COVID. FireSmart BC proposes that these committees represent a missing link for fire preparedness in British Columbia between emergency planners and fire suppression staff, and the communities they serve. The intent of developing a Community FireSmart and Resiliency Committee is to ensure that planners and emergency staff are building resiliency in the community in line with local expectations and interests. The CRI program has made funding available for this initiative through its FireSmart Community Funding and Supports stream. Resuming regular committee meetings is recommended as a key initiative to collaborative regional wildfire planning.

The committee can be an annual or semi-annual body. Its purpose would be to act as a sounding board for the initiatives planned by the CRD with support from the BC Wildfire Service and SSIFR. It may be valuable to have some or all representatives from the authorities identified in the “factors for success”, as well as additional representatives of stakeholder groups as the CRD sees fit. Additional members could include representatives of specific neighbourhoods, industries or businesses, or demographic groups.

The tasks of such a committee could include:

- Adopt terms of reference for the committee.
- Provide review of the CRD’s CRI funding applications
- Suggest initiatives for inclusion in the funding applications.
- Coordinate Community FireSmart Days and advocate for FireSmart planning in priority neighbourhoods.
- Research alternate funding sources for priority projects not supported by CRI.
- Advocate for FireSmart and proposed activities among members’ communities and organizations
- Provide feedback on the implementation of FireSmart initiatives in the spirit of continued learning.
- Represent the interests of a diverse community in advancing FireSmart locally.
- Liaise with the BC FireSmart Committee to provide learning and feedback on program design and availability.

The CRD’s role would be to convene the committee and support its operation by providing start-up support (administration time and initial grant application) and to develop a draft Terms of Reference to be discussed during the first meeting. The structure of the committee may be served by having a multi-member executive to share responsibilities after the first meeting and avoid capacity issues in participating organizations. An executive composed of representatives from the CRD, SSIFR, the NSSWD, and Islands Trust is recommended. Various other CRD staff and stakeholders should be invited as needed, when particular initiatives may require specific input. Quarterly meetings are recommended

Education

Education is first among the seven FireSmart disciplines. Education is enhanced awareness of wildfire risk and prevention, which encourages individuals to act on private property while also building public support for initiatives by government. An education component is currently mandatory for applications to Community Resiliency Investment (CRI) program grants for wildfire preparedness. Current education initiatives in Salt Spring Island (SSI) are primarily led by the SSIFR FireSmart team.

Recommendations attached to the Education discipline are meant to promote a sense of understanding, empowerment, and eventually shared responsibility. The goal of initiatives in this discipline is to create citizens, emergency responders, and government officials who can explain and act on wildfire risk in their communities. Because over 79% of the land base in the community is privately owned, education is also the primary tool available to local government for influencing wildfire risk. By sharing the knowledge and techniques of FireSmart building and landscaping design, the Capital Regional District (CRD) encourages residents to assess and address risk factors on their own properties. Education is not just about emergency management personnel sharing information with residents, however. It is also about representing a vision of a FireSmart community that can inspire the CRD's own departmental operations and feature in its communications with other public authorities and First Nations.

The CRD should plan its education activities to complement existing outreach in SSI. SSIFR and its FireSmart Coordinator are already acting to manage wildfire risk. This direct outreach by local community members should be supported wherever possible. In addition, a cornerstone of community engagement regarding emergency management is the POD Program. This program is a neighborhood emergency program for Salt Spring residents. This program was developed to create a network for rapid information sharing in the event of an emergency, as well as to create a culture of "neighbour's helping neighbour's." This system is an excellent avenue for disseminating wildfire prevention information, and has been utilized for that purpose by SSIFR and the SSI Emergency Program.

The CRD can support local organizations by coordinating joint grant applications for FireSmart activities that further the interest of community wildfire resiliency. Local fire departments may have limited capacity for education activities. If capacity is a challenge, the CRD can provide support through Protective Services and the FireSmart Coordinator.

Factors for Success

Vision of a FireSmart community

Public engagement is one of the most challenging aspects of community wildfire planning. For public engagement to be effective, the CRD needs to reframe managing wildfire risk as a collective undertaking with community and individual benefits. The CRD needs to present a vision of FireSmart that works for the communities and still adequately represents forest character. To do this, public messaging and materials should emphasize that any action to reduce fire hazard can have value. Building a FireSmart community takes time, and a focus should be made on promoting the FireSmart process rather than a scoring outcome.

Photo 11. Education is a key part of developing a FireSmart community.

Audience for communications

A second factor in the effectiveness of education initiatives is appropriate targeting of different audiences. In a diverse community like SSI there are several ways for the CRD to consider targeting its FireSmart messaging and activities. Appropriate audiences for communications development depend on:

- **Different community areas.** Although this plan found similar levels of threat around the community, risk depends on further factors like population density, social vulnerability, and demographics. Additionally, some areas share a common point of access, distance to fire suppression resources, or other qualitative characteristics of risk that make it sensible to consider them as a group for the purposes of outreach.
- **Age and household size.** The communities contain many families with young children while also remaining an attractive place for one- or two-person households of older retirees. Both young families and older people may face cost pressures that keep them from engaging in emergency preparedness or FireSmart initiatives. Ensuring that different groups are informed about wildfire risk is important to building resilience. Some members of these households may have difficulty with the manual labour involved in FireSmarting a property or may not have the time to participate in community activities outside of their other commitments. Finding ways to reach people where they are is an important consideration of recognizing diversity and building resilience.
- **Secondary homeowners.** Many homes in SSI are vacation properties that are uninhabited for extended periods. Owners of these homes may not be as connected to local community media and communications channels, and alternative approaches should be considered.
- **CRD staff.** CRD staff in various departments work to provide services for the residents of the Electoral Area. Promoting FireSmart awareness among staff is an important part of improving policy within other departments and achieving cross-department support for initiatives of the Emergency Services department. The CRD can work to ensure its departmental managers share the same understanding of FireSmart. CRD Protective Services can lead internal training and information sharing to ensure core personnel are familiar with the FireSmart program and principles.
- **Other jurisdictions and agencies.** The CRD is part of a web of local governments and organizations that provide administration to residents of SSI. There may be value in continuing to liaise with other governments serving the community to develop a shared understanding of wildfire threat and FireSmart. This can involve ensuring other organizations like SSIFR or BC Parks are provided with the plan.

Information placement

A third factor for effective education is information placement. Both the timing and location of information provided to the public can influence the size of the audience for outreach and the imprint of the information presented. Timing of active outreach should respond to the cycle of the year, with in-person contacts and community events timed to correspond and respect the calendar of festivals, school, and summer holidays that make the community unique. Informational contacts regarding CRD projects, such as fuel management, should take place during the shoulder season, when important stakeholders like the BC Wildfire Service and members of the public have more time to dedicate to their review. In addition, communication should consider when secondary homes are most likely to be occupied and consider using additional outreach such as print mail-outs to ensure engagement. Education can also be undertaken through passive outreach, through initiatives such as updating CRD webpages and informational signage in key parks. This factor also includes targeting the use of existing CRD resources wherever possible. Today, most people expect resources to be presented in digital and physical formats on request, so resources of both types should be considered. To leverage existing resources means to incorporate FireSmart information into places that are already being managed and maintained by the CRD, and can include physical locations like popular parks, or digital property like the CRD's website and social media identities. To increase the reach of emergency information during a wildfire, the CRD can continue to promote the CRD Public Alert Notification System (PANS), which is the CRD's mass emergency notification system.

Strategic communications

The final factor in successful public engagement around wildfire issues is the careful planning and documentation of a Communications Strategy for each FireSmart initiative undertaken. A strategy may be one or more documents comprising the CRD's plan to engage with specific populations or groups. The strategy can be available to the public or intended for internal use only. The purpose of such a strategy is to identify goals for an education initiative, several key messages for increasing public awareness of wildfire and FireSmart and expected outcomes of the proposed activity. Planning should be used to focus and correctly scope all CRD communications on wildfire, including printed and digital media and during in-person or online events.

Table 17. Potential key messages for a wildfire communications strategy

Potential Key Messages for Public Communications
• The communities of Salt Spring Island are set beside and among forests, making them vulnerable to wildfires. • The wildfire risk in coastal forests during the wildfire season is real, and most forests will support wildfire of moderate intensity. • Predicted and observed climate change in the region are consistent with more aggressive wildfire behavior. • Private landholders have a large role to play in protecting life and property by adopting FireSmart practices for building and landscape maintenance and by being knowledgeable about local emergency plans. • Wildfire preparedness is required at all levels of society, not just at the government scale. Personal and business emergency plans, preparedness, and emergency kits are necessary components of wildfire resilience. • There are resources to support private landholders and neighbourhoods in becoming more FireSmart. • The CRD can help reduce wildfire risk by strategically managing forest fuels on its parkland, and supporting FireSmart community development in collaboration with the Islands Trust.

Initiatives to Consider

Creating opportunities for passive outreach

In developing initiatives within the Education discipline, the CRD should seek to leverage its existing resources and programs, where residents already come into contact with local government. Passive outreach means presenting and providing information about wildfire risk in a variety of formats that are received by residents in a self-directed fashion. The resources the CRD can use to create these opportunities include its digital and physical properties, human resources, and community liaisons. The POD program is an excellent resource for emergency planners to spread wildfire specific educational programming.

Today, digital resources may be preferred and/or seen by more people. The Community Wildfire Resiliency Plan (CWRP) should be made public on the CRD's website. Additionally, the CRD has a dedicated public engagement platform, *Get Involved*, which is used for projects with time limited public engagement. When wildfire projects are planned, this page can include links to BCWS and FireSmart BC webpages. Additional resources that could be created are interactive maps, videos, and infographics. These resources can be advertised using the CRD's social media, or by appending a temporary completion announcement and link in outgoing CRD emails.

One of the CRD's major resources in SSI is its network of community and regional parks, managed by the Salt Spring Island Electoral Area Administration (SSIEAA). The community parks with their small trail networks are often highly used in SSI and are mostly forested. The CRD can initiate passive education by installing wildfire awareness signage and educational material in relatively high-traffic locations, including trailheads, such as at the entrance to Mouat Park. Popular recreational areas are high-visibility locations where people are already thinking about forests– this is a good opportunity to make connections between forests and fire in familiar environments.

Provincial funding requirements specifically support education initiatives aimed at increasing public awareness of fire risk management activities within the other FireSmart disciplines. Planned fuel management or FireSmart landscaping could be used as a focus of education initiatives, with signage or self-guided tour routes developed to engage visitors to these park properties. This component of provincial funding is focused on proposed activities, so any activity-related education materials should be planned in advance and included as a part of an application for implementation funding.

Expanding access to FireSmart information and services

The local FireSmart Coordinator provides home assessments in SSI. This is a large geographic area, which also includes remote island communities, can often limit capacity. Additional staff, such as a higher level FireSmart Coordinator, drastically improves the capacity for these education initiatives, as well as administrative work related to future grant applications.

Hosting a community wildfire preparedness or clean-up day

The CRD can promote wildfire awareness while achieving FireSmart benefits simultaneously by organizing a community clean up or "Wildfire Community Preparedness Day" event. These are public events where members of the public are invited to come and conduct light work around a community park or facility while receiving information about FireSmart. A similar initiative is in place in SSI as the "Cut Broom in Bloom" initiative. This partnership between SSI Conservancy and Transition SSI supports

the removal of invasive and flammable Scotch Broom, and has been occurring for over a decade. This can be expanded to include CRD Parks and occur for a broader range of flammable plants and debris, as informed by FireSmart guidelines. Activities can include removing debris from the vicinity of buildings or pathways, pruning shrubs and bushes, removing invasive species, and raking leaves or needles. The CRD would be responsible for identifying target vegetation for the clean up and bagging and chipping or removing waste. The events can include an educational component, such as a presentation about FireSmart landscaping.

Suitable locations for such an event depend on community interest as much as with identified fuel hazard concerns. In many cases, these areas are of marginal impact to landscape wildfire risk and should therefore be combined with a program of more comprehensive fuel management. Because clean up days are focused primarily on education and demonstration of FireSmart principles in a small area, they do not follow the stricter guidance for locating areas for fuel management. High-use areas are often ideal locations because they allow for corresponding opportunities for passive outreach related to the project completion. Ideally these events would be dispersed throughout SSI and throughout the year. Potential locations include community parks in SSI, such as Mouat Park, Duck Creek Park, or Peter Arnell Park.

Encouraging neighbourhood FireSmart recognition

Through FireSmart Canada, groups of neighbours can access grant funding independently of the CRD for FireSmart activities. The CRD can support these initiatives by helping connect interested residents and providing information on the FireSmart Community Recognition process, requirements, and benefits. This process is meant to be led by interested neighbours and not by government. SSIFR has supported three neighbourhoods in SSI in achieving FireSmart recognition since 2018: Maracaibo, Narrows West, and Bayside.

Photo 12. Maracaibo is a FireSmart recognized neighbourhood.

The process starts when a neighbourhood representative contacts FireSmart Canada to organize a site visit by a Local FireSmart Representative. The Local FireSmart Representative is someone who has completed FireSmart Canada training certification to assess wildfire hazard in the wildland-urban interface (WUI) and can support the neighbourhood FireSmart planning process. In the past SSI Fire Rescue has supported neighbourhoods in this process by providing the expertise of their local FireSmart representative. Before and concurrent with hazard assessments, leading neighbours should be organizing in their community to increase participation and the number of home assessments. The end goal of this organization is the formation of a neighbourhood committee to receive the hazard assessments and steward the creation of a FireSmart Neighbourhood Plan on the advice of the Local FireSmart Representative. The Neighbourhood Plan will assess wildfire hazard on participating properties and identify actions specific to the area for improvement.

The CRD can assist some parts of this process, such as by advertising a new neighbourhood initiative through its social media and online channels. There is also funding available to offer half-day FireSmart Neighbourhood Champion training (See p. 106) for interested residents and/or distributing FireSmart material to households facing barriers to access this information. In areas where neighbourhood organization is underway, the CRD may be able to help facilitate a start up event by including costs on its own application to the province for grant money. Criteria for providing this support should be developed so that serious initiatives with widespread interest in the community are prioritized for resources. There are no specific neighbourhoods in SSI that should be targeted due to the homogenous risk profile. Rather, the CRD should support any SSI neighbourhoods that are interested in developing a neighbourhood plan or any FireSmart activity.

Table 18. Potential sub-areas for FireSmart planning and neighbourhood initiatives.

Name	Wildfire Risk Rating*	Area Description	Fire Protection	Recommended FireSmart Activities
Musgrave Landing	M/H	Mix of interface and intermix conditions in area. Highly isolated.	None	This neighbourhood is outside of the SSIFR fire protection area, putting it an increased risk. The CRD should support the neighbourhood in creating a Neighbourhood Plan, including communications and engagement goals and a strategy for FireSmart assessments of private property and community park lands. The plan would be led by neighbourhood committees with the CRD acting as a local government representative and providing support such as coordination with BC Wildfire Service, and other actors as applicable. The CRD may also include eligible neighbourhood FireSmart activities in its CRI grant applications. Note that SSIFR may be unable to provide FireSmart support to a neighbourhood outside its protection area; therefore the CRD may need to provide additional support.
Fernwood	M	Intermix conditions, isolated community.	SSIFR	The CRD should liaise with SSIFR FireSmart program. A Neighbourhood Plan would include communications and engagement goals and a strategy for FireSmart assessments of private property and community park lands. The plan would be led by neighbourhood committees with the CRD acting as a local government representative and providing support such as coordination with SSIFR, BC Wildfire Service, and other actors as applicable. It may be desirable to negotiate sharing efforts with local FDs, to avoid duplication. The CRD may also include eligible neighbourhood FireSmart activities in its CRI grant applications.
Fulford Harbor	M	Intermix conditions.		
Vesuvius	M/H	Intermix conditions, limited landscape access, adjacent large Regional Park.		

**Ratings reflect modelled wildfire threat on public land in each area. Ratings are L(ow), M(oderate), H(igh), E(xtreme).*

Expanding participation in PANS

During a wildfire emergency, the CRD has several means by which it will publish an evacuation alert or order. The most direct of these is the free, sign-up based CRD Public Alert Notification System (PANS). PANS lets registrants receive emergency notifications via app, SMS (text message), voice call, or email. Because it allows messages directly to user devices or emails, PANS is a crucial piece of technology for advising residents about wildfire. Placing invitations to join PANS should be part of any communications between the CRD and the public regarding this CWRP. For more information on how to register for PANS, visit the CRD PANS website.

Local authorities like the CRD also have access to the National Public Alerting System, Alert Ready. This allows authorities to provide alerts through technical infrastructure, which includes radio stations, television stations, and mobile networks. The CRD can access this service to provide evacuation alerts and orders in the event of a severe interface wildfire.

Legislation and Planning

This discipline considers the bylaws, regulations, and policies or acts of higher levels of government that create the legal environment around wildfire risk. Idea development in this section aims to address how the Capital Regional District (CRD) conducts its own business, including management of parks, waste, and infrastructure, to mitigate wildfire risk. In this section of the plan, higher-level acts and policies providing important scope to the CRD's authority and ability to regulate are discussed, as are regulatory levers at the CRD's disposal.

Federal Acts and the Community Wildfire Resiliency Plan

The Government of Canada makes laws concerning matters of national interest. Natural resources, land management, and emergency response are generally the authority of the provinces, which means relatively few federal acts and policies are directly relevant to the recommendations of this Community Wildfire Resiliency Plan (CWRP). The Government of Canada is not a significant forest landowner on Salt Spring

The Federal legislation with the greatest implications on wildfire management are the acts that protect animals, plants, and ecosystems, including the *Fisheries Act* and *Species at Risk Act*. These acts confer protection by prohibiting damage and assessing penalties. Activities which remove vegetation, such as fuel management, may trigger reviews under either act if a protected species or habitat is compromised. Any fuel management prescription must consider whether federally protected species or habitats (see 31) will be impacted and how these impacts can be avoided. These Acts also affect how local governments apply bylaws and development permit requirements.

Provincial Acts and the Community Wildfire Resiliency Plan

The Province of British Columbia has core authority over lands, natural resources, and municipalities, making it the source of local government jurisdiction and a primary influence on forest and land management, including wildfire. Provincial legislation that affects the other FireSmart disciplines includes the *Building Act* and *Building Code*, *Emergency Program Act*, *Environmental Management Act*, *Forest and Range Practices Act, Local Government Act,* and *Wildfire Act*. Regulations under each of these enactments, such as the Open Burning Smoke Control Regulation, provide legal guidance and objectives for aspects of community development, land management, wildfire prevention, and emergency response.

In SSI, the Islands Trust Act is also of importance. This act places responsibility for community planning within Local Trust Areas of the Gulf Islands with a distinct local government authority, the Islands Trust, that operates in parallel to the CRD. SSI has an official community plan and zoning or development bylaws maintained by the Islands Trust. Under the Islands Trust Act, the CRD is prohibited from adopting bylaws, issuing permits, or undertaking work contrary to the bylaws of the local trust committee. Because of this, the CRD has a reduced ability to influence physical hazard to private property through adopting FireSmart reforms to development and zoning bylaws or Official Community Plans.

Role of the CRD

The CRD's role is to manage wildfire within its jurisdiction in unincorporated areas. Typical areas of authority include the provision of services for waste management, including green waste or vegetation debris, community planning functions and the regulation of development, the maintenance and management of community and regional parks, the administration of bylaw enforcement, and other key areas identified by the *Local Government Act*. The CRD works mainly under a special service model and provides only those services that the elected representatives of the unincorporated areas have determined are needed and can be funded by their communities. For this reason, delivering new bylaws or additional programming may require levies or taxes to be sustainable. In addition, a separate layer of local government, the Islands Trust, is responsible for Land Use planning. This relationship is discussed in detail in the Development Considerations section (p. 96).

Local government also has the authority under BC's Wildfire Act to restrict open burning in Fire Protection Areas. SSIFR is the authority having jurisdiction over open burning in SSI under Open Burning Bylaw No. 125, as well as restricting high risk activities when necessary.

Factors for Success

Ensuring public support and social equity

Changes in law or policy properly result from changes in public expectations over how the community governs itself. Therefore, education around wildfire risk and the benefits of FireSmart often precedes initiatives in other disciplines. Without public support, a change to policy or bylaw may not only fail but be unjust. Ideally new bylaws or public policies will have widespread public support, so that policy changes reflect the whole community. It is important to consider the equity implications of new policies before they are enacted, including whether all groups impacted by a new policy have been adequately heard by the decision-making process.

Recognizing the CRD's jurisdiction

Another factor in the success of a policy initiative is recognizing the CRD's scope of authority. As discussed, the situation of SSI is unusual in that the CRD (or local government) lacks authority over the planning of land use and development in the community. While promoting FireSmart design is a key principle of any CWRP, the CRD's role will rely on actions in other disciplines, such as outreach with representatives of the Islands Trust, support for neighbourhood and community involvement in FireSmart, and leveraging CRD assets like the public park system. Policy changes within the scope of the CRD's authority include managing the use of CRD-owned park land and developing the capacity for bylaw or policy enforcement. Open burning bylaws are the responsibility of SSIFR.

Although the CRD owns and is the ultimate authority for regional parks within SSI, much of their authority will be delegated to the Salt Spring Island Local Community Commission. Any wildfire risk mitigation activities on regional park land in SSI, such as installing awareness signs or vegetation management, must be coordinated with SSIEAA and included in the park and recreation service planning budget.

Considering the need to enforce new bylaws or policies

The enforceability of a policy or bylaw is a major part of its effectiveness. Conducting analysis prior to a policy change can help decision makers think about whether contacts about non-compliance will be both manageable in terms of volume and feasible in terms of staff training and expertise. Policies that require additional investments in training or equipment to allow enforcement should be carefully considered to ensure they fit within the community's vision and goals.

Initiatives to Consider

Adopt restrictions on problematic activities or uses of regional park lands

The CRD may be able to reduce ignition likelihood on its public lands by adopting restrictions on use. Sources of ignition include cigarette butts, hot vehicles and motors, cooking fires, bonfires, firecrackers and fireworks, discarded items, and deliberate arson. It is important to collect information about problematic uses of park land to ensure appropriate targeting of prohibitions. The CRD's parks department should work with SSIEAA to identify in its service records where problematic uses occur within areas of higher wildfire threat. Improving reporting on social issues as they relate to wildfire risk is a key part of improving decision making.

Restrictions could be developed to be:

- Time dependent – in place only during periods of high or extreme fire danger
- Space-dependent – applying to locations with identified high or extreme fire risk
- Both

When designing a prohibition or ban it should be noted that fire threat shown in this plan represents the potential fire behaviour during 90th percentile fire season weather conditions. These are the days that represent periods of high or extreme fire danger, typically at the peak of summer. While worrisome, ignitions during the cool and wet parts of the year are unlikely to result in spreading wildfires. The impacts of climate change are affecting the 90th percentile weather values used to estimate potential fire behavior, which is a reason to support cyclical review of this CWRP and consider any growth in problematic uses.

Assess wildfire hazard on CRD-owned properties

The CRD can adopt internal policies to make sure parks and CRD-owned property and facilities receive wildfire hazard assessment at an appropriate level of service.

The assessment tools for vacant land and CRD facilities vary. The highest standard is a burn probability analysis, which is a comprehensive landscape wildfire model that assessed the likelihood and potential spread rate of wildfire in a large area. This tool is most suitable for very large forested areas like Regional Parks. For smaller forested land or sub-areas of parks, the appropriate assessment tool is the most recent provincial standards for Wildfire Threat Assessment. These assessments constitute the practice of professional forestry and should be completed by a Registered Professional Forester with the appropriate expertise. For facilities and infrastructure, the appropriate standard is likely the FireSmart Critical Infrastructure Assessment, which provides a hazard score to reflect vulnerability (risk) of the capital asset in the context of the immediately surrounding fuels. Critical infrastructure and permanent structures in parks should receive this assessment alongside stand-level wildfire threat assessment. While there is no legal requirement that FireSmart assessments be completed by accredited professionals, a Local FireSmart Representative or Wildfire Mitigation Specialist are recommended for completing these assessments. An appropriate level of service for both kinds of assessment is the same cycle recommended for review and update of the CWRP – once every five years. New assessments exceeding this schedule are advisable if changes in forest health or the environment are believed to have adversely affected the forest fuel components of wildfire threat and FireSmart.

Conduct FireSmart assessments for publicly owned critical infrastructure

Much of the publicly owned critical infrastructure in SSI is not owned or managed by the CRD. This includes most of the drinking water infrastructure, which is operated under the North Salt Spring Water Works Improvement District. This also includes SSIFR infrastructure. However, the CRD can work with these separate entities by providing FireSmart Home Ignition Zone or Critical Infrastructure assessments as appropriate. This will require partnership with the relevant authority. This is supported by the Community Resiliency Investment (CRI) program to allow local governments to develop a FireSmart program for their capital assets and emergency infrastructure. With assessments in place, the CRD could apply for implementation funding to complete re-landscaping or even exterior renovations of its facilities up to a per structure maximum of $53,500.

Update the building policies to incorporate FireSmart design principles in CRD facilities

As part of a FireSmart program for its properties and critical infrastructure, the CRD should require within its major departments that all projects involving building or landscaping be carried out in consideration of FireSmart design principles. Completed facilities are opportunities to educate members of the public about FireSmart building and landscaping techniques.

Photo 13. The SSFRI Fire Hall #3 is an example of FireSmart construction.

Create a program to reduce or eliminate green waste tipping fees for FireSmart projects

An impediment for residents to FireSmart their home's landscaping is the difficulty and expense of removing green waste. The CRD can address this challenge by providing green-waste bins at central community locations where the disposal of debris is provided free of charge for eligible materials such as small conifers and dead branches. This is typically done on individual scheduled days as an event, which can also include educational material for users. Attendance by the CRD FireSmart Coordinator is encouraged to facilitate education, as well as prevent illegal dumping of non-FireSmart related materials. This kind of initiative is supported by the CRI program.

There are no CRD waste disposal facilities on Salt Spring. The CRD maintains the Hartland regional landfill outside Victoria which receives green waste for a tipping fee. It is within the CRD's authority to promote access to this facility for the purpose of disposing green waste from FireSmart activities. The CRI program supports this kind of application, which may involve rebating, reducing, or eliminating tipping fees. However, given the ferry travel required, it is unlikely that residents will access a program that requires travel to the Hartland landfill. A better option may be CRD run community bins for waste from FireSmart activities. One way to ensure the connection between FireSmart and green waste would be to require residents to present a FireSmart assessment for their property when dropping off waste. Another means could be to register residents for reduced tipping fees at the time of the FireSmart Assessment and allow free loads of green waste up to a weight maximum or until a predetermined date. In either case, the Emergency and Waste and Recycling departments would need to collaborate to ensure facility attendants are given clear instructions on the eligibility and quantity of green waste for reduced fees.

Development Considerations

Role of the Capital Regional District

While in other Community Wildfire Resiliency Plans (CWRP) this topic also addresses building codes and guidance for new development, the Capital Regional District (CRD) does not have authority over planning or development in the Islands Trust Area. As a result, this section restates the recommendation to liaise with the Islands Trust (as above in Legislation and Planning). The main purpose of this section is to contain a general discussion of development issues as they relate to fire resiliency. Some of these ideas may be useful to CRD staff in their contacts with the Islands Trust. The SSI Official Community Plan (OCP) contains several objectives, policies, and guidelines to guide development away from natural hazards, such as wildfire. There is also a policy included to give consideration to designation of development permit areas for wildfire hazard.

Bylaws that affect zoning, land use, subdivision, and construction have large impacts on the future fire safety of communities. This is why there have long been building codes in North America to ensure buildings are constructed to acceptable standards. In recent decades, attention has been placed on the design of development, buildings, and landscaping as they influence the risk of wildfire in the wildland-urban interface (WUI). The National Fire Protection Association (NFPA), a US-based international organization, has developed codes and standards for the recommended design of subdivisions and buildings in the WUI, NFPA 1141 and NFPA 1144. NFPA 1141 addresses the design of subdivisions and fire protection infrastructure at the neighbourhood scale, while NFPA 1144 considers the appropriate materials and requirements for building and landscaping on individual properties. These standards are updated from time to time and reissued in new editions. Several municipalities in British Columbia have used these standards to help bring FireSmart into planning review and enforce compliance. The Province may in the future develop regulations within the National and BC Building Codes that address wildfire hazard to development in the WUI.

Subdivision Bylaws

FireSmart principles in FireSmart's Non-Combustible Zone (0-1.5m) and Zone 1 (1.5-10m) are often the focus of regulations in municipalities that consider wildfire hazard in their subdivision (or relevant zoning and development) bylaws. This is because, in many suburban municipalities, development in the interface is characterized by small-lot residential development in which the future management of off-site areas is impractical, unfeasible, or undesirable. Guidelines for subdivision in the interface often support the creation of a "fuel-free zone" within Priority Zone 1, meaning vegetation and landscaping in this area are intended to be of low flammability and non-combustible or fire-resistant building materials are preferred.

In unincorporated areas of the CRD, including SSI, the Ministry of Transportation and Infrastructure is the authority responsible for subdivision approvals, referring applications for subdivision to local authorities (typically including the CRD and Islands Trust) as part of its process. The Islands Trust has been empowered to place additional requirements on the subdivision of land through its bylaws, to better suit community circumstances. Subdivision and development control in rural residential areas can support FireSmart by ensuring developments have a buffer of 10 m between homes and coniferous vegetation, adequate fire design (including turnarounds, cisterns, or local hydrant networks where warranted), and lot layout that either provides or plans for future secondary access to neighbourhoods depending on size. In more rural areas with larger lot sizes, where portions of Priority Zones 2 (30m) and 3 (100m) are also located on-site, there are benefits to maintaining FireSmart guidance for landscaping and development in these areas in addition to Zone 1. NFPA 1141 contains industry-accepted guidance on the design of subdivisions in the WUI.

Subdivision control is a highly effective tool for ensuring new neighbourhoods or developments are set up to be FireSmart. Amending rules around subdivision may also be more acceptable to the public because they apply only to new multi-lot development and not all new construction.

Development Information, Development Permits, and the Official Community Plan

Development Approval Information

The BC Building Code sets the minimum acceptable standards for structures. However, the code does not contain guidance special to the development of homes and buildings in the WUI. For this reason, the Local Government Act provides that OCPs (developed in SSI by the Islands Trust) can contain special areas where additional regulations on development apply. There are two mechanisms available to local government under these powers. The first is "development approval information" (S. 484-487), which allows local governments to delineate areas where applicants for rezoning, development permits, and temporary use permits may be required to provide supplementary information. This can include wildfire hazard information, such as a wildfire hazard assessment of the subject property. This is one way for local governments to collect information about wildfire hazard on private land which is not available in this CWRP.

The Islands Trust has established development approval information areas and Development Permit Areas (DPA) within the OCP to support its environmental policies and DPAs. Wildfire is discussed in the OCP as a natural hazard, with an objective of locating development away from areas known to have natural hazards. The Islands Trust has established a Bylaw No. 175 to outline procedures and policies for requiring development approval information. Wildfire is noted (28c) as a hazard that the Islands Trust can request information on in the context of a new development.

Development Permit Areas Implementation

The second mechanism goes beyond development approval information and allows local government to designate DPAs within the Official Community Plan (S. 488-491). Because DPAs are used to enforce special standards on design and construction, the purposes of the DPA must be justified. Many local governments in British Columbia have used these provisions to establish "Wildfire Hazard" DPAs which rely on the accepted purpose of "protecti[ng] development from hazardous conditions" stated in the *Act*. Although the SSI OCP does not currently have a DPA for wildfire, it does include a policy (A.7.2.8) to "give consideration to designation of development permit areas" for wildfire. The OCP does have DPAs for other natural hazards, including soil erosion and slope instability.

A DPA has two core components: a map, indicating the properties to which the DPA applies, and guidelines which describe the requirements that must be met during development. Like development approval information areas, local government can also require wildfire hazard assessments on private land as a required submission for a development permit. This introduces an optional third component, professional reliance, whereby local government relies on professional hazard assessment and recommendations to adapt DPA guidelines to the circumstances of a specific property.

The DPA map will be adopted by amendment to the OCP and must show the properties within the DPA. Many communities with existing wildfire hazard DPAs distinguish their mapping between areas of high and extreme risk, and provide guidance tailored to this risk. While this approach is made possible by the mapping prepared for the CWRP, it is unlikely to provide fair or effective results in a landscape dominated by intermix conditions on private land. Another approach to mapping a wildfire hazard DPA is to identify all properties within a buffer distance of the forest interface. Buffer distances of 100 or 200 m are commonly used to help address the risk of ember-spotting from a nearby wildfire into a neighbourhood. When designing a DPA map for wildfire risk, it is important to recognize that the level of

wildfire threat changes over time as forests grow and land uses change. For this reason, it is desirable to commission specific mapping that identifies the long-term interface of the community based on the vision in the OCP.

Photo 14. Example of properties within a wildfire DPA.

Guidelines for development in the DPA must be adopted as a schedule to the OCP. Local government can set basic requirements in relation to wildfire risk respecting the character of the development, including landscaping, and the siting, form, exterior design and finish of buildings and other structures as well as restrict the type and placement of trees and other vegetation in proximity to the development. Guidelines are often based on NFPA 1144, with elements of NFPA 1141 and FireSmart adapted as needed to address outstanding issues with subdivision design and vegetation management.

If desired, local governments may require a professional wildfire risk assessment that provides site context and advice to local government on appropriate standards for design and construction, which may vary the guidelines. Codified guidelines are less flexible to site circumstance but provide greater certainty to applicants within the DPA and may be administered without requiring a professional report. Risk assessments reports can help to establish wildfire threat on private land and may improve the public acceptance of any change to development control by allowing for more consideration of individual circumstances.

DPAs, unlike subdivision control, apply to new construction as well as subdivision application. While their purpose is the same – to improve the physical environment of homes in the community as it relates to wildfire risk – DPAs allow established neighbourhoods to be renewed with FireSmart construction over time. This strategy of gradually transitioning existing communities toward FireSmart through the permitting of new construction should be carefully explained if it is promoted as a solution to long-term fire risk. Any amendment to an OCP requires a broad base of public support.

Interagency Cooperation

The Capital Regional District (CRD) is not the only actor in wildfire management within the project area; in fact, several agencies and authorities influence wildfire in the community and work to protect Salt Spring Island (SSI) from catastrophic loss. It takes the collaborative efforts of multiple stakeholders working together to achieve a fire resilient community.

Actors include Salt Spring Island Fire Rescue (SSIFR), representatives of the BC Wildfire Service, First Nations, CRD departments in addition to Emergency Services, and land managers like BC Parks. In many cases, these organizations already have extensive contact with each other, though not in the frame of strategic planning to manage community wildfire risk. The CRD's role as the provider of emergency management means that it can act as an intermediary between different agencies and groups that together prepare SSI for wildfire.

Factors for Success

Identifying Actors and Roles

Emergency response responsibilities are divided in the province. Recognizing who needs to be present during conversations about wildfire preparedness is critical. The following agencies and groups have important roles in preparing and responding to wildfire in SSI

- **The CRD** – conducts emergency and evacuation planning, initiates and staffs Emergency Operations Centre during a wildfire, declares local states of emergency and exercises local emergency powers to direct residents out of a fire zone (under the Emergency Program Act). The CRD also manages properties in the community and regional parks system.
- **BC Wildfire Service** – before a wildfire, supports wildfire risk reduction through projects on provincial crown land and joint training; collaborates with local fire departments and local governments on FireSmart projects. During a wildfire, acts as official first suppression response to a wildfire in areas of SSI without local fire protection districts.
- **SSIFR**– provide first suppression response within their fire protection area. Conduct outreach within their communities to promote responsible fire use and control. Provides most local FireSmart programming through their local FireSmart Coordinator.
- **First Nations** –SSI is within several overlapping traditional territories. Though no reserves are present in SSI, First Nations can consult emergency responders on social, economic, and cultural values threatened by fire prevention or suppression activities.
- **Emergency Management BC** – before, during, and after a wildfire supports local government response.
- **Ministry of Forests, Lands, Natural Resource Operations and Rural Development** – provides review and issues tenures to fuel management projects located on crown land.
- **Ministry of Transportation and Infrastructure** – maintain public roads in unincorporated areas, responsible for subdivision application approval.

Not all of these agencies will be relevant to every discussion in a community about fire resiliency. The CRD should strive to maintain positive relationships with representatives of these organizations and more. Matching issues and interested parties can be part of any communications plan for FireSmart initiatives led by the CRD.

Regular Communications Through a Semi-Annual or Annual Meeting

The CRD and SSIFR have worked together in the past to manage an Interagency Fire Response and Preparedness Working Group, with similar participants as the Community FireSmart and Resiliency Committee. This group met semi-annually in 2019, largely due to complications and capacity constraints of the COVID-19 pandemic. These meetings should resume on an annual basis when possible, and may be a component of the Community FireSmart and Resiliency Committee.

Setting Expectations for Interagency Cooperation

With so many actors involved in emergency response, it is important to set goals, scope, and limitations on any regular communications. This is largely the goal of any regular committee or working group established to bring representatives of the different emergency responders and land managers together. A committee charter can be used to establish the rules and organization of a working group's activities and acts as contract between partners to build trust and promote coordination of emergency planning functions.

Initiatives to Consider

Advocate for an Interagency Fire Response and Preparedness Working Group

Currently, there is no single event that brings together all the relevant authorities and organizations for planning fire response and preparedness. A wildfire working group would serve as an annual meeting to discuss wildfire management across the CRD, including internal and external agencies or departments responsible for wildfire management. The purpose of this group would be to ensure effective relationships are in place in advance of wildfire events, which in turn would ensure effective coordinated response. This could also be a forum to discuss interagency events, such as tabletop planning exercises. In addition, this group would also facilitate collaboration on regional FireSmart initiatives. This could include joint fuel management projects between levels of government, or ensuring participation in education events by various wildfire management agencies. Possible participants in this working group are CRD Protective Services, SSIFR, local First Nations, and the BCWS. It is also recommended that representatives from the North Salt Springs Water Works District and the Islands Trust be involved to coordinate the positive work that these agencies are completing for building wildfire resilience.

The CRD is well positioned to coordinate such a meeting because of its existing relationships with SSIFR and role as the primary local government for unincorporated areas. CRD Emergency Programs acts as a key liaison between SSIFR and other CRD departments, as well as external agencies such as BCWS and Parks Canada. Staff from this department are the logical hosts and coordinators for the Interagency Fire Response and Preparedness Working Group. Recommended timing for meetings would be annually before wildfire season. Recommended timing for meetings would be annually prior to wildfire season.

Provide cultural sensitivity training to better partner with Indigenous communities

Ensuring that all communities receive an equitable standard of service and care during a wildfire is an important public duty. 3.6% of the population of SSI self-identified as indigenous ("indigenous identity") on the 2021 Census[35]. As a discipline involving land management, wildfire prevention can affect indigenous cultural values, and the Indigenous should be involved in the planning of vegetation management. This is particularly relevant with prescribed burning, which may benefit from including a cultural component to reflect the history of indigenous burning in the area. SSI also contains several known sites of archaeological value and many dozens more of continuing cultural significance. Ensuring emergency responders are trained to provide culturally sensitive assistance to indigenous residents during a wildfire and to have positive proactive relationships with representatives of Indigenous nations is an important aspect of reconciliation.

CRI supports providing cultural safety and humility training to emergency management personnel involved in both wildfire prevention and suppression. The CRD could provide staff members in its Emergency Operations Centre with this cultural training any time the services of the Emergency Operations Centre are required. Similarly, it is important that CRD's representative to any community committee or working group have this training.

[35] Statistics Canada. 2021. Salt Spring Island, RDA [Census subdivision], British Columbia and Nanaimo, RD [Census division], British Columbia (table). Census Profile. 2021 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released October 26, 2022.. https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed November 22, 2022)

Cross-Training

This discipline is intended to develop the level of ability and knowledge among emergency managers and first responders in Salt Spring Island (SSI) so that all actors can understand additional roles in wildfire management. Cross-training means bringing the knowledge of one role together with the knowledge of another and is a major component of facilitating FireSmart programming and interagency cooperation. The Community Resiliency Investment (CRI) program recognizes the value of a variety of training for emergency responders but focuses investment on a set of selected courses mostly dealing with suppression training and FireSmart implementation.

Cross-training can also describe initiatives to extend FireSmart training and certifications to the backbone of community wildfire resiliency – community members. Residents are able, through FireSmart BC or FireSmart Canada programming, to attain training to become recognized Neighbourhood Champions. These are roles that are embedded in communities and provide advocacy for wildfire preparedness at a grassroots level. This is particularly effective in contextualizing FireSmart education in individual communities.

Factors for Success

Identify Needs

SSI is fortunate to have a well provisioned fire department with Salt Spring Island Fire Rescue (SSIFR), with several full time staff, as well as a group of dedicated paid on-call staff. SSIFR has the largest response area of any department in the unincorporated electoral areas of the CRD, and as such has the highest training standards and the largest body of equipment. Several department members have been deployed in recent severe wildfire seasons, providing crucial wildfire experience that has been shared throughout the department. All department members are trained to ICS100 and S100, and several have additional training in the S215 and WSPP 115 courses. Good relationships exist with the BC Wildfire Service and the CRD Emergency Program, as well as the local BC Parks operators.

Identify Funding Eligibility

SSIFR can refer to this document and the annual updated CRI program information to understand which courses or opportunities are covered by grant funding. Currently, direct funding opportunities for training within CRI are limited to certain courses and professional roles for enrolment. For example, only volunteers with Fire Departments registered with the Office of the Fire Commissioner can access the suite of courses related to fire suppression. The following courses can be funded for members of SSIFR:

- **Wildfire Risk Reduction Basics Course –** This course is intended as an introduction to the key concepts to minimize the negative impacts of wildfires.
- **Fire Life and Safety Educator –** This course is designed to help facilitate delivery of fire and life safety education to the public.
- **ICS 100 Incident Command System Level 100** – This course, offered by the Justice Institute, introduces the Canadian Incident Command System to emergency management staff and local first responders. This training is also available to emergency management personnel outside of fire departments. All members of SSIFR currently receive this training.
- **SPP-WFF1 Wildland Firefighter Level 1** – This course, designed by the Office of the Fire Commissioner, provides training to structural firefighters in the specifics of wildland firefighting and enables structural firefighters to participate in the province's Structural Protection Program, or field deployments during the fire season. This course replaces S-100 and S-185 for structural firefighters participating in wildland deployments with the BC Wildfire Service.
- **S-100 Basic Fire Suppression and Safety** – This course, designed by the BC Wildfire Service, is the minimum basic standard for any person to participate as a wildland firefighter in British Columbia. All SSIFR currently receive this training.
- **S-185 Fire Entrapment Avoidance and Safety** – This course, designed by the BC Wildfire Service, provides basic knowledge of entrapment avoidance and survival techniques during a wildfire.
- **S-231 Engine Boss** – This course, designed by the BC Wildfire Service, trains firefighters with wildland experience to lead an engine and crew during an interface event and allows contract firefighters to act in higher capacities while on deployment.
- **WSPP-115 –** This is a course is required for structural firefighters prior to being deployed on structure protection crews. This course focuses on structure protection in the context of a wildfire. Many firefighters with SSIFR have received this training.

Having both firefighters and CRD staff complete ICS-100 ensures that emergency responders and staff participating in an Emergency Operations Centre have the same language of site and scene control. Emergency management staff can also receive training in the province's Wildfire Risk Reduction Basics Course, which supports interagency cooperation between local government and the BC Wildfire Service on fuel management projects outside the designated wildland-urban interface (WUI).

Emphasize community preparedness

Through CRI, community members have avenues to access preparedness training within the FireSmart frame. Residents throughout SSI can access training as Neighbourhood Champions, which provides them the knowledge to engage with their communities on preparedness issues and potentially take a leading role in establishing a neighbourhood FireSmart committee for developing a FireSmart neighbourhood plan (discussed under *Education* p.78).

Initiatives to Consider

Collaborate with SSIFR to access additional training for members

Continue to ensure that all members have received ICS-100 and S-100, and support SSIFR to nominate members for S-185 Fire entrapment avoidance and S-231 Engine Boss training. This would ensure all members, who will be the first responders to a wildfire in SSI have the same knowledge of wildland suppression and enable all members to participate in structural protection deployments with the BC Wildfire Service if desired. Engine Boss training supports higher roles for contract members in the province's Structural Protection Program, valuable interface firefighting experience that can be brought back to SSI.

Support CRD Emergency Services staff to become Local FireSmart Representatives or facilitators

Currently, two staff members of the CRD's Emergency Services department are certified Local FireSmart Representatives. As staff are added to the department, or as outreach is conducted within communities, it could be valuable for a staff member to be a designated facilitator for the LFR workshop. This would enable CRD to use in-house talent to build up FireSmart awareness and capacity in its unincorporated communities. Alternately, the CRD could seek this qualification when hiring for additional emergency staff or the role of a regional FireSmart Coordinator.

Help interested community members access Neighbourhood/Community Champion training

Every member of the public who contacts local government or SSIFR looking for information about wildfire resiliency is a potential neighbourhood champion. This role is for self-directed leaders who want to learn more about the principles of FireSmart and the Neighbourhood Recognition process so that they can organize in their communities for fire preparedness. The CRD can help direct people to this program. Three communities in SSI, Maracaibo, Narrows West, and Bayside, have. achieved Neighbourhood Recognition. There are opportunities for the CRD to connect interested residents of SSI with these neighbourhoods, as well as support potential champions to participate in an introductory workshop. These workshops are given by Local FireSmart Representatives and could be held by the CRD if sufficient interest is present in several communities.

Assess future potential for a Home Partners Program approach to FireSmart assessment

The Home Partners Program is another means to provide homeowners with personalized property assessments. While Local FireSmart Representatives are trained to develop neighbourhood recognition, the Home Partners Program is focused on delivering targeted assessments to individual properties within an area, regardless of neighbourhood FireSmart activity. The focus on individual property rather than reducing neighbourhood level fire risk means delivery of the program depends on FireSmart certified “Wildfire Mitigation Specialists”. Specialists conduct home assessments in the program, providing a personalized report to property owners that contains specific discussion about the features of their home and how the fuel environment on their property is likely to behave during a wildfire event. These assessments are currently completed by the SSIFR FireSmart program. SSIFR has trained 20 Local FireSmart Representatives to conduct residential assessments, facilitate a rebate program for FireSmart mitigations, and to provide FireSmart education sessions on SSI. Training for additional Wildfire Mitigation Specialists role can be funded through the CRI program.

Emergency Planning

This FireSmart discipline addresses the CRD's own preparedness and examines connections between the Community Wildfire Resiliency Plan (CWRP) and the CRD's emergency planning mandate. The primary purpose of this section is to consider how wildfire can be incorporated into emergency planning conducted by the CRD and appropriate levels of readiness during the fire season. This discipline also includes related interagency actions such as coordinating joint training and scenario exercises.

Wildfires are complex and dynamic events that have the potential to combine multiple emergencies within communities. Wildfires rapidly change behavior depending on winds, weather, the fuel environment, and topography. Respecting the dynamism of wildfire is the first step to making a successful plan.

The CRD prepares emergency plans for its electoral areas, declares states of local emergency (SoLE) and issues evacuation alerts, orders and rescinds, and coordinates an Emergency Operations Centre during periods of need. Emergency planning, including evacuation planning, by the CRD focuses on rapid situation assessment, and an all hazards approach, rather than prescriptive plans that may quickly be overcome by situational uncertainty. During a wildfire emergency, multiple routes and resources may quickly become unpassable or unsafe or need to be reserved for emergency responders.

Local emergency and evacuation plans cover the general initiation of an Emergency Operations Centre, the declaration of orders and alerts affecting residents and properties, and the CRD's relationship with supporting organizations like Emergency Management BC. The role of the Community Wildfire Resiliency Plan is to provide wildfire-related guidance for emergency planning by the CRD, pre-incident planning by local firefighters, and to propose levels of service for emergency readiness, called "Wildfire Preparedness Condition Level" by the province.

Factors for Success

Wildfire Preparedness Condition Level

Within the CRD's Emergency Services department, adopting a guide to emergency preparedness levels in relation to wildfire danger can help prioritize limited departmental resources during fire season. This guide will associate CRD staffing and activities with the levels of fire danger, with more action to prepare for wildfire being appropriate whenever fire danger rises above low. Fire danger can be monitored daily on the BC Wildfire Service website, and in collaboration with SSIFR. Developing an appropriate guide to Community Wildfire Response Condition Level has not been undertaken as part of this Community Wildfire Resiliency Plan, but the CRD can work towards implementing a level of service based on the example below, adapted from the BC Wildfire Service's guidance. Wildfire preparedness condition level monitoring and guidelines should be developed in collaboration with SSIFR>=.

Table 19. Sample Guide to Wildfire Response Condition Level.

Preparedness Level/ Fire Danger Rating	Action Guidelines
I Low	• Staff monitor fire danger rating weekly
II Moderate	• Staff monitor fire danger rating daily
III High	• Staff on normal shifts • Notify proposed Community FireSmart and Resiliency Committee of preparedness level. • Establish weekly communications with local fire responders regarding preparedness concerns. • Promote wildfire awareness and reporting mechanisms on social media channels. • Publish fire danger rating on CRD website. • Consult with CRD Parks on potential area closures in zones of high and extreme wildfire threat.
IV Extreme	• EOC and parks staff on standby. • Notify proposed Community FireSmart and Resiliency Committee of preparedness level. • Weekly communications with local fire responders regarding preparedness concerns. • Weekly communications with parks department staff over internal preparedness. • Promote wildfire awareness and reporting mechanisms on social media channels. • Publish fire danger rating on CRD website. • Consider area closure notices in park zones of high and extreme wildfire threat.
V Ongoing fire(s)	• Issue area closures in impacted parks and publicize with media release and CRD website. • Mobilize EOC if evacuation is needed, or if fire requires additional support from Emergency Management BC. • Issue Evacuation Alerts and Orders based on fire behavior prediction as appropriate in consultation with BC Wildfire Service and publicize with media release and CRD website. • Assist evacuated residents with support access and emergency lodging. • Daily communications with local fire responders, BC Wildfire Service, and parks department. • Daily public updates via social media and public release.

Initiatives to Consider

Coordinate a tabletop scenario exercise with the members of the proposed Fire Response and Preparedness Working Group

The CRD has facilitated two wildfire exercises with SSIFR since 2020. Due to resource constraints, the BCWS was unable to participate. These exercises present a wildfire scenario, then allows all participants to confirm their roles and follow through a chain of action during a hypothetical wildfire event. These exercises are an opportunity for primary fire responders to share their knowledge and suppression capacity with emergency planners. These exercises are encouraged and should occur on an annual basis.

Conduct a community info session about emergency preparedness during a wildfire

CRD Emergency Programs delivered a webinar series entitled “Living with Fire” in July 2021 for Salt Spring Island. This video introduces the community to emergency planning concepts based on the Emergency Management BC Wildfire Preparedness Guide. Initiatives like this are supported by CRI and encourage residents to prepare for wildfire by having a household or family plan for communications, evacuation, and provisions. These events should continue on an annual basis.

Establish a guide for Emergency Services preparedness levels during wildfire season

The CRD can help allocate the limited resources of the Emergency Services department during fire season by developing and following a guide to Wildfire Response Condition Levels (Table 19), tied to fire danger reporting updated daily by the province. The table presented previously in this section can be used as a sample of the content and actions to be considered by the Emergency Services department in defining its level of service for different fire danger ratings.

Pre-Incident Planning

The pre-incident plan is a body of knowledge for wildfire response prepared by emergency responders in SSI. During a wildfire, SSIFR will provide the suppression response and incident control while the CRD declares a state of emergency as necessary and directs communities to evacuate affected areas. All partners in fire suppression and emergency response should know where key fire suppression resources are located in the community, including water sources and resources, vehicles, structural protection units, and even stores of hand equipment. This section is mainly provided as guidance for SSIFR, who will lead the first response to a wildfire and provide incident control at the scene. The following issues should be addressed by a pre-incident plan:

Command

- First responder
- Incident command and delegation
- Management constraints
- Area closure procedures
- Interagency agreements

Operations

- Air and water access
- Control line locations
- Natural barriers
- Safety zone options
- Staging area locations
- GPS locations for key points

Logistics

- Alert/Order publication and notification
- Location of utilities and de-energization
- Communications protocols
- Roads, trails, and access
- Emergency Operation Centre location

Planning

- Topographic maps
- Vegetation and fuel maps
- Community base map
- Hazardous values
- Archaeological/cultural values
- Protected or rare environmental features
- Land ownership
- Access control

Preparing a pre-incident plan is logically an opportunity to simulate a wildfire response effort. Developing the plan can be part of joint training exercises coordinated between the CRD, BC Wildfire Service, and SSIFR. Such a meeting would be within the scope and core purpose of a proposed Fire Response and Preparedness Working Group, as discussed in *Interagency Cooperation* (p.100).

Vegetation Management

In the context of a wildfire, manipulating the fuel environment is often an effective way to reduce wildfire threat or risk. Vegetation, or fuel management, is a process that aims to reduce wildfire risk on a variety of scales by reducing the potential wildfire threat through vegetation modification. This discipline addresses opportunities to mitigate wildfire risk by altering both natural forest vegetation and the cultivated landscaping around the homes and critical infrastructure. Considerations for this section are divided into two categories corresponding to the common forms of implementation: FireSmart landscaping focused closely on homes and infrastructure, and broader fuel management in forest areas. This division reflects the difference in goals and methods between the two scales.

Managing Vegetation through FireSmart

FireSmart vegetation management is intended to reduce the risk of ignition to a specific building or piece of infrastructure, assuming a fire has occurred in the area. Accordingly, FireSmart vegetation management focuses heavily on achieving guidelines in the Non-Combustible Zone (0-1.5m) and Zones 1 (1.5-10m), 2 (10-30m) and 3 (30-100m) around a home or piece of infrastructure. Goals for management vary with the distance from the structure. In the Non-Combustible Zone, the emphasis is placed on using non-combustible or fire-resistant building materials and covers to reduce the likelihood of ignition by direct flame. Within Zone 1, emphasis is placed on creating an area free of hazardous fuels like coniferous trees and woody debris and using fire-resistant landscape construction (decks and outbuildings), while goals for Zones 2 and 3 emphasize proper spacing, pruning, and removal of some underbrush. The goal is to prevent a structure ignition and create defensible space around the home which firefighters can work in. Vegetation management for FireSmart is often guided by an assessment report prepared by a Local FireSmart Representative or Wildfire Mitigation Specialist, though some homeowners may wish to undertake FireSmart treatments on their own. The expertise of a Registered Professional Forester is recommended for projects where management includes areas of native forest vegetation.

Supports are available through the Community Resiliency Investment program for FireSmart activities on private land in residential areas and for publicly owned critical infrastructure. On private land, only planning and assessment program costs are covered, with the homeowner expected to cover the cost of implementing recommendations. While this can seem daunting, the Local FireSmart Representative can help homeowners understand which actions may be “quick starts” to improve resiliency, and which are appropriate to save until money or time are available. To help, the CRD can apply for funding to offer limited rebates to homeowners who complete activities. The CRD piloted a rebate program in 2022, and this should be further expanded and publicized to increase uptake. Development of other FireSmart initiatives for private land are discussed in the *Education* (p.78) and *Planning* (p.89) sections.

A FireSmart Assessment Program for CRD Critical Infrastructure

Local government can apply for funding to implement the recommendations from a FireSmart assessment for publicly owned critical infrastructure up to a maximum of $53,500 per eligible structure. This is available only for structures critical to wildfire response (such as water infrastructure, communications towers, electrical infrastructure) having a completed FireSmart assessment score card at the time of application. Reassessment with the appropriate score card following the mitigation works is also a covered cost for publicly owned critical infrastructure.

Fuel Management for Forest Landscapes

Fuel management in the wider landscape is not as focused on preventing the ignition of specific homes or structures. Instead, fuel management is about strategically altering the characteristics of a forest to transition it towards lower wildfire threat and thereby reduce the general risk to the community. This facilitates easier wildfire response, and a reduction in the resources required by response agencies to action a wildfire. Sometimes, fuel management is used to produce future fire suppression opportunities such as anchor points or safety zones, locations to initiate defensive back-burns, or improved access to a remote areas of a community. Directions for how many trees to remove and retain, as well as how to protect other values in the forest landscape, are contained in a fuel management prescription prepared by a Registered Professional Forester and reviewed by the BC Wildfire Service. The intent of fuel management is generally to support healthy forest development while reducing wildfire risk. Fuel management is only supported through CRI on public land.

Fuel management is completed through three phases:

1. Identify areas for fuel treatment within a Community Wildfire Resiliency Plan or other high level strategic plan.
2. Develop a detailed Fuel Management Prescription which identifies objectives and strategies to reduce wildfire risk.
3. Operational implementation of the Fuel Management Prescription.

This Community Wildfire Resiliency Plan is the first step in identifying and prioritizing candidate areas for fuel management prescription development. Fuel management is a process of starting wide and narrowing down potential treatment areas as constraints are identified and areas are further ground verified. The areas shown on the map in this section form a discussion piece to be used in pursuing a fuel management program and do not compel or imply fuel management to occur. The process from initial identification of a treatment area to implementation on the ground typically takes several years.

Photo 15. Example of a forest prior to fuel management. (Example from outside the CRD)

Photo 16. In the same area as previous photo, post fuel treatment. (Example from outside the CRD)

Methods for identifying potential fuel treatment areas

Areas on public lands that were identified as having potentially high wildfire risk within 100m of densely populated areas or critical infrastructure were visited in the field. Fuel plots were established in representative areas of the forest stands to determine wildfire threat. Assessments of the fuel condition were completed following the provincial assessment system using the 2020 Wildfire Threat Assessment Guide. This is the provincial standard for field assessments of fuel hazard in the WUI and is used to plan fuel hazard mitigation works. Fuel types are scored under this system which is used to help prioritise the areas for fuel hazard mitigation funding under the Community Resilience Investment Program.

The fuel component of wildfire threat is driven by the density and continuity of fuel on the forest floor, in the canopy, and the ladder fuels that connect the two. The highest threat fuel types are composed of dense coniferous trees with high vertical and horizontal continuity, with high fuel loading on the forest floor in the form of dead logs and branches.

Interface fuel treatments change the composition of a forest to reduce the wildfire threat, and thereby reducing the wildfire risk. This involves reducing the overall fuel load and disrupting both the vertical and horizontal continuity to create gaps between the fuel layers. The overall objective of the fuel treatment prescriptions is to change the fire behavior potential of forests from a crown fire to a surface fire under the most dangerous weather conditions (the 90th percentile weather conditions). Successful fuel management allows suppression resources to be able to act on the wildfire and defend the adjacent values. The detailed strategies for reducing fire behavior potential are detailed in a fuel management prescription, which is developed by a Registered Professional Forester with wildfire management experience. Potential strategies include tree thinning, spacing, pruning, surface debris removal, or creating fuel gaps. Treatment areas should be adjacent to the values at risk, a target of at least 100m wide and located up against man made and natural fuel breaks when possible.

Surface fire is where only fuels in contact with ground are involved in a wildfire.

Crown fire is where tree crowns, including foliage and branches, are involved in a wildfire. Crown fire can be *passive*, meaning only single tree crowns or groups of trees are involved, or *active*, meaning fire is readily spreading between tree crowns.

Figure 21. Comparison of surface and crown fire behavior.

Potential Treatment Areas

The opportunities for forest fuel management on public land in SSI are limited. This is because of several factors, including:

- The small amount of public land in SSI.
- The limited area of contiguous forests with high or extreme wildfire threat.
- High environmental values of remaining forest cover, such as in provincial and regional parks.
- Low feasibility, primarily due to public land isolated by private land parcels and lack of roads into contiguous forested public land areas.

The CRD is a minor landowner in SSI. While all forms of public land ownership within the WUI are potential fuel treatment areas in this Community Wildfire Resiliency Plan, the CRD only has authority to advance treatments that occur solely or partially on its own property. Fuel management on other forms of public land ownership must be advanced through partnership with the agency having authority and the BC Wildfire Service.

Two potential areas for fuel management were identified. The first is in Mouat Park near Ganges, a CRD Community Park. This area was selected due to the higher fuel loading on the surface, and high mortality in the overstory, as well as its adjacency to the community of Ganges. Treatment is expected to be relatively light, given the fuel conditions and high recreation use of the site. The second treatment area is Duck Creek Park. This park is dominated by meadows with thick grass and flammable invasives such as scotch broom. This area is suitable for prescribed burning, with advantageous terrain features and access for safe containment. This will also dovetail with some ecological goals of invasive management and ecological restoration. Maps of the treatment areas are show in Figure 22 and Figure 23, and these areas are described in more detail in Table 20.

Photo 17. Duck Creek Park.

Fuel Management in Regional Parks

Most of the CRD land within the AOI is in the form of regional parks. As such, most of the identified fuel management areas identified in this CWRP are located within regional parks. The purpose of this document is to identify preliminary candidate areas for fuel management for further study in the form of a fuel management prescription document. This fuel management prescription will identify strategies and objectives for fuel management to reduce wildfire risk, but also objectives and strategies to protect important values at risk that must be protected during any fuel management activities. Regional parks in the CRD exist to provide a multitude of values, including ecological and recreational values, which may either synergize or conflict with fuel management activities. While these have been identified at a landscape scale in the Community Description portion of this CWRP, this description is intended as a broad, non-exhaustive survey of some of the important values present. A fuel management prescription is a site-specific, study that will account for all the values that must be managed in a specific area. Furthermore, a fuel management prescription will utilize more diverse and accurate sources of data such as detailed biological, archaeological, and geotechnical assessments, or varied geospatial sources.

Minimal large scale vegetation management for wildfire risk mitigation has occurred in CRD regional parks historically. This is tied to the low frequency of historical wildfire and the fuel conditions. The CRD Regional Parks are under pressure to manage wildfire risk through fuel management by incorporated member communities that abut regional parks, as these communities contain the values at risk by potential wildfire in these parks. Similarly, communities within unincorporated areas are also interested in fuel management in regional parks in and adjacent their communities. This is challenging as at times fuel management objectives may conflict with some of the ecological, recreational, or social objectives that are part of the CRD Regional Parks department policy framework. As such, fuel management activities must include the CRD Regional Parks department as a critical project partner at the first stages of planning.

The regional parks managed by the CRD are disbursed throughout the regional district and are located in the WUI of different municipalities and electoral areas. Many of these municipalities have individual wildfire plans, which have identified regional parks in their respective WUI's as high priorities for fuel management. This has created a patchwork of prospective fuel management areas, all with varying priorities within the wildfire plans that have identified them. This creates a challenge for strategic planning for the CRD Parks department, as these plans are not prioritized or synthesized at a regional level. The CRD Parks department could benefit from creating a strategic plan, not only to prioritize treatments at the regional level, but to identify specific management goals that must be included in fuel management activities within regional parks. This would provide clear direction to municipalities that are proposing fuel management within regional parks, as well as create a system of prioritization for projects at the regional scale. This could be formulated with input from Protective Services as part of emergency planning for the CRD.

Figure 22. Map of potential fuel management areas in SSI.

Figure 23. Map of Mouat Park and Duck Creek treatment areas.

Table 20. Areas with the highest potential for fuel management in SSI.

Treatment Polygon ID	General Location	Jurisdiction	Local Fuel Threat (Hectares)			Total Area (ha)	Priority	Treatment Rationale / Constraints
			Moderate	High	Extreme			
DUCR	Duck Creek Park	CRD-Regional Park	6.7	0	0	6.7	High	Park dominated by thick grass with significant invasive presence (broom). Flat terrain and vehicle access throughout. Excellent candidate for small scale prescribed burning to achieve both wildfire risk reduction and invasive management. Located in CRD regional park, sensitive species present. Due to the poor resolution of the PSTA ownership layer, boundaries are approximate. Survey may be required. Treatment requires collaboration with SSIEAA
MOPA	Mouat Park	CRD-Regional Park	22.9	0	0	22.9	Moderate	Highly used park with trails and disc golf course, well maintained in eastern portions but increasing fuel loading in west. Patches of high fuel loading. Cw is stressed with mortality, likely increasing fuel loading in future. Treatment likely quite light with pruning, surface fuel management, and thin from below. Located in CRD regional park, sensitive species present. Due to the poor resolution of the PSTA ownership layer, boundaries are approximate. Survey may be required. Treatment requires collaboration with SSIEAA

Action Plan & Implementation

This section takes discussion from the preceding sections on FireSmart Disciplines and summarizes recommendations for the Capital Regional District (the CRD) to consider pursuing. Successful implementation of the Community Wildfire Resiliency Plan (CWRP) requires a strategy for implementation, tracking mechanisms for success, and a schedule for revisiting issues left unresolved. The Action Plan follows the SMART criteria for outlining potential initiatives:

- **Specific**: Target exactly what is to be achieved
- **Measurable**: quantify or suggest an indicator of progress
- **Assignable** – specify who will be responsible for implementation
- **Realistic**: state what results can reasonably be achieved
- **Time Bound**: state expected time for completion. Note that some recommendations must be implemented on a recurring basis annually or biannually. For example, an annual social media campaign to raise awareness.

Plan monitoring and updates

While priorities and timelines are assigned below, the CRD may, with feedback from its community, decide some initiatives are of greater importance than others. The risk environment will continue to change beyond the completion of the plan and require adjusting expectations and resource allocation for building wildfire resiliency programming. This is a natural part of the implementation process of any plan. For these reasons, the CWRP and this Action Plan should be revisited from time-to-time to ensure they are meeting the needs of the SSI. A formal review after five years is recommended, with at least annual reviews of the Action Plan.

Tracking and Reporting

There are funding sources available to help implement many of these recommendations, subject to a competitive application program open to all local governments. UBCM manages the Community Resilience Investment (CRI) Program which offers up to 100% funding for a range of wildfire mitigation initiatives. Many of the recommendations made in this report are eligible for CRI funding. Estimated costs for implementing these recommendations are in addition to existing operating budgets.

Initiatives pursued by the CRD in the Action Plan should become part of the Protective Services department's annual progress review. The Action Plan can be recreated and modified to add columns for noting whether items are in progress or have been completed, as well as capture specific measurable outcomes that can help justify the Region's wildfire resiliency initiative.

Following the Action Plan, Table 21 provides a sample tracking and reporting tool.

Table 21. Action Plan.

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
Renewing the Plan and Building Resiliency						
Objective: View the Community Wildfire Resiliency Plan as a Living Document and incorporate wildfire resiliency into strategic decisions						
1. Conduct a formal review of the CWRP contents every 5 years. Review the Action Plan every year.	CRD Protective Services	High	$30,000 per update	Continuing program capacity for wildfire preparedness within the Protective Services department.	Maintain annual tracking and monitoring information on initiatives in the Action Plan	CRI funding eligible (CWRP updates). **Required for 2024 CRI funding applications.**
2. Establish a regional FireSmart Coordinator position within CRD Protective Services	CRD Protective Services	High	$60,000-$70,000 per year (one year contract)	Develop a job plan (title, responsibilities, priority initiatives, manager, term) Funding for this position can be supported by CRI up to 100% of salary.	Fill this position and establish a job plan for the first contract year. This may be a new role, or an enhanced role for the existing CRD FireSmart Ambassador.	This position is not intended to replace the local FireSmart Coordinator within the SSIFR. Rather this is intended as a regional, overhead position to provide administrative capacity, creating more opportunities for local outreach by the SSIFR FireSmart Coordinator. CRI funding eligible. **Required for 2024 CRI funding applications.**
3. Develop-a Community FireSmart and Resiliency Committee	Regional FireSmart Coordinator CRD Protective Services	High	up to $5,000 per meeting	Develop terms of reference, network participants, support participation	Host initial meeting Approve draft terms of reference	Include SSIFR, NSSWD, and Islands Trust as local partners. CRI funding eligible **Required for 2024 CRI funding applications.**
Education						
Objective: Promote FireSmart as a strategy for wildfire preparedness and demonstrate the Region's commitment to wildfire resiliency in the community						
4. Publish the CWRP, risk maps, and highlights on the CRD's website and digital communications tools.	CRD Protective Services	High	Staff time	IT support Coordination between departments	Successful publication within one year after receipt by the Board of Directors	
5. Install wildfire awareness signs at key park locations.	CRD Protective Services CRD Parks	Medium	$5,000	Staff time, communications materials, signs	Installation of sign at highest traffic trailheads in SSI.	

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
	SSIEAA			Coordination between departments		
6. Support voluntary FireSmart assessment program for private property in SSI	SSIFR FireSmart Coordinator / Regional FireSmart Coordinator	High	See Item 3. Incidental expenses beyond FS Coordinator salary.	Coordination with SSIFR	Offer an annual opportunity to residents to have their property assessed	CRI funding eligible
7. Host a Community Clean Up Day in a Community Park or another suitable park as a demonstration of FireSmart principles.	SSIFR FireSmart Coordinator / Regional FireSmart Coordinator SSIEAA	Medium	$5,000	Coordination with parks to designate clean-up areas, desired outcomes	Number of participants Weight of vegetation/debris removed Reduce surface fuel loading near homes.	CRI funding eligible
8. Promote FireSmart Neighbourhood Planning in neighbourhoods at relative risk.	SSIFR FireSmart Coordinator / Regional FireSmart Coordinator	Medium	$3,000-$5,000	Coordination with local fire recommended. FireSmart Coordinator within CRD Protective Services	Number of households represented, participating Offer neighbourhood champion workshop to regional residents.	CRI funding eligible
9. Expand participation in PANS	CRD Protective Services	High	Staff time	IT Support Outreach with local organizations Community advertising	Registrations as a percent of population. Registrations by area	
Legislation and Planning						
Objective: Ensure Regional District by-laws and policies support wildfire resiliency						
10. Explore restrictions on high risk activities in parks (smoking, campfires, etc)	CRD Protective Services SSIEAA	Medium	Cost to be estimated by further study	Coordination between departments Assess compliance and enforcement capabilities	Completion of meetings with parks to assess feasibility	
11. Assess wildfire hazard on CRD-owned properties	CRD Protective Services SSIEAA	Medium	$1,000 per structure, 400 $/ha for parks.	Coordination between departments	Assessment of all CRD properties in SSI	CRI funding eligible.
12. Create FireSmart program (assessments and mitigation) of existing CRD critical infrastructure.	CRD Protective Services	High	$25,000-$30,000	Coordination between departments	Completed FireSmart Assessment Score Cards for all CRD-owned critical infrastructure.	CRI funding eligible.

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
13. Support authorities having jurisdiction to conduct FireSmart Assessments of non-CRD critical public infrastructure, such as by completing joint CRI application for this purpose	CRD Protective Services Improvement Districts School District SSSIFR	Medium	Incidental	Coordination between CRD and authorities having jurisdiction.	Completed FireSmart Assessment Score Cards for all critical infrastructure identified in SSI	CRI funding eligible.
14. Update the building policies to incorporate FireSmart design principles in CRD facilities	CRD	Medium	Staff time	Coordination between departments	New capital projects reflect recognition of FireSmart building design and principles.	Review and revision may be CRI funding eligible depending on scope.
15. Create a program to reduce or eliminate green waste tipping fees for FireSmart projects at the Hartland regional landfill	CRD Parks and Environmental Services CRD Protective Services	High	Cost to be estimated by further study	Coordination between departments Baseline studies Operational capacity and training	Green waste by weight associated with a completed FireSmart assessment Fees deferred	Tipping fees: CRI funding eligible.

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
Development Considerations						
Objective: Consider FireSmart design principles in planning and development bylaws.						
16. Support Islands Trust in investigating the use of the Development Approval Information provisions to request and collect information on wildfire hazard on private property, particularly during land subdivision.	Islands Trust with support from SSIFR and CRD Protective Services	Medium	Staff time	Capacity in Islands Trust planning for administration and SSIFR for review. Coordination between departments. CRD can support through funding and providing mapping resources from this CWRP.	Bring a workable pathway to request wildfire hazard assessment reports for development applications on private land.	CRI funding eligible, subject to scope limitations around the bylaw review. CRD likely must be lead applicant on CRI application, disbursing funds for work to Islands Trust. Pursuing wildfire hazard information on private land through the DAI mechanism helps establish wildfire risk on private land in SSI. This information need not be requested from every application. Designating a DAI zone for wildfire hazard can be part of the investigation process.
17. Provide FireSmart information (bulletins, brochures, web resources) with development application materials	Islands Trust with support from SSIFR and CRD Protective Services	High	Staff time	Coordination between Islands Trust and CRD Protective Services and SSIFR.	FireSmart information is provided with all development permit application templates.	CRI funding eligible, to a pre-determined maximum (physical materials); web resources free. CRD likely must be lead applicant on CRI application, disbursing funds for work to Islands Trust.
18. Support Islands Trust in preparing mapping of a designated wildfire hazard area for future OCP updates.	Islands Trust with support from SSIFR and CRD Protective Services	High	$25,000-30,000	Potentially significant investment in methodology, mapping, and community engagement if DPA pursued.	Map community-supported zones for wildfire interface hazard.	CRI funding eligible, subject to scope limitations. CRD likely must be lead applicant on CRI application, disbursing funds for work to Islands Trust.

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
						If incorporated into the OCP, mapping can be used for future DPA mechanisms to gather information on wildfire hazard on private land and/or guide development toward FireSmart principles.
19. Support Islands Trust in creating a Development Permit Area at their next OCP update.	Islands Trust with support from SSIFR and CRD Protective Services	High	$5,000 to $15,000	Completion of mapping as per above recommendation Planning support	Creation of Wildfire DPA's for SSI as part of next OCP update	CRI funding eligible, subject to scope limitations. CRD likely must be lead applicant on CRI application, disbursing funds for work to Islands Trust.
Interagency Cooperation						
Objective: Ensuring wildfire response is effective						
20. Initiate a region-wide Interagency Fire Response and Preparedness Working Group	CRD Protective Services	High	$2,000 per meeting	Participation of local fire depts, BCWS, Parks Canada, regional emergency responders	Host initial meeting Host tabletop exercise for incident planning	CRI funding eligible
21. Provide cultural sensitivity training to Protective Services staff to support positive partnerships with Indigenous people and communities	CRD Protective Services	Medium	Staff time & facilitation fee		1 on duty or on call EOC staffer with cultural sensitivity training at all times during emergency. Consider expanding to all staff.	CRI funding eligible
Cross Training						
Objective: Ensuring emergency responders have a variety of training and experience						
22. Support SSIFR to access additional training on future CRI funding applications.	CRD Protective Services SSIFR FireSmart Coordinator / Regional FireSmart Coordinator	Medium	Incidental	Identify training needs for new recruits, transfers SSIFR to identify candidates for training and desired courses.	Full participation in training by members who want it	CRI funding eligible

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
23. Support additional CRD staff or SSIFR members to become Local FireSmart Representatives	CRD Protective Services SSIFR	Medium	Staff time		At least 2 persons in CRD Protective Services to have active LFR certification at all times.	CRI funding eligible. SSIFR currently has 20 Local FireSmart Representatives; this staffing level is adequate, and should be maintained.
24. Host a neighbourhood champion training workshop for interested community members	SSIFR FireSmart Coordinator	Medium	$5,000 per event	Successful fostering of a FireSmart neighbourhood planning program	Neighbourhood champions trained in each priority identified areas.	CRI funding eligible
25. Train CRD staff or Local FireSmart Representatives to be Wildfire Mitigation Specialists	CRD Protective Services SSIFR FireSmart Coordinator	Low	$8,500 - $10,000	Expression of interest in WMS programming from local fire depts or general public.	Certification of a WMS within the CRD Protective Services department.	CRI funding eligible. WMS assessments of private land require requests from public. CRD Parks have expressed interest in this program.
Emergency Planning						
Objective: Enhance emergency response capacity						
26. Coordinate a tabletop scenario exercise with the members of the proposed Fire Response and Preparedness Working Group	CRD Protective Services SSIFR BCWS NSSWD	Medium	$2,140 per meeting	Suitable event space, pre-scenario planning	Number of attendees	CRI funding eligible
27. Continue and expand community information sessions about emergency preparedness and evacuation during a wildfire	CRD Protective Services SSIFR	Medium	$5,000 per event,	Conclusion of evacuation planning process.	Host event Number of attendees	CRI funding eligible
28. Establish a guide for Protective Services EOC preparedness levels during wildfire season	CRD Protective Services	High	Staff time	Administrative capacity in ES.	Adopt as policy a Guide to Wildfire Preparedness Condition Levels	Sample for development provided in Emergency Planning section
29. Contribute towards a pre-incident plan for wildfire events with local suppression experts	Interagency Fire Response and Preparedness Working Group	High	Staff time.	Participation of emergency responders and suppression authorities	Complete annual pre-incident plan and discuss with regional working group for fire response in pre-season meeting	CRI funding eligible when developed as part of a working group of Community FireSmart and Resiliency committee

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
Vegetation Management						
Objective: Modify fuel environments to reduce risk around infrastructure and communities						
30. Work to implement FireSmart Assessment recommendations for critical infrastructure, such as by supporting joint applications to CRI for infrastructure designated in the HRVA.	CRD Protective Services	High	TBD based on assessment outcomes.	Administrative capacity	Completed FireSmart activities and updated score cards	CRI funding eligible, when initial FireSmart assessment has been completed. Up to $50,000 per structure.
31. Develop guidelines and/or strategy for fuel management in Regional Parks	CRD Parks CRD Protective Services	High	$25,000	CRD Parks staff time CRD Protective Services support	Development of a region wide strategy including guidelines (values to protect, priorities, etc) that can be incorporated into fuel management prescriptions	Region wide plan could be reference material for fuel management activities throughout CRD Regional Parks.
32. Consider developing fuel management prescriptions in proposed treatment areas.	CRD Parks CRD Protective Services SSIEAA	Medium	Up to $400/ha for fuel management prescription	CRD Staff time Coordination with BC Wildfire Service	Maintain options to pursue fuel treatment in identified areas.	CRI funding eligible for prescription and treatment.

Table 22. Sample tracking and reporting tool.

Recommendation/Action	Lead	Date Completed	Cost	Successes, challenges, and lessons learned	Follow up – provide description
Action	Who lead this implementation?	When was the implementation completed? Or is this an annual project?	What was the cost? Include labour hours here	Was the metric for success achieved? If not, why? Was the metric unrealistic? What unexpected challenges were encountered?	How does implementation or failure to implement impact other actions? Did implementation of this action lead to new required actions?

Appendices

Appendix A: Glossary of Terms

Term	Definition
Area of Interest (AOI)	The geographic study area for a Community Wildfire Protection Plan, within which the extent of the boundaries of the WUI are determined.
Community Wildfire Resiliency Plan	A plan adopted by a local government or First Nation to identify wildfire threat and risk throughout the study area, examine policy and planning responses, and assess emergency response capacity while providing action item recommendations for building community resilience, supported by the Province through the Community Resiliency Investment Program.
Critical Infrastructure	Assets, structures, or features that underpin the health and safety of the community and allow governance to take place
Crown fuels	Forest fuels occurring in the above the level of the ground, on tree stems or in tree canopies, including live and dead branches attached to trees, bark, and foliage.
Fire Return Interval	The time between fires in a defined area, typically measured at the landscape scale.
FireSmart	A term for that describes living with the risk of wildfire while reducing the adverse affects of wildfire. Also refers to a program of disciplines for mitigating the risks of wildfire
Fuels	Those elements of a forest that can burn, including organic material on the forest floor, logs, dead branches and needles, shrubs and herbs, and the bark, wood, and foliage of live trees.
Fuel management	Coordinated action to reduce wildfire risk by modifying the structure and density of forest fuels.
Fuel management prescription	A document that identifies fuel management strategies to reduce wildfire risk in a defined area, while also ensuring other values are protected.
Fuel treatment	The implementation of a fuel management prescription, which may involve the physical modification of fuels by heavy machinery or ground workers.
Interface	A pattern of urban development where contiguous development directly abuts native vegetation.
Intermix	A pattern of urban development where buildings are closely placed within and among trees.

Landscape Unit Plan	A plan prepared by the Province that provides objectives for resource management within a defined area, including policies related to forest biodiversity and wildlife habitat.
Official Community Plan	A local government plan for an electoral area(s) or municipality, mandated by provincial legislation, that shows how land use will be planned and how local government will meet other provincial policy objectives. Official Community Plans may also include additional policies based on local needs and interests.
Suppression	Actions taken in response to fire to control the spread of the fire or reduce it in area or severity.
Surface fuels	Forest fuels found on top of the organic layer of the soil and below the crowns of trees, typically including understory vegetation, dead branches, needles, and logs.
Wildfire	A form of natural landscape disturbance involving the combustion of vegetation.
Wildfire risk	The probability of a wildfire occurring combined with the consequences or impacts it would cause.
Wildfire season	The period of the year during which wildfires generally take place due to weather and fuel conditions. In BC, this is typically April – September.
Wildfire threat	A classification of potential fire behavior based on fuel conditions, weather conditions, slope, aspect, and other biophysical factors.
Wildland-Urban Interface (WUI)	The geographic area where homes and buildings meet continuous areas of natural vegetation.

Appendix B: Local Wildfire Threat and Risk Process

This appendix describes the methodology used to determine wildfire risk. The findings of this analysis have been integrated into the main body of the report in the Wildfire Risk Assessment section.

The local wildfire risk assessment process involves:

1. Verification of local fuel types to develop a fuel type map
2. Assessment of fire spread patterns
3. Consideration of topography
4. Stratification of the WUI based on relative wildfire threat and proximity to communities.
5. Identify priority wildfire risk areas

Steps 1-3 of the above provide an assessment of the potential wildfire behaviour throughout the study area. Wildfire risk is assessed by integrating the probability of severe wildfire with the consequences of wildfire in step 4; the highest risk forests are directly adjacent communities, and where severe wildfire is probable.

Fuel Type Attribute Assessment

Fuel typing falls into sixteen national benchmark fuel types that are used by the Canadian Fire Behaviour Prediction System[36]. This system divides fuels into 5 major groups and 16 more specific fuel types. These groups are used to describe fuels according to stand structure, species composition, surface, and ladder fuels, and the organic (duff) layer. The current Canadian Forest Fire Behaviour Prediction (FBP) System does not include coastal forests in their fuel type descriptions[37], therefore the fuel type that most closely represents forest stand structure was identified.

Different fuel types are associated with different levels of wildfire threat (wildfire behaviour potential). Therefore, accurate fuel typing is a critical input to wildfire behaviour and threat assessment mapping. Conifer fuel types typically have the highest wildfire behaviour potential and are the most likely to support continuous crown fire and spotting potential. Different conifer fuel types have different crown fire and spot fire potential.

[36] Natural Resources Canada. (April 2021) FBP Fuel Type Descriptions. https://cwfis.cfs.nrcan.gc.ca/background/fueltypes/

[37] Perrakis, Daniel D.B., Eade, George. (2018). British Columbia Wildfire Fuel Typing and Fuel Type Layer Description. Victoria, B.C. Candian Forest Service, Pacific Forestry Centre.

C-3 and C-5 - Conifer Fuel Types

There are 7 possible conifer dominated fuel types (Figure 24), only 5 of which are typically encountered in British Columbia. Two of these fuel types, C-3 and C-5, are commonly found in the AOI. Both characterize second growth conifer stands. C-3 includes a higher density stand with lower crown heights, while C-5 is lower in density and has higher crown heights.

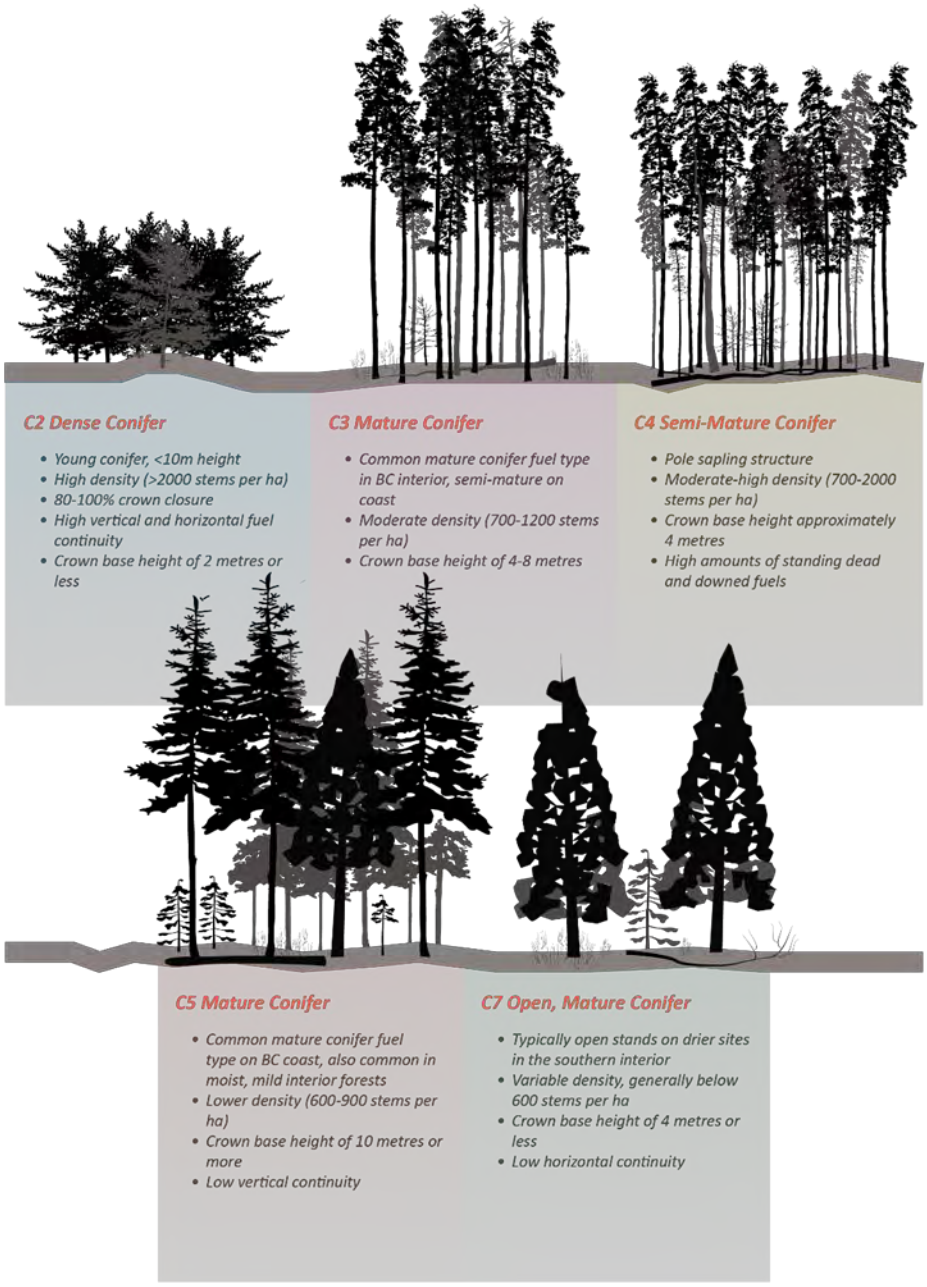

Figure 24. Characteristics of the seven conifer fuel types. C-3 and C-5 are prevalent within the AOI.

Photo 18. Example of a stand classified as C-3 fuel type.

Photo 19. Example of a stand classified as C-5 fuel type.

Fuel type M-1/2 – Mixed stands

This fuel type is found throughout the study area, often around riparian areas or areas historically disturbed. They are characterized by stands comprised of a mix of coniferous and deciduous species. The conifer component in these stands is mostly a mix of Douglas-fir, western redcedar and western hemlock. The deciduous component varies and includes bigleaf maple and red alder. In a few locations, the broad-leaved evergreen tree arbutus contributes to the deciduous component of the stand. Fire behaviour potential in these stands increases with and is highly dependent on the number of coniferous trees present.

Photo 20. Example of a stand classified as M-2 fuel type.

Fuel type D-1/2 - Deciduous

This fuel type consists of stands that are generally moderately stocked and dominated by deciduous trees. Within the AOI, there is little area classified as this fuel type. These stands occur primarily in areas that have historically been disturbed. They can include a small amount of conifer trees, usually in patches or as single trees. Dead and down round wood fuels are a minor component of this fuel complex. During the summer months, the principal fire-carrying surface fuel consists chiefly of deciduous leaf litter and cured herbaceous material. Areas dominated by shrubs are also included in this type. These are dense plant communities with few trees and a variety of shrub species. These deciduous stand and shrub communities will all have a relatively low fire behaviour potential.

Photo 21. Example of a stand classified as D-1/2 fuel type.

Fuel type O1 a/b– Grass

This fuel type consists of grass cover with minimal tree cover. This fuel type is applied to unmaintained, native grasses, rather than large maintained lawns or irrigated crops which are much less flammable. Grass fuels are dominated by fine fuels and are very responsive to moisture inputs or deficits. As such, wildfire behaviour varies widely based on recent weather conditions. Under dry and windy conditions, grass fuels can support extreme rates of spread and fire intensity. However, small amounts of moisture can drastically limit wildfire spread or behaviour. Therefore, the wildfire behaviour potential in these areas is dependent on the degree of curing, which is typically quite high during the wildfire season.

Photo 22. 01 a/b fuels in foreground. Note the contrast with irrigated, maintained grass in rear.

A map of the fuel types in the AOI was obtained from the Provincial Strategic Threat Analysis (PSTA) dataset. The PSTA fuels data, based on the FBP system, is created from existing provincial data and algorithmic interpretation of orthophotos. When examined at a local scale for a CWPP, errors are evident. These are often due to recent disturbance, such as logging or land clearing for development. Another source of error is very fine differences in fuel types that are difficult to capture in a large scale analysis, such as selection cut harvesting, or tree mortality from disturbance. As such, part of the local wildfire risk process is ensuring this map is as accurate as is feasibly possible.

The following process, developed with consultation with the BCWS Provincial Fuels Specialist, is used to update the fuel map for the AOI:

1. DHC reviewed the fuel type layer with latest ortho imagery. Identified obvious errors at this scale. This included areas identified as forest but have recently been cleared. In some areas the VRI-derived fuel type was classified as grass or slash, but the polygon in the aerial imagery is clearly treed. These were classified using air photo interpretation and referencing the nearest treed polygons.

2. Areas were identified for ground truthing. This focuses on areas adjacent values and communities as priorities.

3. Field work was conducted to ground truth the fuels layers. Polygons adjacent to values were visited by forester and the accuracy of fuel typing layer confirmed. Where errors were encountered, the fuel layer was updated and representative photos were taken. Fuel type change forms are completed for each fuel type change.

4. Finalize the spatial fuels layer.

5. Submit fuel type change forms to BCWS for review.

Fire Spread Patterns

Initial Spread Index (ISI) is a rating of the expected rate of spread of a fire. ISI is derived by combining wind speed with the Fine Fuel Moisture Index (FFMC), which measures the moisture content of the most easily ignited fuels. High winds, FFMC, and ISI will result in an increased rate of spread and wildfire intensity and are therefore reviewed together. Data for FFMC and ISI is recorded at local BCWS weather stations. In addition, local weather stations record wind speed and direction. This data is then assessed under typical wildfire conditions to determine rates of spread potential, potential wildfire intensity, and spread direction.

Topography

Steep slopes significantly increase wildfire spread through increasing radiant and convective heat. Aspect on steep slopes will also affect wildfire spread, as south-facing slopes will be much warmer and drier than other aspects. Areas with steep, vegetated slopes below them are at higher risk than flat areas with similar fuel loading.

Table 23 Slope percentage and fire behaviour implications.

Slope Percent Class	Fire Behaviour Implications
<20%	Very little flame and fuel interaction caused by slope, normal rate of spread.
21-30%	Flame tilt begins to preheat fuel, increase rate of spread.
31-45%	Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.
46-60%	Flame tilt preheats fuel and bathes flames into fuel, very high rate of spread.
>60%	Flame tilt preheats fuel and bathes flames into fuel well upslope, extreme rate of spread.

Table 24 Slope position of value and fire behaviour implications.

Slope Position of Value	Fire Behaviour Implications
Bottom of Slope/ Valley Bottom	Impacted by normal rates of spread.
Mid Slope - Bench	Impacted by increased rates of spread. Position on a bench may reduce the preheating near the value. (Value is offset from the slope).
Mid slope – continuous	Impacted by fast rates of spread. No break in terrain features affected by preheating and flames bathing into the fuel ahead of the fire.
Upper 1/3 of slope	Impacted by extreme rates of spread. At risk of large continuous fire run, preheating and flames bathing into the fuel.

Local Wildfire Threat Classification

Integrating fuels, fire spread patterns, and topography provides an assessment of local wildfire threat, or the wildfire behaviour potential under severe wildfire conditions. Severe wildfire conditions are defined as the 90th percentile weather conditions over the last 10 years. These are the times when wildfire is most likely, and suppression conditions are most challenging. This analysis highlights the locations most likely to support high or extreme wildfire behaviour that may be beyond the suppression capability of BCWS or SSIFR.

Proximity of Fuel to the Community

Fuel closest to the community usually represents the highest hazard. To capture the importance of fuel proximity, the wildland urban interface (WUI) is weighted more heavily from the value or structure outwards. Fuels adjacent to the values and/or structures at risk receive the highest rating followed by progressively lower ratings moving out.

The local wildfire threat assessment process subdivides the WUI into 3 areas (Table 25):

1. Areas within 100 m of the WUI (WUI 100)
2. Areas from 101 to 500 m from the WUI (the WUI 500)
3. Areas 501 to 1000 m from the WUI (the WUI 1000).

Table 25 Proximity to the Interface.

Proximity to the Interface	Descriptor*	Explanation
WUI 100	(0-100 m)	This Zone is always located adjacent to the value at risk. Treatment would modify the wildfire behaviour near or adjacent to the value. Treatment effectiveness would be increased when the value is FireSmart.
WUI 500	(101-500m)	Treatment would affect wildfire behaviour approaching a value, as well as the wildfire's ability to impact the value with short- to medium- range spotting; should also provide suppression opportunities near a value.
WUI 1000	(501-1000 m)	Treatment would be effective in limiting long - range spotting but short- range spotting may fall short of the value and cause a new ignition that could affect a value.
	>1 000 m	This should form part of a landscape assessment and is generally not part of the zoning process. Treatment is relatively ineffective for threat mitigation to a value, unless used to form a part of a larger fuel break / treatment.

Local Wildfire Risk Classification

Wildfire risk at a local level is determined by combining fuel, fire spread patterns, and topography with proximity zones. This estimates the likelihood of severe wildfire occurring near communities. The BCWS has provided a systematic process to model wildfire risk in a community which involves using weighted averages to provide a numerical wildfire risk score (Figure 25). This score is then ranked as Low, Moderate, High, and Extreme, which is then mapped for easy visual reference. Areas of high and extreme risk are typically directly adjacent to communities, and downwind of dense conifer forests. The areas of highest risk are prioritized for field assessment to ground truth and determine management options.

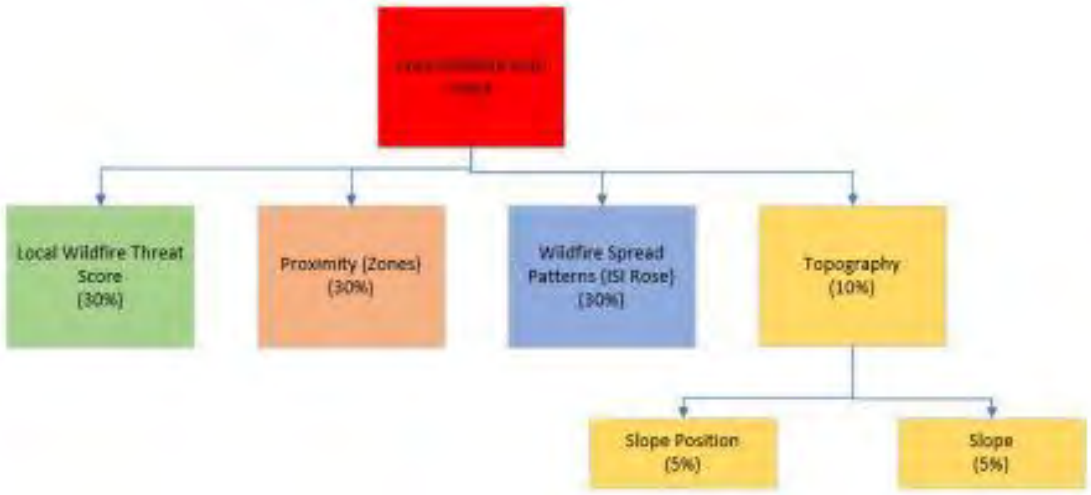

Figure 25. Weighted averages used to determine wildfire risk.

Appendix C: Large Format Maps

Large format maps supplied separately.