

Strathcona Regional District Electoral Area B: Cortes Island Community Wildfire Protection Plan 2020 Update



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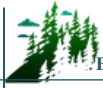
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Cover photo: Debrah Zemanek, Cortes Island



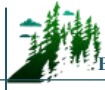
REGISTERED PROFESSIONAL SIGN AND SEAL

RPF PRINTED NAME	
Debrah Zemanek	5292
DATE SIGNED	
May 17, 2021	
I certify that the work described herein fulfills the standards expected of a member of the Association of British Columbia Forest Professionals and that I did personally supervise the work.	
Registered Professional Forester Signature and Seal	
	



COMMONLY USED ACRONYMS

BCWS	British Columbia Wildfire Service
BEC	Biogeoclimatic Ecosystem Classification
CDC	Conservation Data Centre
CCFC	Cortes Community Forest Cooperative
CFGP	Cortes Forestry General Partnership
CIFFA	Cortes Island Firefighting Association
CFFDRS	Canadian Forest Fire Danger Rating System
CRI	Community Resiliency Investment Program
CWPP	Community Wildfire Protection Plan
DPA	Development Permit Area
FBP	Fire Behaviour Prediction System
FMP	Fire Management Plan
FPA	Fire Protection Area
FSCNRP	FireSmart Canada Neighbourhood Recognition Program
FSP	Forest Stewardship Plan
GAR	Government Actions Regulation
HIZ	Home Ignition Zone
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations, and Rural Development
MOTI	Ministry of Transportation and Infrastructure
NDT	Natural Disturbance Types
NFPA	National Fire Protection Agency
OFC	Office of the Fire Commissioner
OCP	Official Community Plan
PSTA	Provincial Strategic Threat Analysis
PTU	Proposed Treatment Unit
SRD	Strathcona Regional District
TSA	Timber Supply Area
UBCM	Union of British Columbian Municipalities
VFD	Volunteer Fire Department
WRR	Wildfire Risk Reduction. Crown Land WRR is a category of funding for risk reduction activities on provincial Crown Land (introduced in 2019)
WUI	Wildland Urban Interface



COMMONLY USED DEFINITIONS

Crown Closure – the proportion of the sky hemisphere obscured by the crowns of live trees

Firebrand – A piece of burning wood or material.

Emergency Operations Centre – A designated facility established by an agency or jurisdiction to coordinate the overall agency or jurisdictional response and support to an emergency response¹.

Emergency Support Services – A provincial program delivered by Local Authorities and First Nations' Governments that meet the basic needs of British Columbians impacted by disasters by providing short-term support².

Official Community Plan – Plans that describe the long-term visions of communities through a statement of objectives and policies that guide decisions on municipal and regional district planning and land-use management³.

Reception Centre – A centre to receive evacuees who have been forced from their homes as a result of an emergency or disaster⁴.

Resiliency – The capability to recovering from a threat or disaster.

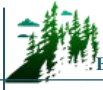
Stand Replacing Fire – A wildfire which kills all or most living overstory trees in a forest stand, initiating forest succession.

¹ Justice Institute of BC, Emergency Management Division. *Emergency Operations Centre Operational Guidelines 2nd Addition*. Available from: <https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/emergency-management-bc/bcems>

² Government of British Columbia. *Emergency support services (ESS) volunteers*. Retrieved from: [Emergency support services \(ESS\) volunteers - Province of British Columbia \(gov.bc.ca\)](#)s

³ Government of British Columbia. *Official Community Plans for Local Governments*. Retrieved from: [Official Community Plans for Local Governments - Province of British Columbia](#)

⁴ Justice Institute of BC, Emergency Management Division. *What is a Reception Centre*. Available from: <https://irc.jibc.ca/modules/module-1-reception-centre-services/what-is-a-reception-centre/>



EXECUTIVE SUMMARY/ SUMMARY OF CWPP RECOMMENDATIONS

The Community Wildfire Protection Plan (CWPP) process was created in British Columbia (BC) as a response to the devastating 2003 wildfire in Kelowna. As an integral part of the Community Resiliency Investment (CRI) Program, managed by the Union of BC Municipalities (UBCM), CWPPs aim to develop strategic recommendations to assist in improving safety and to reduce the risk of damage to property from wildfires. The purpose of this document is to plan for and facilitate wildfire risk reduction.

This CWPP Update will provide the Strathcona Regional District (SRD) with a framework that can be used to review and assess areas of identified high fire risk throughout Cortes Island. Additionally, the information contained in this report should help to guide the improvement and/or development of emergency plans, emergency response, evacuation plans, communication and education programs (including FireSmart), bylaw development in areas of fire risk, and the management of potentially hazardous forest lands adjacent to Cortes Island structures.

Since the development of the last CWPP in 2011, the SRD has made progress at implementing recommendations from the report. The most notable actions include implementation of the following:⁵

- Developing a Cortes Island Evacuation Plan that considers the identification of road blockages and clearing procedures during an evacuation event and preestablishing marshalling points throughout the island (Recommendation 19, Recommendation 20, Recommendation 22);
- Implementing and maintaining wildfire training for CIFFA personnel in collaboration with BC Wildfire Service (BCWS) on an annual basis (Recommendation 33) and;
- Increasing CIFFA interface and wildland firefighting tools and PPE (Recommendation 35).

The SRD has also initiated a FireSmart program that is discussed in more detail in Section 2.4.

Wildfire management requires a multi-faceted approach for greatest efficacy and risk reduction outcomes. A total of 42 strategic recommendations are found in a tabularized format within this Executive Summary (Table 1). In addition, these recommendations are more thoroughly discussed in their appropriate sections within the document and are summarized at the end of each section. The recommendations within this strategy should be considered as a toolbox of options to help reduce the wildfire risk to the community. There is not one combination or course of action which is the answer; the SRD will have to further prioritize based on resources, strengths, constraints, and availability of funding and regularly update the prioritization and course of action as variables change through time.

⁵ A full enumeration of recommendations from the 2011 CWPP can be found in Appendix I – Summary of 2011 Recommendations.

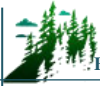


Table 1. Summary of CWPP Recommendations by Document Section.

Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
1	Medium	Review and amend South Cortes Island Fire Protection Services and Facilities Service Establishment Bylaw No. 1236 to include the Tiber Bay community within the fire protection area. See Recommendation #3.	This motion has been pursued by Tiber Bay community members. CIFFA is in support once the list of expansion requirements have been met.	~12 in-house staff hours required for internal work.	SRD Initiative; CIFFA collaboration
2	Low	Amend Section 304.6 of the Cortes Island Official Community Plan (Community Services) to include a section on wildfire preparedness and community initiatives (i.e., FireSmart, fuel reduction etc.) to mandate wildfire risk. Include the potential of impact wildfire may have on public health and safety, ecosystems, habitat, and water quality among other values. See the Fraser Valley Regional District Electoral Area D OCP Update ⁶ , the Cariboo Regional District Electoral Area G OCP ⁷ and other regional district electoral areas as examples.	Embed community FireSmart values in the OCP to guide future development.	~20 in-house hours (UBCM CRI Program Funding). Example cost \$10,000 including \$1,500 for administration (SRD) and \$8,500 for consultant costs (100 hrs @ \$85/hr).	SRD Initiative
3	High	The SRD should work with the Ministry of Transportation and Infrastructure (MOTI) and overlapping private land owners, to assess the feasibility of developing a turn-around on Mary Point Road in the Tiber Bay community (50°05'19.9"N, 124°53'15.9"W) to improve emergency services access and	Current access route is not wide enough to support CIFFA fire trucks, preventing the community from being included within the Fire Protection Area. CIFFA is in support once the list of expansion requirements have been met.	~4-6 in-house hours (Local Government funding/UBCM CRI Program Funding-	SRD initiative MOTI collaboration

⁶ Fraser Valley Regional District. 2018. *Official Community Plan for Popkum-Bridal Fall Bylaw No. 1502, 2018*. Retrieved from: <https://www.fvrd.ca/assets/Services/Documents/Planning~and~Development/Projects~and~Plans/Popkum~Bridal~Falls~OCP~Update/Area%20D%20Bylaw%201501%20nd%20Reading.pdf>

⁷ Cariboo Regional District. 2018. *Lac La Hache Area Official Community Plan Bylaw No. 5170*. Retrieved from: https://www.cariboord.ca/en/business-and-development/resources/Documents/PlanningandDevelopment/OCP/LacLaHacheAreaOCP/Lac_La_Hache_Area_OCP.pdf



Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
		community egress in the event of an evacuation or wildfire event.		Interagency Cooperation)	
4	Medium	Develop an Emergency Access Map for the SRD to inventory trail and road network for suppression planning, identify of areas with insufficient access, and to aid in strategic planning. Ground-truthed locations of existing and potential fuel breaks, Local Fire Threat and tenure holders contact information should be incorporated within the map. The map should be included in the Cortes Island Evacuation Plan and shared with fire suppression personnel, BCWS and industrial operators (Community Forest and Klahoose Woodlot) to support emergency response in the event of a wildfire. The map should be reviewed as needed to incorporate additions and/or changes.	An Emergency Access Map will support emergency response in the event of a wildfire and/or evacuation event. During field work consultants observed that road mapping is out of date. Minimizes the need for using machinery to build cat guards, etc., in an otherwise undisturbed area	~60 in-house hours/consultant (Local Government funding/Potential UBCM Funding)	SRD initiative
5	Medium	The SRD should work with the CFGP and BCWS to develop a 5 - 10-year plan for access management throughout the Cortes Island Community Forest from a wildfire suppression perspective. The collaborative plan should align with the CFGP Operations Plan ⁸ , while considering wildfire suppression access. Access to the north island is currently is inadequately developed, significantly challenging ground-based fire control opportunities, and should be prioritized through the development of this plan.	Inadequately developed access impedes ground-based fire control opportunities. CFGP access management plans should consider wildfire suppression access while harmoniously achieving Community Forest FSP objectives.	~60 in-hour hours (Local Government funding/Potential UBCM CRI Program Funding)	SRD/BCWS/CFGP initiative

⁸ Cortes Forestry General Partnership. 2018. *Five Year Plan. Operations Planning 2018 – 2022*. Retrieved from: <http://www.cortesforestrypartnership.com/wp-content/uploads/DRAFT-5-Year-Plan-Feb-6-2018.pdf>



Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
6	Medium	Coordinate with BC Hydro to address lengthy response times during electrical failures. Lobby to improve latency and on-island resources.	CIFFA Fire Chief noted prolonged power outages due to BC Hydro lengthy response time as a safety concern, specifically due to the increase usages wood stoves and associated communication challenges.	~6 hours (local government hours for 1 meeting with BC Hydro). Potential UBCM CRI funding (Interagency Cooperation)	SRD initiative/BC Hydro collaboration
7	High	Complete and participate in regular testing of, and updates to, the Evacuation Plan for the Cortes Island.	Identify any challenges with the new Evacuation Plan before it is deployed in a real emergency.	UBCM Program funding	SRD/CIEPC initiative
8	Medium	Develop an Evacuation Plan pamphlet that summarizes key components of the Evacuation Plan, specific to resident roles during an evacuation event. The pamphlet should be made available online and could be available as a hard copy at general stores.	Pamphlets are an effective public communication tool; evacuation was identified as a primary concern in the 2020 survey of island residents.	SRD funding; UBCM funding may be available	SRD/CIEPC initiative
9	Medium	Work with BCWS to outsource on-island wildfire resources (i.e., water tenders, facilities) that can be deployed as required during a wildfire event. Available resources could be organized by evacuation zone and contracts should be pre-established within each zone to ensure resources and equipment is readily available throughout the Island in the event of an emergency. Incorporate in Evacuation Plan.	Ensure adequate resources and equipment are readily available and easily accessible during a wildfire event. BCWS interest.	~6-10 in-house hours (Local Government funding)	SRD/BCWS initiative



Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
10	Medium	Ensure that both CIFFA Fire Halls and all ESS facilities have back-up gas or diesel generators with sufficient fuel supply for extensive power outages (3 + days) so that they can function as reception centers/department operation centers as required in the event of an emergency	Prolonged power outages typically occur on an annual basis during winter months due to the island's exposure of south and southwesterly winds and are common during wildfire events.	~8 in-house hours per structure. Local Government Funding	Locally funded (CIFFA) or external grant. The SRD has limited power to fund improvements to society buildings
11	Medium	Develop an outreach document that outlines emergency fuel/propane emergency shut off best-practices for facilities with hazardous infrastructure (HI) (e.g., gas stations) to enact in the event of an approaching wildfire or ember shower. Consider contacting the Emergency Management BC Vancouver Island Regional Office for guidance.	Provide facilities with hazardous infrastructure with resources/procedures to reduce hazard during a wildfire event.	~40 in-house hours (Local Government funding/UBCM CRI Program Funding)	SRD Initiative
12	Medium	Complete or schedule periodic updates of the CWPP. The frequency of updates is highly dependent upon major changes which would impact local wildfire risk, or the rate at which wildfire risk reduction efforts are implemented. An evaluation of major changes (including funding program changes that may lead to new opportunities) and the potential need for a CWPP update should be initiated every 5 years.	A current (i.e., no more than 5 years old) CWPP is currently a requirement for further funding under the CRI Program.	UBCM CRI Program funding/Local Government funding	SRD Initiative



Document Section 5.1 Fuel Management					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
13	High	Proceed with detailed assessment, prescription development and treatment of fuel treatment units identified and prioritized in this CWPP.	Reduce wildfire hazard in priority treatment units.	SRD funding or UBCM CRI Program; external forestry consultant	SRD Initiative
14	High	As part of fuel treatment implementation in SRD Parks (i.e., HANK MOD in Hank's Beach Park and HALL HI in the Whaletown Commons), the SRD should develop interpretive signage to demonstrate pre- and post-fuel treatment forest stands.	Increase public awareness and support of fuel management practices. Example- BCWS Parksville base trail.	SRD funding or UBCM CRI Program	SRD Initiative
15	High	When operational fuel treatments are conducted, treatment monitoring 5-10 years out should be completed by a qualified professional. This can be completed with a CWPP update or as a stand-alone exercise.	Assess the efficacy of the treatment and to schedule maintenance activities. It is cheaper to perform maintenance early, when regeneration is small.	UBCM CRI Program funding/SRD funding. Forestry consultant.	SRD Initiative
16	High	Consider developing a rationale for reduced stocking standards applicable to Cortes Island by employing a qualified wildfire management professional, and in consultation with the Fuel Management Specialist (Powell River Fire Centre) and MFLNRORD. Engage Cortes Island Community Forest and the Klahoose Woodlot to add fire management stocking standards to their forest stewardship/license plans and consider applying them in portions of the wildland urban interface.	Reduce interface wildfire risk throughout managed forest lands that are closest to structures in the WUI. CFGP is open to developing and applying fire management stocking standards where appropriate. Some MFLNRORD Natural Resource Districts have already developed fire management stocking standards that could be applied.	~60 hours. Potential UBCM CRI Program funding (Interagency Cooperation)	SRD Initiative Collaboration with MFLNRORD/BC WS/CFGP



Document Section 5.1 Fuel Management					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
17	Medium	The SRD should look for opportunities to support and promote the Cortes Island Community Forest's wood waste removal initiative of providing community members with firewood. Fire wood distribution should be in conjunction with FireSmart education, specifically related to FireSmart firewood storage; consider having an LFR volunteer or CIFFA member during firewood pickup/delivery to educate community members.	Remove hazardous debris accumulation from operating areas while providing residents with firewood during winter months.	UBCM/CRI funding available ~8 in-house hours for support and education delivery	SRD/CFGP



Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
18	High	Engage a qualified professional (LFR) to complete formal FireSmart assessments of critical infrastructure such as fire halls, community centers, and water infrastructure as identified in this CWPP (Table 7).	Increase critical infrastructure wildfire resiliency through achieving FireSmart principles.	\$680/site-consultant costs (8 hrs @ \$85/hr) UBCM/CRI funding available	Local Initiative (CIFFA)
19	High	Work with societies on Cortes Island to support the use of fire-resistant construction materials (i.e., aluminum roofing), building design and landscaping for all CI when completing upgrades or establishing new infrastructure. Additionally, vegetation setbacks around critical infrastructure should be compliant with FireSmart guidelines (no combustible material within 10 m of structures). See Section 5.2.3 Priority Areas within the AOI for FireSmart for consultant field observations of Critical Infrastructure.	Increase critical infrastructure wildfire resiliency through achieving FireSmart principles.	Negligible in-house cost. Campbell River FireSmart Guide to Gardening available free online. ⁹	Local Initiative SRD Advocacy
20	Medium	Encourage and facilitate priority neighborhoods to self-organize to attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status. Leverage the leadership of a Local FireSmart Representative. Consider utilizing the local FireSmart rebate program or neighbourhood chipping opportunities as incentives.	Increase wildfire resiliency throughout priority neighbourhoods identified in the CWPP by collectively FireSmarting homes.	\$5,000/ neighbourhood and an additional 40 hours/initiative UBCM CRI Program funding available	CIFFA Advocacy

⁹ <https://srd.ca/wp-content/uploads/2020/10/final-cr-firesmart-guide-to-gardening-pdf-version-min-1.pdf>



Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
21	High	Apply for funding from the UBCM CRI Program to hire a Local FireSmart Representative (LFR) to assist neighbourhoods and homeowners in complying with FireSmart principles at both the neighborhood and individual home-level. Encourage CIFFA personnel and/or the Emergency Response Committee members to become certified LFRs by participating in the FireSmart 101 course and subsequent LFR workshop.	There are currently no LFRs located on Cortes Island. LFRs should be engaged in neighbourhood and individual home FireSmart assessments.	UBCM CRI grant(s) available. Example cost \$14,000: \$12,000 for LFR contract pay (\$~500/week compensation for 20 weeks plus \$2,000 SRD administration for new contract)	SRD Initiative
22	High	Provide outreach materials to encourage homeowners to complete a FireSmart home assessment using the Home Assessment guide or the FireSmart Begins At Home mobile app, though a Local FireSmart Representative, or through the FireSmart Home Partners Program.	Educate homeowners of FireSmart principles and encourage residents to FireSmart homes.	UBCM CRI funding available for LFR training and employment and public education materials	SRD/CIFFA Initiative



Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
23	High	Apply for funding from the UBCM CRI Program to develop a local FireSmart rebate program. The rebate program is described in detail in the CRI Program 2020 FireSmart Community Funding and Supports – Program & Application Guide and must adhere to the goals and objectives of FireSmart, as outlined in Section 5.2.1. Before applying for funding, SRD resources available to execute the program should be reviewed. An LFR could be engaged to support the program.	Incentivize homeowners to FireSmart activities on their properties by allowing them to access partial rebates for, if rated as high or extreme risk in a FireSmart home assessment.	20-35 in-house hours plus additional hours to administer the rebate program, UBCM CRI funding available for rebate (max \$500/property)	SRD Initiative
24	High	Continue to implement the community chipping program with the help of neighbourhood champions, LFRs, and Neighbourhood FireSmart Committees, if possible. Consider offering chipping services as an incentive for neighbourhoods to join the FireSmart Neighbourhood Recognition Program. Education of FireSmart yard and landscaping principles, including chipping specifications should be incorporated into the program.	Aid homeowners in removing hazardous debris off of properties, while educating residents on FireSmart yard and landscaping principles.	Eligible for UBCM CRI Program funding. Example cost is \$7,400: chipping contractor costs (four 8-hour days @ ~\$200 per hour); \$1000 for outreach/advertising	SRD Initiative



Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
25	Moderate	The SRD should consult with the Recycling Centre staff to assess the capacity of accepting residential yard waste. Subsequently, the SRD should consider supplying an on-site wood-waste bin.	Wood waste is currently not accepted at the Recycling Centre, nor anywhere within the AOI. Free disposal is a fire-safe alternative to burning waste and debris on private properties.	~\$3000 UBCM CRI funding or SRD funding	SRD Initiative in collaboration with the Recycling Center



Document Section 5.3 Communication					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
26	Medium	Encourage the Cortes Island School to adopt and deploy existing wildfire education programs. There is emergency preparedness curriculum available provincially, which includes preparedness for a variety of natural hazards, including wildfire (Master of Disaster, FireSmart BC Education box). Other options/value-added activities include consulting with Association of BC Forest Professionals (ABCFP) and BCWS (Coastal Fire Centre) as well as local fire department and FireSmart representatives to facilitate and recruit volunteer teachers and experts to help with curriculum development to be delivered in the school (field trips, guest speakers, etc.).	Engage and educate youth in wildfire management and risk reduction.	~5-10 in-house staff hours UBCM CRI Program funding available FireSmart BC Education box - \$800 (<i>Junior Kindergarten - Grade 12</i>)	Local Advocacy
27	Medium	Work towards educating homeowners within unprotected areas (i.e., outside of Fire Protection Areas) of their level of risk.	It is common, especially in the case of second homeowners/vacation owners, for them to be unaware of the lack of fire services in their area (in the event they call 911).	~8 in-house staff hours. UBCM CRI Program Funding available	SRD/CIFFA Initiative
28	Low	Promote and provide information to private landowners related to exterior residential sprinklers as a FireSmart prevention measure. At FireSmart events distribute information on exterior sprinkler component parts, manufacturers, and water supply system requirements. Develop general costs of exterior sprinkler equipment for property owners.	Educate homeowners on effectively wetting down homes and Fire Priority Zones to discourage home ignition during a wildfire event.	~12 in-house staff hours UBCM CRI Program funding available (Education) ~\$200 for 1 gutter-mount sprinkler kit ¹⁰	SRD/CIFFA Initiative

¹⁰ Example: <https://shop.waspswildfire.ca/collections/all-products/products/complete-wildfire-protection-kit>



Document Section 5.3 Communication					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
29	Medium	Additional signage of danger class rating, fire bans and general fire safety related warnings should be posted as required in the AOI. Signs should be updated at least weekly during the fire season by a CIFFA member or designate.	Island tourism during the wildfire season increases. It is important to ensure the island residents and visitors understand current fire bans and Danger Class Ratings.	~\$5,000 for new danger rating signs SRD funding	SRD/CIFFA Initiative
30	High	Develop a FireSmart/Wildfire Preparedness page on the SRD website with links on Tideline.com. Updates and opportunities should also continue to be communicated regularly through the Cortes Island Radio.	This page can serve as a platform to promote workshops, waste disposal opportunities and other community FireSmart initiatives. Updates on fire bans, high or extreme Fire Danger days, and current fires can be integrated with this page.	~40 hours for set-up. Additional hours for updates as required. UBCM CRI Program funding available	SRD Initiative
31	High	Continue to promote FireSmart approaches for wildfire risk reduction to Cortes residents through FireSmart workshops, open houses, and/or presentations. Aim to conduct the engagement/promotion campaign prior and during the fire season. Supply FireSmart resources to homeowners during these engagement campaigns and promote the FireSmart Begins At Home mobile app as a method of conducting home assessments. Include education specific to island residents including emphasizing the importance of visible addresses and widened driveways for emergency response, safe debris removal methods and FireSmart firewood storage.	Increase community education on wildfire risk and FireSmart principles.	~20 hours. UBCM CRI Program funding available. Example workshop cost: \$1,700 consultant costs (20 hrs @ 85/hr); \$1,500 advertising costs	SRD/CIFFA Initiative



Document Section 5.3 Communication					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
32	High	This CWPP report and associated maps should be made publicly available through the SRD's Wildfire Protection page, the Cortes Island website and shared on social media. In addition, this CWPP should be shared with local industry partners who may be interested in collaborating on fuel treatments.	Increase community education on island-specific wildfire risk.	~3-6 hours depending on method of distribution	SRD Initiative

Document Section 5.4 Other Measures					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
33	Medium	Encourage BC Parks to communicate fire risk and enforce provincial fire bans when patrolling in Hathayim/Von Donop Marine Provincial Park.	Educate island visitors of wildfire risk and current fire bans during wildfire seasons.	~2 in-house hours	BC Parks Advocacy
34	Medium	Encourage CIFFA to report wildfire incident calls to increase UBCM funding opportunities and to obtain valuable data regarding wildfire risk.	Currently, fire incident calls are not categorized by interface or wildfire, reducing UBCM funding opportunities.	~1 in-house hour	CIFFA Initiative



Document Section 5.4 Other Measures					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
35	High	Work with CFGP and the Klahoose Woodlot to ensure that high risk activities, such as vegetation management, pile burning and harvesting do not occur during high/extreme fire danger times. CFGP should ensure that adequate fire suppression tools (as per wildfire act and regs) are on-site during high-risk activities conducted in the community forest and Klahoose woodlot.	Reduce chance of ignitions as per the <i>Wildfire Act</i> and reduce spread potential during an ignition event.	~4-8 in-house hours for communication. UBCM CRI funding may be available (Interagency Cooperation)	SRD/CIFFA Advocacy with CFGP/KFN Woodlot
36	High	Develop utility right-of-way best management practices (BMPs) for regular brushing and clearing of woody debris and shrubs in coordination with BC Hydro to help reduce fire risk, utility pole damage and subsequent outages. In addition, BC Hydro and the Ministry of Transportation and Infrastructure should ensure rights-of-way do not contain fine fuel accumulations (< 7.5 cm, easily cured) and significant regeneration of conifer vegetation prior to and during the fire season and are maintained in a low hazard state.	Tree failures adjacent to power lines (transmission and distribution) are common occurrences and represent significant risks to ignition within the AOI. CIFFA identified that majority of brush fires occur under powerlines and encroachment of understory vegetation and overhanging trees were noted by consultants in various locations throughout the island.	~12 hours (local government hours for 2 meetings with BC Hydro). Potential UBCM CRI funding (Interagency Cooperation)	BC Hydro Advocacy

Document Section 6: Wildfire Response Resources					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
37	High	Develop a Fire Department Governance Review that outlines a recommended governance and administration structure to facilitate change of the current CIFFA contractual model. This document should review current administrative structures, operating environments and subsequently propose an emergency services model on Cortes Island that reflects the current fire industry	Upon discussion with an external consultant, it has been determined that the current Emergency Services structure on Cortes Island does not reflect requirements of the current fire services industry. Since the establishment of the Office of the Fire Commission, an increased level of training, equipment and supervision is now	~120 in-house hours/consultant hours	SRD initiative



Document Section 6: Wildfire Response Resources					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$ or Person Hours)	Resources
		environment e.g., a regional approach to fire services. Resources and steps needed, as well as an implementation plan should be incorporated into the review.	required throughout all fire service departments. ² A Fire Department Governance Review will allow the SRD to identify and establish approaches to amend administration and governance, increase service effectiveness and reduce liability issues. Example Fire Department Governance Review: Regional District of Nanaimo ¹¹		
38	High	The SRD should conduct a water supply vulnerability assessment that includes an analysis of the vulnerability of water supply tanks and natural water sources to wildfire, mass wasting, and/or drought, and the duration and quality of supply during sustained pumping effort. Within the assessment, the feasibility of installing 500-gallon water tanks in Tiber Bay and at the bottom of Gorge Hill should be considered to increase the availability and distribution of water for wildfire suppression to each community throughout the Island. Water sources should be regularly inspected by the CIFFA to ensure they have adequate supply in the event of a fire.	Determine potential supply issues in the event of a large interface wildfire event. CIFFA identified Tiber Bay and Gorge Hill as locations deficient of adequate water sources. Some CIFFA owned water tanks were noted as low or empty during field visits.	~\$2,000 for the assessment (consultant). (UBCM CRI Program Funding-Emergency Planning) Additional time and cost for water tank consultation, implementation and monitoring	SRD Initiative/external consultant
39	Medium	Augment existing sumps to prevent water depletion during the wildfire season. Specifically, expand the existing sump adjacent to the hazardous Recycling Centre to facilitate water retention.	Recycling Centre staff identified an on-site sump that frequently dries up during summer months.	~4 in-house hours (Local Government funding)	7

¹¹ Dave Mitchell & Associates Ltd. 2019. *Nanaimo Fire Department Governance Review*.



Document Section 6: Wildfire Response Resources					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$ or Person Hours)	Resources
40	High	Fire departments should continue training and working with BCWS. As part of the training, it is recommended to conduct annual reviews to ensure PPE and wildland equipment resources are complete, in working order, and the crews are well-versed in their set-up and use. It is recommended the CIFFA continue to engage in annual practical wildland fire training with BCWS that covers at a minimum: pump, hose, hydrant, air tanker awareness, and employment of SPUs. Interface training should include completion of a joint wildfire simulation exercise and safety training specific to wildland fire and risks inherent with natural areas. It is recognized that BCWS crew resources are limited and their availability and is highly dependent upon the current fire season and other BCWS priorities.	Maintain an annual structural and interface training program and foster a strong relationship between CIFFA and BCWS.	Time/cost dependent on numbers and training done. Wildfire training courses qualify for UBCM CRI Program funding	CIFFA Initiative
41	High	Ensure all fire personnel continue to maintain their SPP-WFF1 certification at a minimum. Consider expanding the training program to maintain a high level of member education and training specific to interface and wildland fires (i.e., SPP-115). SPP-115 provides training to structural firefighters on the use of wildfire pumps and hose (and fire service hose and hydrants) in the application of structural protection units (SPUs). The fire departments should continue the practice of staying up to date on wildfire training opportunities, and to train members in this capacity, as training resources/budgets allow.	Ensure all CIFFA personnel are qualified to respond to wildfire emergencies and use wildfire suppression equipment. CIFFA Fire Chief noted that currently all CIFFA members must maintain SPP-WFF1 certifications.	Time/cost dependent on numbers and training done. Wildfire training courses qualify for UBCM CRI Program funding	CIFFA Initiative
42	High	Continue to improve CIFFA wildfire equipment supply by purchasing new or replacing old equipment. Specifically, the CIFFA should work towards obtaining funding for an SPU with hoses, pumps and sprinklers that can be deployed during a wildfire event. Consider applying for funding opportunities through the UBCM Volunteer & Composite Fire Department Training program.	Augment wildfire resources so that CIFFA is equipped to respond to wildfire emergencies.	~16 in-house hours for applications Cost dependent on equipment purchased; UBCM	SRD/CIFFA Initiative



Document Section 6: Wildfire Response Resources

Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
				funding may be available.	

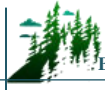
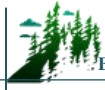


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SECTION 1: INTRODUCTION

Although forest fires are both inevitable and essential to the health of forested ecosystems, the 2003, 2009, 2017 and 2018 wildfire seasons resulted in significant economic, social and environmental losses in BC. The 2003 fires led to the development of the Filmon Report¹² and a standardized process to address emergency planning. Community Wildfire Protection Plans (CWPPs) arose from the Filmon Report recommendations to fill the identified planning need.

Locally, the Strathcona Regional District (SRD) experienced unprecedented wildfires burning close to communities in 2018 and 2019, including a 21-hectare wildfire adjacent to the Sayward community in 2019. Wildfire disasters like those experienced in Slave Lake, Alberta (2011), Washington State (2014 and 2015), Fort McMurray, Alberta (2016), and BC and California (2017 and 2018) all display the vulnerability of communities and the potential toll of wildfires on families, neighborhoods, public health and the economy of entire regions. These events, along with important advances in loss prevention programs have spurred the need for greater consideration and due diligence with respect to fire risk in the wildland urban interface (WUI).¹³ Even in coastal regions of BC, a busy wildfire season can overwhelm available resources. CWPPs are an invaluable opportunity to proactively manage wildfire risk and increase community resilience to wildfire.

1.1 PURPOSE

The CWPP is a framework that local governments can use to assess and mitigate wildfire risk. The information contained in this report will help guide the development of emergency plans, emergency response, public education programs, community planning, and the management of forested lands adjacent to the community.

This plan will provide the SRD with:

- an updated assessment of wildfire risk on Cortes Island;
- an updated assessment of values at risk and potential consequences from wildfire;
- maps of fuel types and recommended areas for fuel treatments;
- an updated assessment of emergency response capacity and community FireSmart status and;
- options and strategies to reduce wildfire risk in seven FireSmart disciplines: education, legislation and planning, development considerations, interagency cooperation, cross-training, emergency planning, and vegetation management.

CWPPs are funded in BC by the Union of BC Municipalities (UBCM) under the Community Resiliency Investment (CRI) FireSmart Community Funding and Supports Program. As per funding requirements, this CWPP is completed according to the 2018 CRI template.

¹² Filmon, G. 2004. Firestorm 2003 - Provincial Report.

¹³ Wildland/urban interface is defined as the presence of structures in locations in which conditions result in the potential for their ignition from flames and firebrands/embers of a wildland fire (National Fire Protection Association). See Appendix E for a more detailed discussion.



1.2 CWPP PLANNING PROCESS

This CWPP is a review and synthesis of the background information and current data related to the Area of Interest (AOI), which represents a two-kilometer spotting buffer around a threshold density of values at risk (structures) on Cortes Island. It updates and replaces the CWPP completed for Cortes Island in 2011. The CWPP process consists of four general phases:

- 1) Consultation involving key local government representatives, structural and wildfire specialists, First Nations and stakeholders.
- 2) Identification of the values at risk and assessment of the local wildfire risk.
- 3) Developing a wildfire risk mitigation strategy.
- 4) Building a community engagement and education strategy.

1.2.1 Consultation

Engagement with local government, provincial government representatives, stakeholders and First Nations played a key role in developing this CWPP Update. The first step in the consultation process was to assemble the key players in the 'Wildfire Working Group'. This group was composed of key SRD staff, which included the Protective Services Coordinator and the Community Services Manager, as well as principal external personnel, including the Cortes Island Fire Rescue Association (CIFFA) Fire Chief, CIFFA Fire Captain, and the Cortes Island Community Forest Manger.

The objective of ongoing communications with the Wildfire Working Group, was to obtain information on wildfire risk mitigation initiatives currently in place or completed, existing plans and policies, current resources, identify areas of concern, identify vulnerabilities throughout Cortes Island, and to determine priorities and potential mitigation strategies. Members of the Working Group were consulted on an ongoing basis throughout plan development and were integral in providing Plan review and approval. The Wildfire Working Group was integral in the review of the draft of this CWPP and provided ongoing support throughout the CWPP process.

BCWS representatives from the Powell River Fire Centre and the provincial Wildfire risk Specialist were consulted as follows: 1) at the onset of the project planning phase (Powell River Wildfire Technician) and 2) throughout the CWPP development process, both via the submission of Fuel Type Change Rationales and questionnaire regarding concerns and priorities of BCWS with respect to wildfire and emergency planning in the SRD; and 3) revision of draft document upon plan completion.

Information sharing took place with the Stz'uminus First Nation, Penelakut Tribe, Lyackson First Nation, Halalt First Nation, Ts'uubaa-asatx Nation, Cowichan Tribes, Nanwakolas Council, Wei Wai Kum Nation, We Wai Kai Nation, Xwemalhwu Nation, K'omoks First Nation, Tla'amin Nation and Klahoose First Nation as identified through the Consultative Areas Database and in consultation with MFLNRORD and the SRD, regarding the CWPP Update and locations or potential for possible cultural values at risk requiring consideration. Information sharing consisted of an initial phone call, and subsequent distribution of a referral letter and information package (maps, explanation of CWPP Update and CWPP Update draft). Subsequent calls and/or emails took place with some Nations.



Additional stakeholders were consulted to identify synergies, opportunities for collaboration, and ensure linkages with adjacent and overlapping planning. These stakeholders included the Klahoose Woodlot and BC Parks. Combined, these various consultation and engagement opportunities have generated a shared understanding of the CWPP Update objectives and expected outcomes among local government, stakeholders, residents, and land managers.

1.2.2 Identification of Values at Risk and Local Wildfire risk Assessment

The risks associated with wildfire must be clearly identified and understood before a CWPP can define strategies or actions to mitigate risks. The identified values at risk are described in Section 3 and concepts of wildfire risk and risk are elaborated on in 0 The wildfire risk on Cortes Island was assessed through a combination of the following approaches:

- Natural fire regime and ecology (Section 4.1.1);
- Provincial Strategic Threat Analysis (Section 4.2) and;
- Local wildfire risk analysis (Section 4.3).

1.2.3 Development of a Risk Management Strategy

An effective risk management strategy was developed considering a full range of activities relating to the following seven FireSmart disciplines:

- Education
- Legislation and Planning
- Development Considerations
- Interagency Cooperation
- Cross-training
- Emergency Planning
- Vegetation Management

1.2.4 Building Community Engagement and Education Strategy

Engaging the community in wildfire protection planning activities, from local government staff and officials to key stakeholders and residents, is key to ensuring successful implementation of CWPP recommendations. A community engagement and education strategy is described in Section 1.1. A presentation to the SRD Board and key stakeholders will help ensure high level approval and support for this CWPP Update.

SECTION 2: LOCAL AREA DESCRIPTION

This section defines the Area of Interest (AOI) on Cortes Island and describes the distribution of communities on the island. It also summarizes the current community engagement in wildfire prevention and mitigation, and identifies linkages to other plans and policies with relevance to wildfire planning.



2.1 AREA OF INTEREST

The AOI for the CWPP is illustrated below in Map 1. The AOI represents a two-kilometer (km) spotting buffer around areas with a structure density ≥ 6 per km², and encompasses the majority of Cortes Island. Although portions of Marina, Hernando, and the Twin Islands overlap the AOI, only recommendations that pertain to wildfire risk and response on Cortes Island are within the scope of this CWPP.

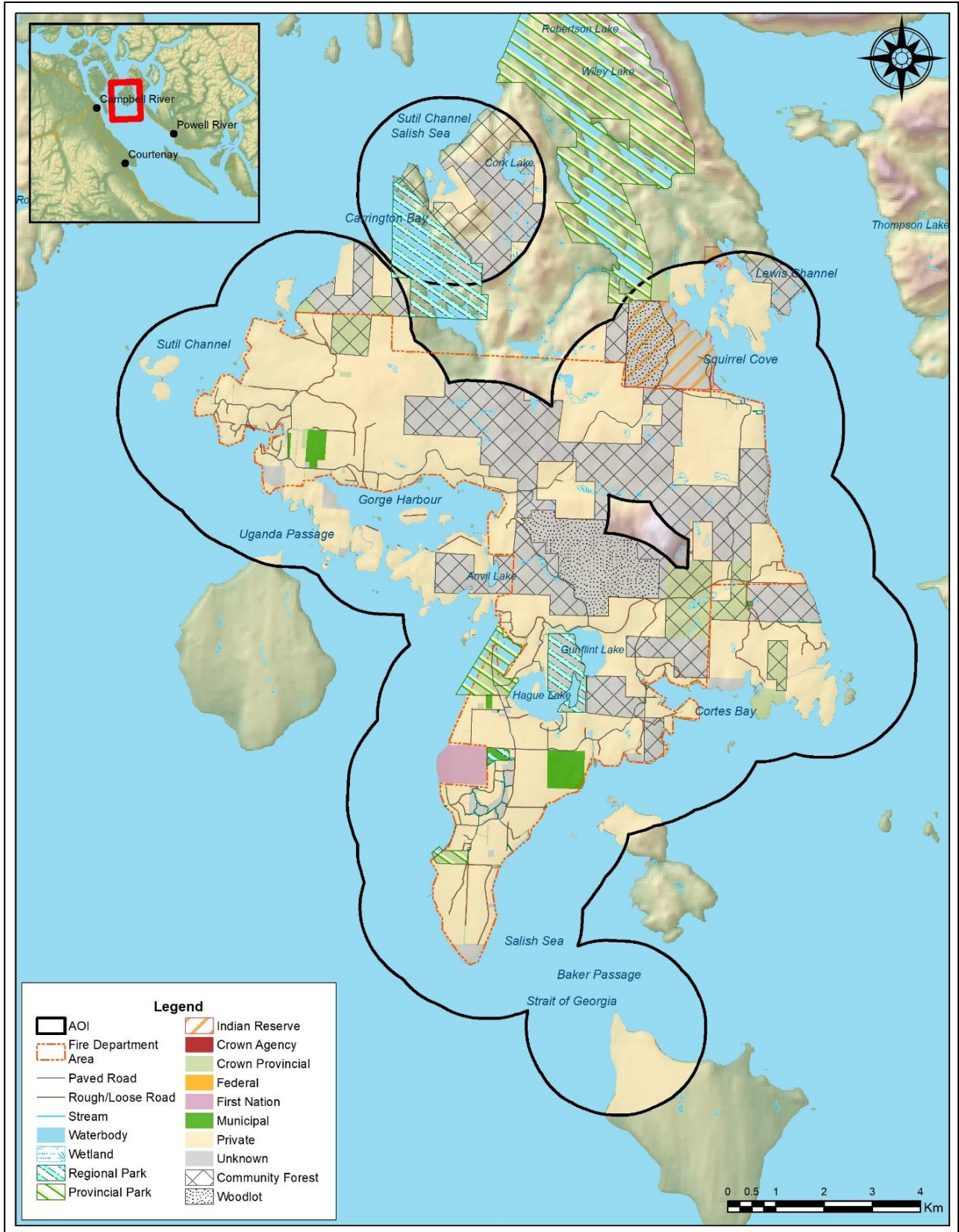
A breakdown of the AOI’s land ownership is provided in Table 2. Approximately half of the land area is privately owned. The majority of the land remaining is Crown land licensed as a community forest to the Cortes Forestry General Partnership (CFGP), a partnership between Klahoose First Nation and the Cortes Community Forest Cooperative (CCFC). Much of the north island is encompassed by Hathayim (Von Donop) Marine Provincial Park and has no road access.

Table 2. Summary of AOI by land ownership.

Land Ownership	Hectares
Crown Agency	1.55
Crown Provincial	9572.13
Federal	79.10
Municipal	109.18
Private	4747.58
Unknown	75.58
Water	2662.10

*The land ownership source is ParcelMap BC, provided by the Land Title and Survey Authority (LTSA). This dataset does not differentiate Indian Reserves as Federal Crown parcels.

Wildfire threat on Cortes Island was analyzed and updated through a local wildfire threat assessment process as described in SECTION 4: Wildfire Risk and Appendix A-1-Fuel Type Attribute Assessment. The distribution of wildfire threat classes across the AOI is illustrated in Map 7 on page 49.



Map 1. Area of Interest (AOI).



2.2 COMMUNITY DESCRIPTION

Cortes Island is within Electoral Area B of the Strathcona Regional District and contains no incorporated municipalities. The island is characterized by a mix of isolated rural properties, small residential neighbourhoods, parkland, and forest tenure, including the Klahoose First Nation woodlot and the Cortes Island Community Forest. The population is clustered in four main areas: Whaletown, Mansons Landing, Cortes Bay, and Squirrel Cove.

Cortes Island has been inhabited by the Coast Salish Aboriginal Peoples since time immemorial. Klahoose, Xwemalkwu (Homalco), We Wai Kai (Cape Mudge), Wei Wau Kum (Campbell River) First Nations, and Tla'amin Nation are among the First Nation governments whose traditional territory includes Cortes Island. Klahoose First Nation has land parcels on Cortes Island that overlap the AOI, including the main community of Squirrel Cove. Klahoose First Nation land is excluded from this document as a separate CWPP document (Klahoose First Nation 2020 CWPP) has been prepared that makes recommendations specific to Klahoose land, emergency planning, governance, and community concerns. Tla'amin Nation treaty land south of Mansons Landing is also excluded from the AOI.

Services to residents of Cortes Island are provided both privately and by the Strathcona Regional District. The regional government provides land use planning, emergency management, fire protection, building and development permits, bylaw enforcement, administration and solid waste services. Water and sewer are provided by private wells and septic systems. Klahoose First Nation provides additional services to residents of Squirrel Cove, which is not in the AOI. The island is accessed via a BC Ferries route from Quadra Island, by private boat, or by private plane.

The island is comprised of low-lying forested hills with variable topography, including rocky outcrops, freshwater lakes, and small valleys throughout the landscape. Cortes Island lies in the rain shadow of Vancouver Island; summers are warm and dry and winters are mild and wet.

The economy of Cortes was historically driven by trapping, mining, and logging. European settlement began by in the late 1800's, consisting mainly of hand-fallers who relocated. Population reached a peak in the 1920s, then decreased due to a combination of economic declines, lack of access, and associated high costs of living. Population remained low until a 16-car ferry, Cortes Queen, began sailing to Cortes Island from Quadra Island in 1969.¹⁴ Trapping and forestry remain important parts of the economy today, along with other industries such as retail, tourism, construction and agriculture. Today, the remoteness of the island entices individuals who are in search of an independent and secluded lifestyle to relocate to the island.

Fire protection within the AOI is the responsibility of the volunteer Cortes Island Fire Association (CIFFA). CIFFA is contracted by the SRD on a 4-year basis. Mutual aid agreements exist between CIFFA and BCWS and are used frequently. Generally, a fire that occurs outside of the CIFFA's Fire Protection Area (FPA) is under the jurisdiction of the BC Wildfire Service (BCWS). However, under exceptional circumstances, such as high to extreme fire hazard conditions, the CIFFA can respond to an interface fire outside of their

¹⁴ Our Cortes, 2020. *Island History*. Retrieved From: <http://ourcortes.com/our-cortes/island-history/>



designated FPA when directed by the BCWS. Likewise, the BCWS can provide CIFFA with resources and personnel within the FPA as requested.

Access and egress are a concern on Cortes Island due to its rural nature. Many properties are isolated and surrounded by forest on all sides. Furthermore, most homes and neighbourhoods are located at the end of narrow driveways or single-access roads that branch off of main artery roads like Whaletown Road and Seaford Road. This not only presents a challenge for emergency access and egress, but also limits the ability of fire crews to respond to fires and safely evacuate residents.

2.3 PAST WILDFIRES, EVACUATIONS AND IMPACTS

In the last century, wildfires on Cortes Island have been infrequent and relatively small in size. No historic fires on the island have resulted in documented evacuations or structural loss. The most recent wildfire, that was a result of pile burning, occurred 8 years ago and only reached 0.2 ha in size. Nevertheless, the dry climate and high amount of forest cover on Cortes Island are both risk factors from a wildfire perspective, and large fires have historically burned on other coastal islands. Local fire threat and fire weather is discussed in further detail in 0

2.4 CURRENT COMMUNITY ENGAGEMENT

The SRD has an active FireSmart program and since the 2011 CWPP has held several FireSmart events on Cortes Island. Generally, there is widespread recognition and awareness from SRD staff, CIFFA personnel and community members of the threat posed to Cortes Island by wildfire. As a result, significant progress has been made to enhance community engagement in FireSmart initiatives.

Initiatives carried out by the SRD include chipping and removing yard and wood debris on private land, distributing educational materials, hosting FireSmart workshops and using Facebook and other social media platforms to engage the public with fire danger information. CIFFA is also involved with public advisories and educating homeowners about FireSmarting their properties, and have FireSmart resources available throughout their website, cortesfire.org. It should be noted that the SRD aims to encourage and educate residents on FireSmart practices and recommendations, but no bylaw is in presently place that requires nor enforces compliance. Some local governments with sufficient enforcement resources will enact an Unsightly Properties or Fire Protection bylaw that grants local staff the authority to require the removal of materials on private property that pose a fire risk.

Community understanding of wildfire risk is generally high, with a prevalent sentiment that a wildfire induced evacuation is the most plausible cause for an evacuation order off the island. In a 2020 residents survey, there was significant public support for more FireSmart initiatives, including education and debris removal on private properties (Appendix J– Cortes Island Wildfire Survey Community Feedback). Voluntary community participation within the CIFFA is notable with consistent annual membership. Nevertheless, community engagement in wildfire mitigation activities associated with the SRD is relatively low as an intent to distance from government is common among island residents.



2.5 LINKAGES TO OTHER PLANS AND POLICIES

The following is a summary of SRD and provincial policies and guidelines that relate to strategic wildfire management, wildfire risk reduction, operational fuel treatments and emergency planning. Regional policies and bylaws are important tools available to mitigate wildfire risk to a community, by providing strategic direction, authority to enforce FireSmart compliance, and recognition of risk in land use planning and development. This section recommends amendments to plans and bylaws to further recognize and promote FireSmart principles.

2.5.1 Local Authority Emergency Plan

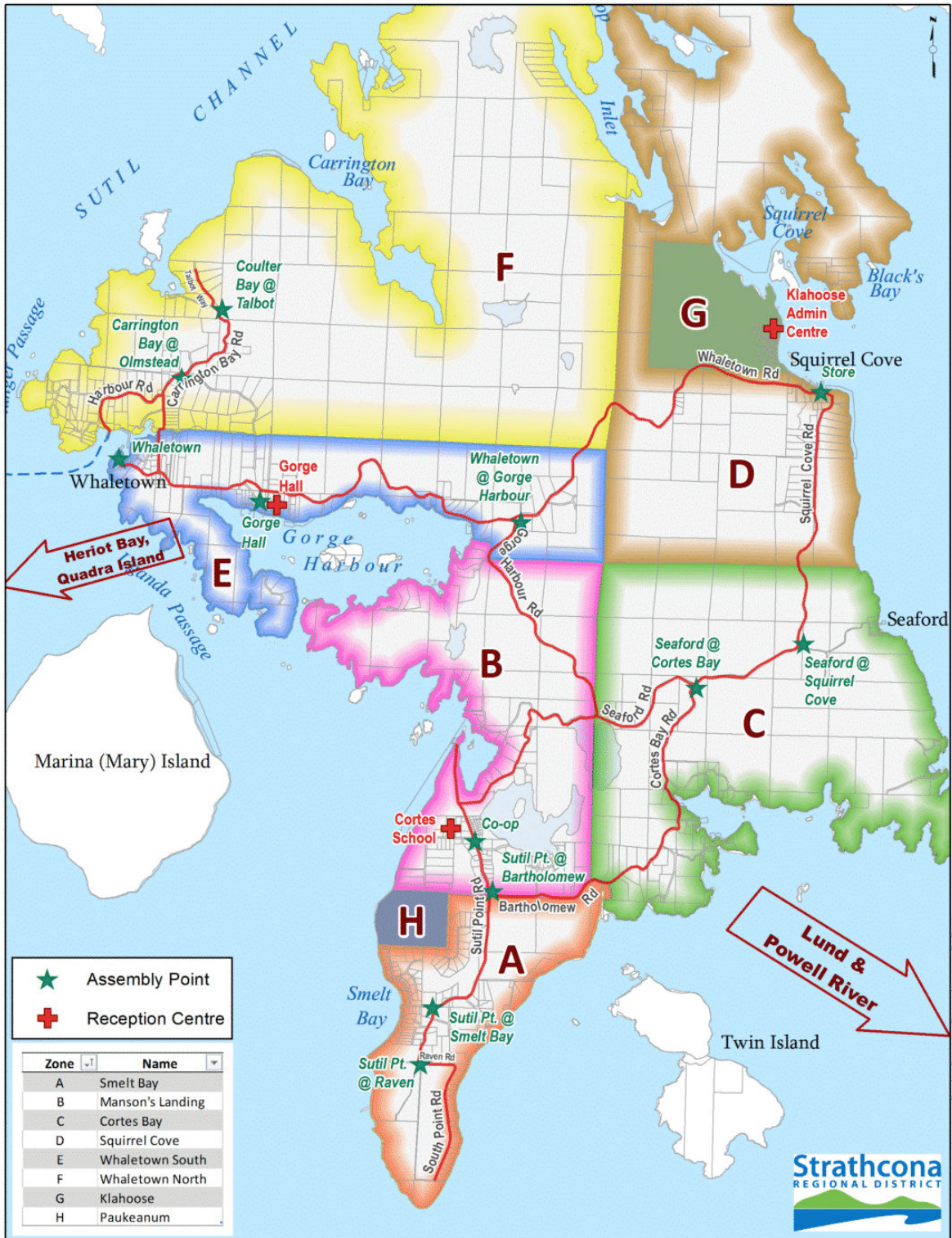
Emergency preparedness and response is managed by the SRD in collaboration with the Cortes Island Emergency Planning Committee (CIEPC), which is guided by higher level emergency management legislation such as the provincial Emergency Program Act.¹⁵ The Emergency Program Act describes the various roles and administrative duties of the province and local governments with regards to emergency organization, the implementation of higher level emergency plans, the processes of declaring a state of emergency and coordinating post disaster relief programs and assistance.

A Cortes Island Evacuation Plan¹⁶ was developed in 2016 by the SRD and the CIEPC to provide guidelines and procedures for a coordinated evacuation off of Cortes Island in a threatening event deeming an area of the island unsafe to occupy. The evacuation plan includes basic contingencies in the event of a wildland/interface fire, including the designation of an Emergency Operations Centre, information on Emergency Support Services (ESS), specific and alternate evacuation routes to be used during an emergency situation, and a list of key contacts and the roles of local government personnel in the event of a wildfire. BC Ferries are identified as the main transportation method on and off the island.

The Evacuation Plan is a result of the Cortes Island Official Community Plan (OCP) and a 2011 Community Wildfire Protection Plan (CWPP), discussed in the next section. The evacuation plan delineates the evacuation process, including evacuation levels (Level 1 – Level 3), evacuation notifications and tracking. Evacuee supply lists, traffic plans, routes and destinations, assembly points, required equipment and allocated source, and evacuation zones have also been outlined within the plan. Six evacuation zones (Smelt Bay, Mansons Landing, Cortes Bay, Squirrel Cove & IR 7, Whaletown South, and Whaletown North) have been established so that evacuation may occur for specific zones based upon their deemed risk of hazard (Map 2). Within each zone, respective assembly points, Emergency Social Services (ESS) facilities, boat ramps, wharfs and evacuation routes have been mapped and residence lists have been created. Community feedback of the updated Evacuation Plan has been summarized by Evacuation Zone in Appendix J– Cortes Island Wildfire Survey Community Feedback.

¹⁵ British Columbia Provincial Government, 2020. Emergency Program Act. Retrieved From: https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/00_96111_01

¹⁶ Strathcona Regional District. 2016. *Community of Cortes Island Evacuation Operational Guidelines*.



Map 2. Cortes Island Emergency Evacuation Staging.¹⁷

¹⁷ Strathcona Regional District. 2020. Cortes Island Evacuation Survey; *Community Wildfire Protection Plan & Evacuation Plan Survey*. Retrieved from: <https://srd.ca/projects/cortes-evacuation-survey/>



In consultation with CIFFA, it was noted that the development of the evacuation plan has improved the island's preparedness for an evacuation event. However, the plan lacked community engagement and incorporated little public input and consultation. As such, an updated evacuation plan is currently being drafted by the SRD in collaboration with the CIEPC that incorporates community input and feedback. By utilizing local knowledge in the disaster planning process, the SRD hopes to gain valuable insight regarding potential personnel and equipment availability, identifying vulnerable populations, exploring the number of residents capable of self-evacuating with personal boats and an estimation of the number of household pets on Cortes. An Evacuation Plan pamphlet should be developed that summarizes key components of the Evacuation Plan, specific to resident roles during an evacuation event. The pamphlet should be made available online.

It is also recommended that an Emergency Access Map is incorporated into the current evacuation plan. Through consultation with the Wildfire Working Group, as well as field verification, out-of-date road mapping has been identified as an issue. The map should include up-to-date road networks, including names and condition, the locations of fuel breaks (implemented or natural, for optimal burn-off locations), natural water sources, gates, critical and hazardous infrastructure, home addresses and tenure holders with associated contact numbers. The Cortes Forestry General Partnership (CFGP) should be contacted regularly to ensure that forestry road construction and deactivation is as up-to-date as possible.

In addition to providing the safest, quickest, and easiest access routes for emergency crews, including BC Wildfire Service, a Emergency Access Map would minimize the need for using machinery or motorized access in an otherwise undisturbed area. This would reduce the risk of soil disturbance and other environmental damage, as well as reduce rehabilitation costs.

2.5.2 Affiliated CWPPs

A previous CWPP was developed for Cortes Island in 2011¹⁸ to assist the SRD in identifying wildland fire risks and providing applicable recommendations. None of the recommended priority areas for fuel treatments to mitigate wildfire risk have been implemented. Barriers to implementations were associated with funding limitations and increased costs of treating a remote island. Areas of concern were revisited and proposed treatment units have been amended and added to. Refer to Section 5.1.1 for further details regarding proposed treatment units and Appendix I – Summary of 2011 Recommendations. The 2011 document was reviewed for context and relevance.

2.5.3 Regional Government Policies and Recommendations

The intent of this section is to review all relevant local government plans, policies and bylaws and identify sections within that are relevant to the CWPP Update. The following regional bylaws, strategies and policies are relevant to wildfire planning on Cortes Island.

Electoral Area B (Cortes Island) Official Community Plan- Bylaw No. 139

¹⁸ Broome, K., Andrew, B. 2011. B.A. Blackwell. *Cortes Island Community Wildfire Protection Plan*. Retrieved from https://srd.ca/wp-content/uploads/2019/07/Cortes_CWPP_Final.pdf



An Official Community Plan (OCP) is a general statement of the objectives and policies of the local government, and provides the SRD with a long-range framework to guide, monitor and evaluate future land use and development throughout the respective Electoral Area. The following sections contain objectives and policies which are directly relevant to wildfire risk reduction, emergency response, and community resilience post-disaster as described in Table 3 and Table 4 below.

Table 3. Summary of relevant Cortes Island OCP Sections

OCP Section	Summary
Section 407.2 Health & Quality of Life Policies	<ul style="list-style-type: none"> Promote health and quality of life through public safety, including providing adequate emergency and fire services, and developing an evacuation plan The 2016 Evacuation Plan is a result of this policy.
Section 304.6 Community Services	<ul style="list-style-type: none"> Fire emergency preparedness and protection throughout the planning area to support individual lifestyle while protecting neighbors and ecological integrity
Section 203 First Nations Policies	<ul style="list-style-type: none"> The SRD should cooperate and coordinate with First Nations regarding the provision of fire services to reserve lands The Klahoose First Nations respond internally to fire events within the Klahoose community, however, the CIFFA may offer support upon request.
Section 406.2.2 Watershed Protection and Water Supply	<ul style="list-style-type: none"> Ditching of roads are to be designed to maximize groundwater recharge and retention. DPA designations may be placed upon lands deemed important to protection the island's water resources Freshwater lakes should be placed within a water conservatory zone to protect their integrity.
Section 402.1 (c), (e) Transportation	<ul style="list-style-type: none"> Encourage the Ministry of Transportation and Infrastructure to retain all local arterial roads at an acceptable standard (c) Rural road standards should be met, consultative process should be ongoing and road classifications should be updated as required
406.3.2 Hazardous & Special Waste	<ul style="list-style-type: none"> Residents should dispose of hazardous waste in accordance with Regional District and applicable government agency regulations An on-island system to dispose of hazardous waste should be developed (i.e. Recycling Centre)



OCP Section	Summary
Section 501 Authority to Establish Development Permits	<ul style="list-style-type: none"> The SRD may designate a DPA for protection of development from hazardous condition
Section 404 Climate Change	<ul style="list-style-type: none"> Incorporating climate change and its potential impacts and mitigation measures when reviewing new development applications and undertaking long-term planning initiatives
Section 301.2 Community Goals – A Livable Environment	<ul style="list-style-type: none"> Community education regarding the protection of the natural environment to achieve the Community Goal of maintaining a liveable physical environment.
Appendix “C” Community Background	<ul style="list-style-type: none"> The Cortes Island Firefighting Association (CIFFA) encompasses two firehalls and provides voluntary firefighting service for most road-accessible homes on the island The Cortes Community Radio Society is responsible for broadcasting emergency communications throughout the Discovery Islands The Emergency Social Services Team provides short-term assistance to community members who are forced to leave their home in an emergency instance

Table 4. Summary of relevant SRD Bylaws

Bylaw	Summary
Bylaw No. 2733, Strathcona Emergency Program Service Establishment Bylaw	<ul style="list-style-type: none"> Establishes a service to provide emergency preparedness plans and operations. Regulates all aspects of the "Strathcona Emergency Program" to be reviewed every 5 years.
Bylaw No. 37, Strathcona Emergency Program Service Bylaw No. 2733, 2004, Amendment	<ul style="list-style-type: none"> Amends Bylaw 2733 to include Electoral Area B (Cortes Island) in the Strathcona Emergency Program Service, to extend the boundaries of the Service Area and recognize Cortes Island as a participating area of the Bylaw.
Bylaw No. 1263, South Cortes Island Fire Protection Services and Facilities Service Establishment Bylaw	<ul style="list-style-type: none"> Establishes the service of fire protection services and facilities to include South Cortes Island (Electoral Area I) as a participating area. Fire protection in reference to this bylaw includes the prevention of, response to and suppression of fires, rescues service including vehicle extrication and providing assistance to ambulance paramedics when required to do so.
Bylaw No. 331, South Cortes Island Fire Protection Services and Facilities Service Establishment Bylaw No. 1236, Amendment	<ul style="list-style-type: none"> This bylaw amends the participating area of Bylaw 1236 to include all of Electoral B in fire protection services.



Bylaw	Summary
<p>Bylaw No. 331, South Cortes Island Fire Protection Services and Facilities Service Establishment Bylaw No. 1236, Amendment, Section 4.0 Standards of Service</p>	<ul style="list-style-type: none"> • Sanctions the Cortes Island Fire Fighting Association to operate the fire protection service for a 5-year term, allocating funds in accordance to the agreement. • The Association agrees to standards of service, including adequate training and licensing, abiding by laws, regulations bylaw and orders of the jurisdiction and understanding limitation to authorize entrance of personnel onto private property.
<p>Bylaw No. 331, South Cortes Island Fire Protection Services and Facilities Service Establishment Bylaw No. 1236, Amendment, Section 5.0 Service Area</p>	<ul style="list-style-type: none"> • Authorizes the Cortes Island Fire Fighting Association to engage in wildfire suppression outside the service area when commissioned by the Ministry of Forests, Lands and Natural Resource Operation or another duly constituted provincial authority. • Section 5 outlines the possibility of expanding the scope of services offered by the Association, such as rescue service, assistance to medical response and first responder services and service boundary adjustments to include wharves and docks adjacent to the current boundaries as well as unserved areas requesting services.
<p>Bylaw No. 2027, Park Rules and Regulations Bylaw, 1996, Appendix A Section 7.0 Fires</p>	<ul style="list-style-type: none"> • Gives authority to the SRD to make rules and regulations governing the use, management, improvement, operation, control and use of Regional District Parks
<p>Bylaw No. 2455, Electoral Area 'I' (Cortes Island) Zoning Bylaw, 2002</p>	<ul style="list-style-type: none"> • Regulates zoning permissions throughout Cortes Island • Part 500 outlines subdivision standards, including frontage specifications to ensure that every property has adequate access to a public ROW.
<p>Bylaw No. 158, Building Regulation Bylaw 2015</p>	<ul style="list-style-type: none"> • Specifies that all residential construction must abide by the Building Code including material standards in part 9.26.2.1.

2.5.4 Higher Level Plans and Relevant Legislation

Awareness of all relevant provincial legislation and regulations and land management plans is a critical step in ensuring a proactive and effective wildfire mitigation approach in the AOI. Table 5 summarizes the higher-level plans that apply to Cortes Island and their relationship to community wildfire planning.



Table 5. Key Higher-Level Plans and Relationship to the CWPP

Plan	Description	Relationship to CWPP
Cortes Forestry General Partnership		
Community Forest (CF) Operating Plan (2014)	Following the Community Forest Agreement that was commissioned by FLNROD in 2013, a Community Forest Operation Plan was established to outline the management philosophy for the CRA and enact a public input and monitoring structure for operational activities. The framework emphasizes sustainable ecosystem-based strategies while balancing social and economic community objectives.	The Operating Plan identifies that risk management strategies to reflect climate change adaptation should be implemented in operational planning. As such, landscape level fuel breaks have been recommended within the CF that meet harvesting objectives while reducing the potential for crown fire behaviour.
CFGP Community Forest K4G FSP (2019)	The FSP illustrates Forest Development Units within which CF forest activities are planned for and describes strategies to address government objectives that are reflected in higher level plans.	While the FSP employs regional and provincial legislation to direct forest stewardship, it does not speak to encompassing wildfire prevention objectives. Incorporating wildfire management within forest stewardship may concurrently meet local, regional and provincial objectives.
CFGP Five Year Plan (2018)	The Five-Year Plan outlines planned operational activities, approximate timelines, rational, harvest volumes and stand types.	Within the plan, integrating opportunities to mitigate wildfire risk through harvesting, road building and silviculture operations are considered. Aligning CFGP operational activities with wildfire risk reduction is reflected through recommended CF fuel treatments and road construction/maintenance recommendations.
Ministry of Forests, Lands, Natural Resource Operations and Rural Development		
Vancouver Island Land Use Plan (2000)	The VILUP is a comprehensive land use plan on a regional scale that was developed to guide sustainable resource stewardship and management of crown land and water.	The plan establishes land use objectives for Special Management Zones and Resource Management Zones, which guides CFGP FSP's and subsequently CWPP recommendations pertaining to crown land.
Cortes Landscape Unit Plan (2012)	This Sustainable Resource Management Plan identifies protection measures for landscape level biodiversity and old growth forests in the Cortes Landscape Unit.	The Landscape Unit Plan summarizes OGMA units for each of the BEC zones within the landscape unit and sets objectives for the management within each zone. OGMA values have been considered throughout the development on the CWPP.
BC Parks		
Ha'thayim (Von Donop) Marine Provincial Park	The PSZP identifies marine recreation as the primary purpose of the park. Secondary, is to protect the natural environment, and	The southern portion of the park lies within the CWPP AOI, and thus, special



Plan	Description	Relationship to CWPP
Purpose Statement and Zoning Plan (PSZP)	contribute to the protection of the CWHxm1.	park values are considered throughout the development of the CWPP.
Mansons Landing Provincial Park PSZP	Protecting natural values associated with the northern Gulf Islands and protecting the Strait of Georgia Terrestrial Ecosession is identified as the primary role of the park within the PSZP. Day-use recreational opportunities have also been identified as park values.	The park receives heavy recreational traffic, and public safety of this park has been considered throughout the development of the CWPP.
Smelt Bay Provincial Park Master Plan	The Smelt Bay Master Plan identifies protecting natural and heritage resources of the park, along with providing camping and day-use beach opportunities as key management objectives.	Consideration for the park’s capacity to foster tourism and recreation activities has been given in the development of the CWPP.
Local Government		
Strathcona Regional District Strategic Plan 2020 - 2024	The strategic plan outlines that supporting adaptation of climate change through sub-regional initiatives and increasing understanding and capabilities to respond to wildfire are key district strategic priorities.	Recommendations made throughout the CWPP are aimed to increase public understanding of wildfire hazards and FireSmart principles, while increasing Cortes Island’s wildfire resiliency.



Table 6. Summary of Planning Recommendations.

Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
1	Medium	Review and amend South Cortes Island Fire Protection Services and Facilities Service Establishment Bylaw No. 1236 to include the Tiber Bay community within the fire protection area. See Recommendation #3.	This motion has been pursued by Tiber Bay community members. CIFFA is in support once the list of expansion requirements have been met.	~12 in-house staff hours required for internal work.	SRD Initiative; CIFFA collaboration
2	Low	Amend Section 304.6 of the Cortes Island Official Community Plan (Community Services) to include a section on wildfire preparedness and community initiatives (i.e., FireSmart, fuel reduction etc.) to mandate wildfire risk. Include the potential of impact wildfire may have on public health and safety, ecosystems, habitat, and water quality among other values. See the Fraser Valley Regional District Electoral Area D OCP Update ¹⁹ , the Cariboo Regional District Electoral Area G OCP ²⁰ and other regional district electoral areas as examples.	Embed community FireSmart values in the OCP to guide future development.	~20 in-house hours (UBCM CRI Program Funding). Example cost \$10,000 including \$1,500 for administration (SRD) and \$8,500 for consultant costs (100 hrs @ \$85/hr).	SRD Initiative
3	High	The SRD should work with the Ministry of Transportation and Infrastructure (MOTI) and overlapping private land owners, to assess the feasibility of developing a turn-around on Mary Point Road in the Tiber Bay community (50°05'19.9"N, 124°53'15.9"W) to improve emergency services access and	Current access route is not wide enough to support CIFFA fire trucks, preventing the community from being included within the Fire Protection Area. CIFFA is in support once the list of expansion requirements have been met.	~4-6 in-house hours (Local Government funding/UBCM CRI Program Funding-	SRD initiative MOTI collaboration

¹⁹ Fraser Valley Regional District. 2018. *Official Community Plan for Popkum-Bridal Fall Bylaw No. 1502, 2018*. Retrieved from: <https://www.fvrd.ca/assets/Services/Documents/Planning~and~Development/Projects~and~Plans/Popkum~Bridal~Falls~OCP~Update/Area%20D%20Bylaw%201501%202nd%20Reading.pdf>

²⁰ Cariboo Regional District. 2018. *Lac La Hache Area Official Community Plan Bylaw No. 5170*. Retrieved from: https://www.cariboord.ca/en/business-and-development/resources/Documents/PlanningandDevelopment/OCP/LacLaHacheAreaOCP/Lac_La_Hache_Area_OCP.pdf



Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$ or Person Hours)	Resources
		community egress in the event of an evacuation or wildfire event.		Interagency Cooperation)	
4	Medium	Develop an Emergency Access Map for the SRD to inventory trail and road network for suppression planning, identify of areas with insufficient access, and to aid in strategic planning. Ground-truthed locations of existing and potential fuel breaks, Local Fire Threat and tenure holders contact information should be incorporated within the map. The map should be included in the Cortes Island Evacuation Plan and shared with fire suppression personnel, BCWS and industrial operators (Community Forest and Klahoose Woodlot) to support emergency response in the event of a wildfire. The map should be reviewed as needed to incorporate additions and/or changes.	An Emergency Access Map will support emergency response in the event of a wildfire and/or evacuation event. During field work consultants observed that road mapping is out of date. Minimizes the need for using machinery to build cat guards, etc., in an otherwise undisturbed area	~60 in-house hours/consultant (Local Government funding/Potential UBCM Funding)	SRD initiative
5	Medium	The SRD should work with the CFGP and BCWS to develop a 5 - 10-year plan for access management throughout the Cortes Island Community Forest from a wildfire suppression perspective. The collaborative plan should align with the CFGP Operations Plan ²¹ , while considering wildfire suppression access. Access to the north island is currently is inadequately developed, significantly challenging ground-based fire control opportunities, and should be prioritized through the development of this plan.	Inadequately developed access impedes ground-based fire control opportunities. CFGP access management plans should consider wildfire suppression access while harmoniously achieving Community Forest FSP objectives.	~60 in-hour hours (Local Government funding/Potential UBCM CRI Program Funding)	SRD/BCWS/CFGP initiative

²¹ Cortes Forestry General Partnership. 2018. *Five Year Plan. Operations Planning 2018 – 2022*. Retrieved from: <http://www.cortesforestrypartnership.com/wp-content/uploads/DRAFT-5-Year-Plan-Feb-6-2018.pdf>



Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$ or Person Hours)	Resources
6	Medium	Coordinate with BC Hydro to address lengthy response times during electrical failures. Lobby to improve latency and on-island resources.	CIFFA Fire Chief noted prolonged power outages due to BC Hydro lengthy response time as a safety concern, specifically due to the increase usages wood stoves and associated communication challenges.	~6 hours (local government hours for 1 meeting with BC Hydro). Potential UBCM CRI funding (Interagency Cooperation)	SRD initiative/BC Hydro collaboration
7	High	Complete and participate in regular testing of, and updates to, the Evacuation Plan for the Cortes Island.	Identify any challenges with the new Evacuation Plan before it is deployed in a real emergency.	UBCM Program funding	SRD/CIIEPC initiative
8	Medium	Develop an Evacuation Plan pamphlet that summarizes key components of the Evacuation Plan, specific to resident roles during an evacuation event. The pamphlet should be made available online and could be available as a hard copy at general stores.	Pamphlets are an effective public communication tool; evacuation was identified as a primary concern in the 2020 survey of island residents.	SRD funding; UBCM funding may be available	SRD/CIIEPC initiative
9	Medium	Work with BCWS to outsource on-island wildfire resources (i.e., water tenders, facilities) that can be deployed as required during a wildfire event. Available resources could be organized by evacuation zone and contracts should be pre-established within each zone to ensure resources and equipment is readily available throughout the Island in the event of an emergency. Incorporate in Evacuation Plan.	Ensure adequate resources and equipment are readily available and easily accessible during a wildfire event. BCWS interest.	~6-10 in-house hours (Local Government funding)	SRD/BCWS initiative

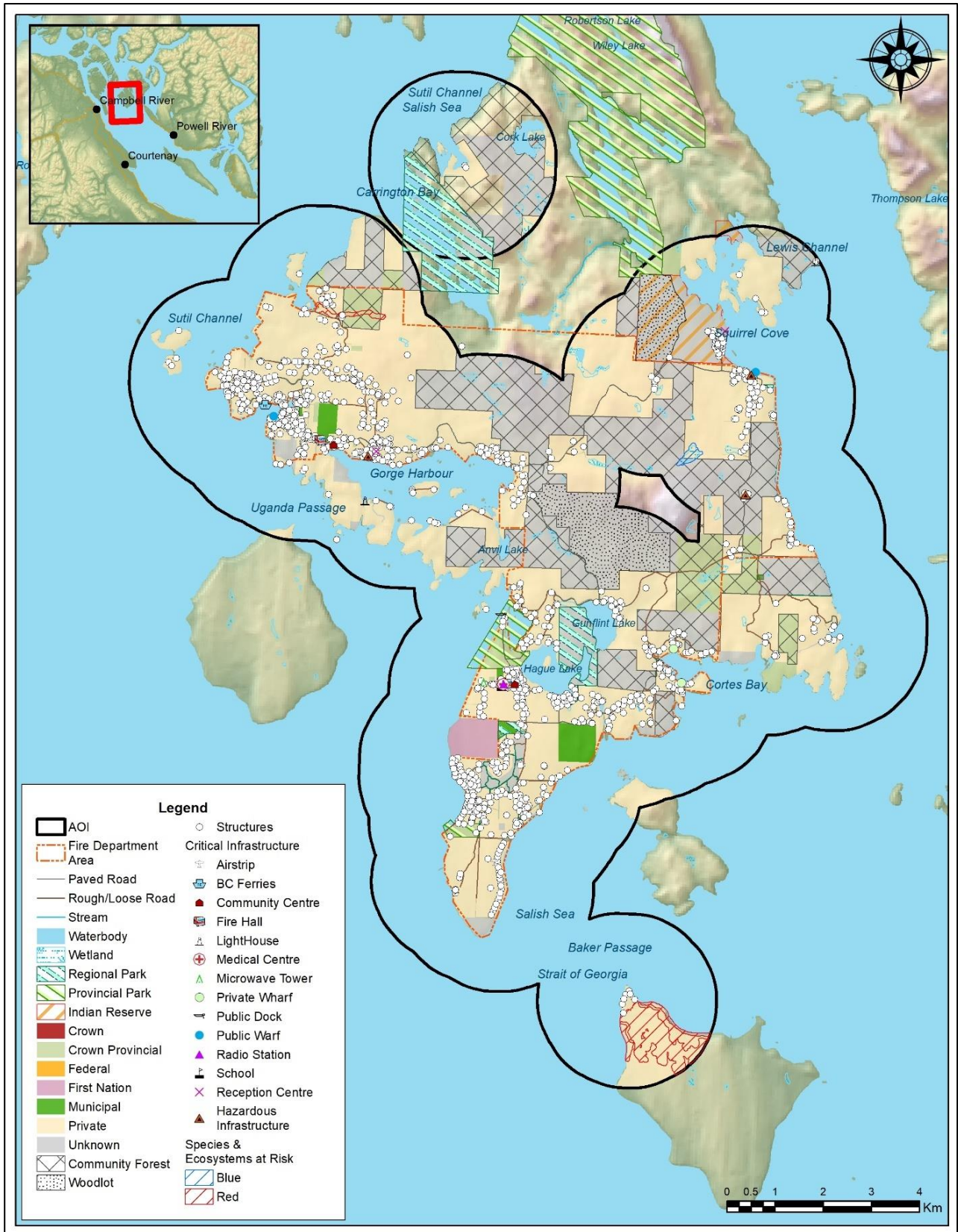


Document Section 2.5 Planning					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$ or Person Hours)	Resources
10	Medium	Ensure that both CIFFA Fire Halls and all ESS facilities have back-up gas or diesel generators with sufficient fuel supply for extensive power outages (3 + days) so that they can function as reception centers/department operation centers as required in the event of an emergency	Prolonged power outages typically occur on an annual basis during winter months due to the island's exposure of south and southwesterly winds and are common during wildfire events.	~8 in-house hours per structure. Local Government Funding	Locally funded (CIFFA) or external grant. The SRD has limited power to fund improvements to society buildings
11	Medium	Develop an outreach document that outlines emergency fuel/propane emergency shut off best-practices for facilities with hazardous infrastructure (HI) (e.g., gas stations) to enact in the event of an approaching wildfire or ember shower. Consider contacting the Emergency Management BC Vancouver Island Regional Office for guidance.	Provide facilities with hazardous infrastructure with resources/procedures to reduce hazard during a wildfire event.	~40 in-house hours (Local Government funding/UBCM CRI Program Funding)	SRD Initiative
12	Medium	Complete or schedule periodic updates of the CWPP. The frequency of updates is highly dependent upon major changes which would impact local wildfire risk, or the rate at which wildfire risk reduction efforts are implemented. An evaluation of major changes (including funding program changes that may lead to new opportunities) and the potential need for a CWPP update should be initiated every 5 years.	A current (i.e., no more than 5 years old) CWPP is currently a requirement for further funding under the CRI Program.	UBCM CRI Program funding/Local Government funding	SRD Initiative



SECTION 3: VALUES AT RISK

The following section is a description of the extent to which wildfire has the potential to impact the values at risk (VAR) within the AOI. The VAR are the human and natural resources that may be impacted by wildfire and include human life and property, critical infrastructure, high environmental and cultural values, and other resource values. VAR also include hazardous values that pose a safety hazard. Key identified VAR are illustrated below in Map 3.



Map 3. Values at Risk within the AOI



3.1 HUMAN LIFE AND SAFETY

Human life and safety are the first priority in the event of a wildfire. Population distribution is a key consideration during wildfire evacuations. Evacuation can be complicated by the unpredictable and dynamic nature of wildfire, which can move quickly. Evacuation takes time, and safe egress routes can be compromised by wildfire causing limited visibility, or by traffic congestion and/or accidents.

Census data of Electoral Area B of the SRD, or Cortes Island, records a total population of 1,035 in 2016, which is a 2.7% increase from 2011 populations. The average age of the population is 48 years old and the number of occupied private dwellings in 2016 is 535., The majority of these dwellings (480) are single-detached homes. The population of the island is concentrated around the communities of Mansions Landing, Cortes Bay and Whaletown,²² but dwellings are scattered throughout the AOI. As a result, there are large areas of continuous forests interspersed with rural residences and narrow, winding roads.

The population of Cortes Island fluctuates significantly throughout the year because of tourism. Cortes Island attracts visitors for fishing, camping, hiking, sailing, motor boating, and other recreational endeavors year-round, but particularly during the fire season (May – October). Parks, recreation areas, beaches and lakes throughout the AOI are highly used during the summer months, including Mansons Landing Provincial Park, Smelt Bay Provincial Park, K’was Regional Park, and Hank’s Beach Forest Conservation Park. Furthermore, Cortes Island is a central island within the Desolation Sound, which is frequently used as a boating and tourist destination during the summer months and therefore significantly increases the number of people and time it takes to evacuate the island the event of a wildfire.

Knowledge of and access to updated structure locations within an area is a critical step in efficient and successful emergency response planning and the development of mitigation strategies and recommendations. Field visits, consultation with the Wildfire Working Group, and access to recent orthophotography has enabled the development a spatial layer with structure locations that account for the most recent developments.

3.2 CRITICAL INFRASTRUCTURE

Protection of critical infrastructure (CI) during a wildfire event is an important consideration for emergency response effectiveness, ensuring that coordinated evacuation can occur if necessary, and that essential services can be maintained and/or restored quickly in the case of an emergency. Critical infrastructure includes emergency and medical services, electrical and natural gas services, transportation, water, Emergency Social Services (ESS) facilities, and communications infrastructure. A critical infrastructure dataset was built upon the CI spatial layer from the 2011 CWPP and through consultation with the Wildfire Working Group and field visits. This data is shown in Map 3. Table 7 details an inventory of critical infrastructure identified in the AOI.

²² Squirrel Cove is also a population center, but is addressed in the Klahoose First Nation CWPP (2020).



3.2.1 Electrical Power

The main source of electrical power on Cortes Island is an underwater hydro line originating from Lund on the mainland. Electrical service for most of the AOI is received through a network of wooden pole transmission lines and underground distribution infrastructure supplied by BC Hydro. This system is well-mapped and BC Hydro states that staff will work with local fire departments and BCWS to mitigate impacts to this infrastructure in the event of a wildfire.²³ The island is also serviced by underground Telus fiber optic cables; their entry points are not publicly available.

A large fire has the potential to impact electrical service by causing disruption in network distribution through direct or indirect processes. For example, heat from flames or fallen trees associated with a fire event may cause power outages. Many wooden pole transmission lines have significant understory brush, and consideration must be given to protecting this critical service and providing power back-up at key facilities to ensure that the emergency response functions are reliable. Neighbourhoods with small, street-side wooden poles that connect to homes are particularly vulnerable to fire. It is recommended that utility right-of-way best management practices such as regular brushing and clearing of woody debris and shrubs be employed to help reduce fire risk, utility pole damage, and subsequent outages.



Figure 1. Vegetation encroachment on powerline- Cortes Island.

Secondary power sources are important to reduce critical infrastructure vulnerability in the event of an emergency which cuts power for days, or even weeks. Due to the rural nature and remoteness of Cortes Island, along with the island's exposure to south/southwesterly winds during winter months, power outages for prolonged periods of time during winter months are common. As such, the majority of households within the AOI are equipped with a gas-fueled generator as power outages are expected on an annual basis during winter months. Vulnerabilities for secondary power sources include mechanical failure, potentially insufficient power sources should a wide-scale outage occur, and fuel shortage in the event of very long outages. New residents to Cortes Island may be unfamiliar with the anticipated power outages and thus, may not be outfitted to endure such an event.

3.2.2 Communications, Pipelines and Municipal Buildings

A full inventory of critical infrastructure for communications, and community buildings with updated locations is presented below in Table 7. The SRD does not own or operate any of the community buildings on Cortes Island. The Cortes Island Evacuation Plan designates the Cortes Island School, Gorge

²³ BC Hydro, 2020. Earthquakes, wildfire, and floods. Retrieved from: <https://www.bchydro.com/safety-outages/emergency-preparation/natural-disasters.html>



Hall, and the Klahoose Administration Building (outside of the AOI) as Emergency Social Services (ESS) facilities. The Cortes Health Center in Mansons Landing, Mansons Hall, and all general stores and gas stations were also identified as critical infrastructure. Cortes Island residents are serviced by the BC Ferries terminal in Whaletown, with regular sailings to Quadra Island and on to Campbell River.

The closest cell tower to Cortes Island is on the mainland, north of Lund, so cell service is spotty throughout the island. However, there are two radio towers located in Mansons Landing. Telephone communication distribution lines also rely on wooden poles, increasing the vulnerability of these structures.

Table 7. Critical Infrastructure Identified in CWPP field visits

Critical Infrastructure Type	Location
Airstrip	Raven Road, Mansons Landing
BC Ferries Terminal	Harbour Road, Whaletown VOP 1Z0
Community Centre (x2)	Gorge Hall (ESS facility) - Robertson Road, Whaletown Mansons Hall - 983 Beasley Road, Mansons Landing
Fire Hall (x2)	Fire Hall 1 - 959 Beasley Road, Mansons Landing Fire Hall 2 - Whaletown Road
Cortes Island Community Radio Building	983 Beasley Rd, Mansons Landing VOP 1K0
Gorge Harbour Marina and Gas Station	1374 Hunt Road, Whaletown VOP 1Z0
Medical Centre	983 Beasley Road, Mansons Landing
Radio Tower (x2)	957 Beasley Road Fire Hall 1 - 959 Beasley Road, Mansons Landing
Public Dock	Sutil Point Road VOP 1K0
Public Wharf (x4)	1611 Forrest Rd, Squirrel Cove, BC VOP 1T0 Mansons Landing, BC VOP 1K0 Cortes Bay Whaletown Road
Private Wharf (x2)	Cortes Bay Seattle Yacht Club 1420 Red Granite Rd, Mansons Landing, VOP 1K0 Royal Vancouver Yacht Club Papp Road, Cortes Bay
School (ESS facility)	Cortes Island School - Beasley Road VOP 1K0
Gas Station (x2 ~10,000-24,000 Gal)	Squirrel Cove Trading Post, 1611 Forrest Rd, Squirrel Cove, BC VOP 1T0 Gorge Harbour Marina Resort, Hunt Road, Whaletown VOP 1Z0
General Stores (x4)	Cortes Market - 809 Sutil Point Rd, Mansons Landing, BC VOP 1K0 Cortes Coop - 800 Sutil Point Rd, Mansons Landing, BC VOP 1K0 Squirrel Cove Trading Post - 1611 Forrest Rd, Squirrel Cove, BC VOP 1T0 Gorge Harbour Marina Resort - Hunt Rd, Whaletown, BC VOP 1Z0
ESS facility (Squirrel Cove)	Klahoose First Nation Administration Center - 1719 Ocean View Road, Mansons Landing, BC VOP 1K0

3.2.3 Water and Sewage

There is no SRD water system on Cortes Island. Residents throughout the AOI have private groundwater wells and some surface water intakes. Klahoose First Nation operates a water system for residents of Squirrel Cove. CIFFA has installed water cisterns at both fire halls, Squirrel Cove Road (Recycling Center),

the Squirrel Cove Store, and a cistern and hydrant at the Cortes Island School in Mansons Landing. There are also two private cisterns at Siskin Lane. All water infrastructure is listed in Table 8.

Section 406.2.2 of the Cortes Island OCP addresses watershed protection and supply. Relevant policies are listed in Section 2.5.3 of this document, and include ditching to maximize groundwater retention for fire suppression, and the placing of freshwater lakes in a water conservancy zone. All roads to retain ground water and act as a fire guard. The CIFFA has indicated that ditching has been ineffective at retaining groundwater resources during the fire season. Currently, there are no lakes placed in water conservancy zones. However, a proposed Cortes Island Zoning Bylaw is being developed, which may have the ability to address interface wildfire concerns, including placing certain lakes in water conservancy zones.

The SRD does not provide sewer services to Cortes Island. The only associated infrastructure with the AOI includes a lift station and a sewage treatment facility in Squirrel Cove, which is discussed in the Klahoose First Nation 2020 CWPP. All other residents employ private on-site septic tank systems to store and treat sewage.

Table 8. Artificial water supply throughout the AOI

Critical Infrastructure Type	Location
Fire hydrant	Cortes Island School
Private Cistern (2)	Siskin Lane
CIFFA Cistern	Cortes Island School
CIFFA Cistern (2)	Squirrel Cove Road- by Recycling Centre
CIFFA Cistern (2)	Squirrel Cove Store
CIFFA Cistern (2)	Fire Hall 1 – Mansons Landing
CIFFA Cistern (2)	Fire Hall 2- Whaletown Road
Fire hydrants and drinking water system (outside of AOI)	Klahoose First Nation – Squirrel Cove

3.3 HIGH ENVIRONMENTAL AND CULTURAL VALUES

The following section identifies high environmental and cultural values and where they are located. Environmental, cultural and recreational values are high throughout the AOI. A more detailed account of environmental and biodiversity aspects of this region is presented in Section 3.3.3.

3.3.1 Drinking Water Supply Area and Community Watersheds

Cortes Island has no officially designated community watershed and as discussed in Section 3.2.3, the SRD provides no water services to Cortes Island. Residents rely upon private subsurface wells and surface water sources for drinking water purposes. Annual community education programs occur on neighboring Quadra Island aimed at teaching island homeowners how to keep private wells up to code and water supplies free of contamination.

Although the gentle topography and prevalence of groundwater wells limits the vulnerability of Cortes Island’s drinking water quality to wildfire, it is still possible for wildfire to result in impacts to water supply. Depending on fire size and severity, there is the potential for significant hydrological impacts,



extending for years post-burn.²⁴ Some areas may have a lower threshold for precipitation triggered events and would be particularly vulnerable to post-wildfire debris flows, mass wasting, landslides, and flooding. This could directly impact the communities through structure loss and risk to public safety, or indirectly, through loss or damage of critical infrastructure, roads, or impacts on the watershed affecting water quality.

3.3.2 Cultural Values

Archaeological sites and remains in BC that pre-date 1846 are protected from disturbance, intentional and inadvertent, by the *Heritage Conservation Act* (HCA), which applies on both private and public lands. Sites that are of an unknown age that have a likely probability of dating prior to 1846 (i.e., lithic scatters) as well as Aboriginal pictographs, petroglyphs, and burials (which are likely not as old but are still considered to have historical or archaeological value) are also protected. Under the HCA, protected sites may not be damaged, altered or moved in any way without a permit. It is a best practice that cultural heritage resources such as culturally modified tree (CMT) sites be inventoried and considered in both operational and strategic planning.

Due to site sensitivity, the locations of archaeological sites may not be made publicly available, however, data provided by the MFLNRORD Archaeology Branch confirms that there are known overlaps with archeological sites within the AOI, and there is high to moderate potential for previously unidentified archeological sites to exist elsewhere in the AOI. Prior to stand modification for fire hazard reduction, and depending on treatment location, preliminary reconnaissance surveys or archeological impact assessments may be undertaken to ensure that cultural heritage features are not inadvertently damaged or destroyed. Fuel treatment activities must include consultation with all identified First Nations at the site level and with sufficient time for review and input regarding their rights and interests prior to prescription finalization or implementation.

During consultation, the Tla'amin Nation has requested that they be notified of any fires on or near Tla'amin land, east of Mansons Landing.

3.3.3 High Environmental Values

The following is a list of ecosystem or species at risk occurrences that have been identified through the B.C. Conservation Data Center (CDC), and have been specifically observed and recorded within the AOI boundary (Table 9): Sitka Spruce/Salmonberry (*Picea-sitchensis/Rubus spectabilis*) Very Dry Maritime, Grand Fir/Dull Oregon-grape (*Abies grandis/Berberis nervosa*), Douglas-fir/Dull Orgeon Grape (*Pseudotsuga menziesii/Berberis nervosa*) and Labrador-Tea/Western Bog-laurel/Peat-mosses (*Rhodoendron grenlandicum/Kalmia microphylla/Sphagnum* spp.) Through consultation with the CDC and a biologist or qualified professional, all site level operational plans must identify and mitigate potential impacts to ecosystems or species at risk.

²⁴ Jordan, P., K. Turner, D. Nicol, D. Boyer. 2006. Developing a Risk Analysis Procedure for Post-Wildfire Mass Movement and Flooding in British Columbia. Part of the 1st Specialty Conference on Disaster Mitigation. Calgary, AB May 23 -26, 2006.



Table 9. Publicly available occurrences of Red and Blue-listed species recorded within the AOI.

Common Name	Scientific Name	Category	BC List	Habitat Type
Labrador-Tea / Western Bog-laurel / Peat-mosses	<i>Rhododendron groenlandicum</i> / <i>Kalmia microphylla</i> / <i>Sphagnum spp.</i>	Ecological Community	Blue	Wetland Realm - Peatland Group: Bog Wetland Class (Wb)
Douglas-fir / Dull Oregon-grape	<i>Pseudotsuga menziesii</i> / <i>Berberis nervosa</i>	Ecological Community	Red	Terrestrial Realm - Forest: Coniferous - mesic
Grand Fir / Dull Oregon-grape	<i>Abies grandis</i> / <i>Berberis nervosa</i>	Ecological Community	Red	Terrestrial Realm - Forest: Coniferous - mesic
Sitka Spruce / Salmonberry Very Dry Maritime	<i>Picea sitchensis</i> / <i>Rubus spectabilis</i> Very Dry Maritime	Ecological Community	Red	Terrestrial Realm - Forest: Mixed - moist/wet; Terrestrial Realm - Flood Group (F): Highbench Flood

3.4 OTHER RESOURCE VALUES

There are multiple resources values associated with the land base, including timber supply, agriculture, wildlife habitat, drinking water supplies, and recreation and tourism.

The AOI encompasses much of the Cortes Island Community Forest, which is administered by the Cortes Forestry General Partnership (CFGP), an equal partnership between the Klahoose Forestry No. 2 Limited Partnership and the Cortes Community Forest Cooperative (CCFC). MFLNRORD issued a Community Forest Agreement (CFA) in 2013 to the CFGP for approximately 3,869 ha of Crown land spread across 9 distinct operating areas²⁵, approximately 35% of the island. The first operating plan was completed in 2014 and revised in 2019 to reflect the community’s philosophy for sustainable, ecosystem-based management of the community forest.

Fuel reduction treatments on provincial Crown land are not anticipated to have a measurable effect on the timber harvesting land base. Typically, forest stands identified for fuels treatments are highly constrained for conventional logging and are often in undesirable or uneconomic stand types. However, as the CFGP imposes a variable retention system, there is a potential opportunity to collaborate with the community forest manager on commercial thinning projects that meet multiple objectives, including fuel management.

3.5 HAZARDOUS VALUES

Hazardous values are defined as values that pose a safety hazard to emergency responders. The industrial sites and facilities that can be considered hazardous values are listed in Table 10. The recycling Centre collects solid waste and recyclables, including household and industrial organic waste and a variety of household hazardous materials and/or combustible materials (e.g., tires, vehicle batteries, propane tanks, oil and oil filters and containers). Additional hazardous structures on the island include two gas stations. Anywhere combustible materials, explosive chemicals, or gas is stored can be

²⁵ Cortes Community Forest Cooperative. 2019. *About*. Retrieved from: <https://cortescommunityforestcoop.org/what-we-do>



considered a hazardous value. Protecting hazardous values from fires is important to preventing interface fire disasters.

The management and treatment of fuels in proximity to hazardous infrastructure is critical in order to reduce the risks associated with both structural fire and wildfire. Specifically, best management practices recommended for management of hazardous values include: 1) incorporating FireSmart planning and setback requirements for all infrastructure in this category; and 2) maintaining emergency fuel/propane emergency shut off procedures to be enacted immediately and efficiently in the event of an approaching wildfire or ember shower.

Table 10. Hazardous Infrastructure Identified in CWPP field visits.

Hazardous Infrastructure Name	2018 Location
Recycling Centre	Squirrel Cove Rd, Mansons Landing, BC VOP 1K0
Gas Station (x2)	Squirrel Cove Trading Post - 1611 Forrest Rd, Squirrel Cove, BC VOP 1T0 Gorge Harbour Marina Resort, Hunt Road, Whaletown VOP 1Z0



SECTION 4: WILDFIRE RISK

This section summarizes the factors that contribute to and were assessed in the determination of wildfire risk around the community. These factors include the natural fire regime and ecology, the Provincial Strategic Threat Analysis, and the local wildfire risk analysis completed for the AOI.

The relationship between wildfire hazard, threat and risk is defined as follows:

$$\textit{Wildfire risk} = \textit{Probability} \times \textit{Consequence}$$

Where:

- **Wildfire risk** is defined as the potential losses incurred to human life, property and critical infrastructure within a community in the event of a wildfire;
- **Probability** is the likelihood of fire occurring in an area and is related to the susceptibility of an area to fire (fuel type, climate, probability of ignition etc.); and
- **Consequences** refer to the repercussions associated with fire occurrence in a given area (higher consequences are associated with densely populated areas, or areas of high biodiversity etc.).

4.1 FIRE REGIME, FIRE WEATHER AND CLIMATE CHANGE

The ecological context of wildfire and the role of fire in the local ecosystem under historical conditions is an important basis for understanding the current conditions and the potential implications of future conditions on wildfire risk to a community. Historical conditions may be altered by the interruption of the natural fire cycle (i.e., due to fire exclusion, forest health issues, human development) and/or climate change.

4.1.1 Fire Regime and Fire Weather

Historic Fire Regime

The Biogeoclimatic Ecosystem Classification (BEC) system classifies the province into zones by vegetation, soils, and climate. Regional subzones are derived from relative precipitation and temperature. Subzones may be further divided into variants based upon climatic variation and the resulting changes in the vegetative communities; variants are generally slightly drier, wetter, snowier, warmer, or colder than the climate of the regional subzone.²⁶ BEC zones have been used to classify the Province into five Natural Disturbance Types (NDTs). NDTs have influenced the vegetation dynamics and ecological functions and pathways that determine many of the characteristics of our natural systems. The NDT classification is based on the frequency and severity of pre-European disturbance events (including but limited to wildfires) and provides an indication of historical fire regime. The physical and temporal patterns, structural complexity, vegetation communities, and other resultant attributes of NDT types should be used to help design fuel treatments, and where possible, to help ensure that treatments

²⁶BECWeb: <https://www.for.gov.bc.ca/HRE/becweb/resources/classificationreports/subzones/index.html>

are ecologically and socially acceptable.²⁷ The AOI is characterized by the BEC subzones and associated NDTs as outlined in Table 11 and Map 4.

Almost the entirety of Cortes Island is classified as Coastal Western Hemlock very dry maritime (CWHxh1). A small portion of the north island, outside of the AOI, is classified as CWH dry maritime (CWHdm). Although a small part of the AOI overlaps the drier Coastal Douglas Fir moist maritime (CDFmm) on Hernando Island, there is no CDFmm on Cortes Island.

Table 11. BEC zones and natural disturbance types found within the AOI²⁸

Biogeoclimatic Zone	Natural Disturbance Type	Area (ha)	Percent (%)
CDFmm: Coastal Douglas-fir, Moist Maritime	NDT2	918.81	5%
CWHxm1: Coastal Wester Hemlock, Very Dry Maritime	NDT2	16,328.43	95%

The AOI is entirely characterized as Natural Disturbance Type 2 (NDT2): ecosystems with infrequent stand-initiating events. NDT2 ecosystems can be generalized as even-aged forest stands with extended post-fire regeneration periods. As a result, uneven-aged tendencies (i.e., patch dynamics) can occur when forested areas remain undisturbed for significant periods of time. Fires are often moderate in size (20 – 1000 ha), with unburned areas resulted from sheltering terrain features and high site moisture. Fires have historically resulted in a a mosaic of mature forests across the landscape interspersed with younger forests. The mean return interval for fires and disturbances in the NDT2 has generally been 200 years. The fire regime in the CDFmm and CWHxm1 has been modified by human activities during the last century, which include forest harvesting and fire suppression.¹¹

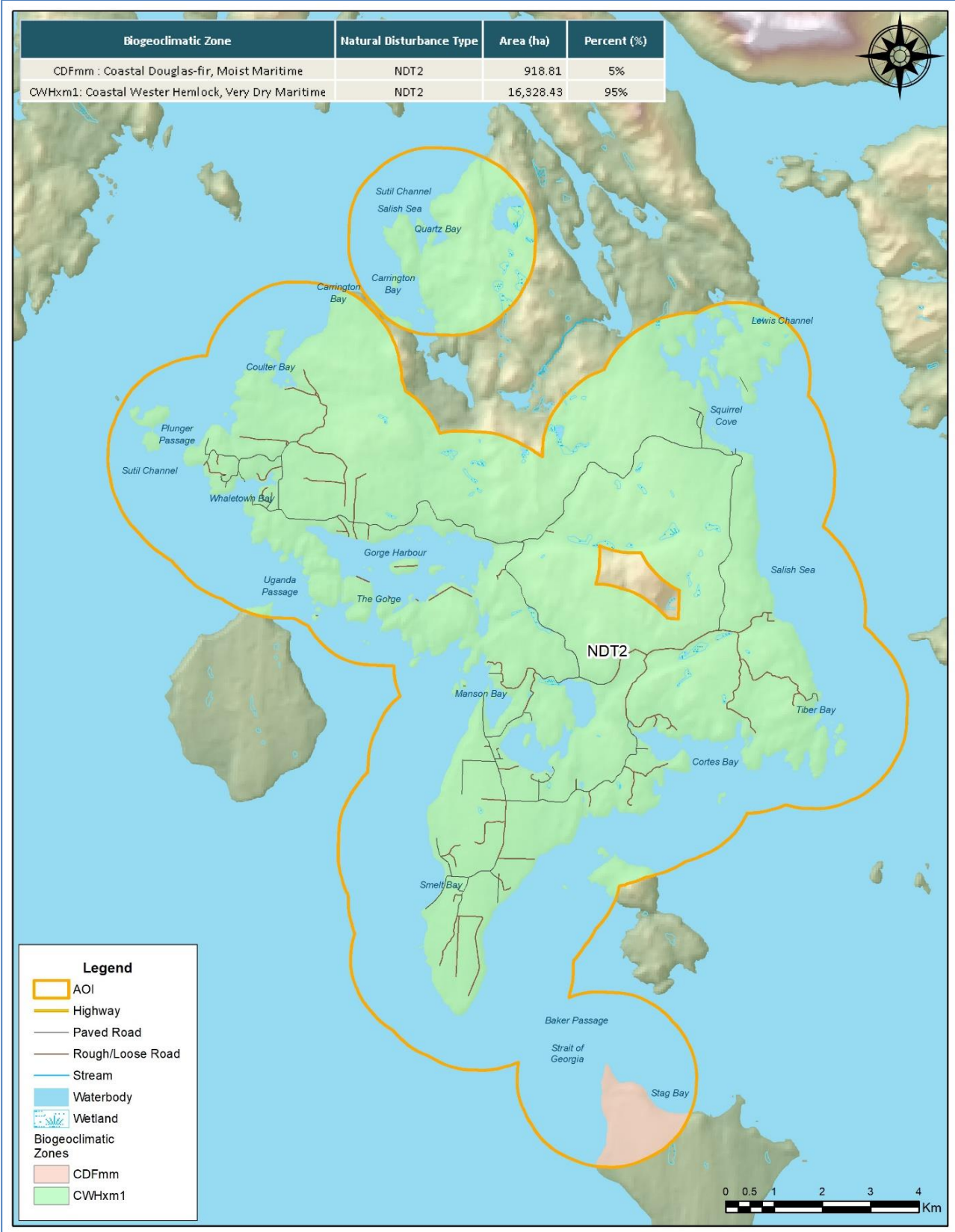
NDT 2 comprises forest ecosystems (CDF and CWH) with infrequent stand initiating fire or disease events¹². Fires historically were moderate of size, with many larger fires occurring after periods of extended drought. Long post-fire regeneration periods produced multi-storied forest canopies, with extensive areas of mature forests surrounding patches of younger stands. As a result of major fires that have occurred, the landscape consists of extensive areas of even-aged stands with snags and veteran trees that have endured previous fires.

While natural disturbance regimes are useful for describing the historical disturbance pattern typical for an area, fire history is complex and highly variable across space and time for many ecosystems.²⁹ Furthermore, forest health issues, human development and natural events contribute to changes in the fire regime, forest attributes and fuel hazard around the community.

²⁷ Province of British Columbia, 1995. Biodiversity Guidebook.

²⁸ MFLNRORD BEC Map (DataBC)

²⁹ Hall, E. 2010. Maintaining Fire in British Columbia's Ecosystems: An Ecological Perspective. Report submitted to the Wildfire Management Branch, Ministry of Forests and Range.



Map 4. Biogeoclimatic Zones and natural disturbance regimes within the AOI



Forest Health Issues

The 2015-2017 Coastal Timber Supply Areas Forest Health Overview outlines forest health issues and best management practices by Natural Resource District. The Sunshine Coast District is applicable to the AOI.³⁰ In comparison to other coastal regions, the Sunshine Coast District's timber supply loss due to pests and abiotic damaging agents is minor. Damaging agents responsible for the most significant annual unsalvageable loss throughout the District include Western blackheaded budworm and episodic windthrow events. In drier regions of the District, laminated root rot may be present in young Douglas-fir stands.

These forest health factors have implications for the level of surface fuel accumulation in affected stands, as well as access and working conditions for fire fighters in the event of wildfire. Standing dead and downed Douglas fir and hemlock were observed during the field visit and contributed to the hazard rating of some stands.

Human Development and Natural Events

Most land cover change in the AOI can be described as interface development, forestry operations, or natural disturbance. Forest harvesting of small cutblocks with high retention occurs on Crown land throughout the AOI, increasing the proportion of C-5 fuel types. Interface development in the region is mainly characterized as small land clearings on private lots. The overall implication of human development is an increase in human ignition potential and an increase in interface and intermixed development areas. Forest harvesting and land clearing generally increases the slash (S-1 to S-3) and mixed conifer/deciduous (M-1/2) fuel types on the landscape as stand development occurs. During field visits, it was noted that slash in areas harvested under dispersed retention was generally low and was abated through decomposition in blocks that were harvested 3-5 years prior.

Fire Weather Rating

The Canadian Forestry Service developed the Canadian Forest Fire Danger Rating System (CFFDRS) to assess fire danger and potential fire behaviour. Fire Danger Classes provide a relative index of the ease of ignition and the difficulty of suppression. A network of fire weather stations is maintained during the fire season by MFLNRORD and the recorded data are used to determine fire danger, represented by Fire Danger Classes, on forestlands within a community. The information can be obtained from the BCWS and is most commonly utilized by municipalities and regional districts to monitor fire weather, restrict high risk activities when appropriate, and to determine hazard ratings associated with bans and closures.

The BC *Wildfire Act* [BC 2004] and *Wildfire Regulation* [BC Reg. 38/2005], which specify responsibilities and obligations with respect to fire use, prevention, control and rehabilitation, and restrict high risk activities based on these classes. Fire Danger Classes are defined as follows:

- **Class 1 (Very Low):** Fires are likely to be self-extinguishing and new ignitions are unlikely. Any existing fires are limited to smoldering in deep, drier layers.

³⁰ BC FLNRORD. 2015. Coast Area: 2015-17 Coastal Timber Supply Areas Forest Health Overview. Retrieved from: https://www.for.gov.bc.ca/ftp/HFP/external/!publish/Forest_Health/TSA_FH_Strategies/2015-Coast%20FH%20Strategy.pdf



- **Class 2 (Low):** Creeping or gentle surface fires. Ground crews easily contain fires with pumps and hand tools.
- **Class 3 (Moderate):** Moderate to vigorous surface fires with intermittent crown involvement. They are challenging for ground crews to handle; heavy equipment (bulldozers, tanker trucks, and aircraft) are often required to contain these fires.
- **Class 4 (High):** High-intensity fires with partial to full crown involvement. Head fire conditions are beyond the ability of ground crews; air attack with retardant is required to effectively attack the fire's head.
- **Class 5 (Extreme):** Fires with fast spreading, high-intensity crown fire. These fires are very difficult to control. Suppression actions are limited to flanks, with only indirect actions possible against the fire's head.

It is important for the development of appropriate prevention programs that the average exposure to periods of high fire danger is determined. 'High fire danger' is considered as Danger Class ratings of 4 (High) and 5 (Extreme). Danger class days were summarized to provide an indication of the fire weather in the AOI. Considering fire danger varies from year to year, historical weather data can provide information on the number and distribution of days when the AOI is typically subject to high fire danger conditions, which is useful information in assessing fire risk.

Figure 2 displays the average frequency of danger class days between the months of April and October. The data summarized comes from the TS Maurelle BCWS weather station, which is located on Maurelle Island and provides a 10-year fire weather data collection interval for the AOI. See Figure 3 for BCWS weather stations surrounding the AOI. According to Figure 2, fire weather in the AOI is the highest from July to September. There is an average of 8-16 days with 'high' or 'extreme' danger class days during each of these months. August has the most severe fire weather on average, with 16 days of high, or extreme fire danger. There are historically 3-7 'high' danger class days each in May, June, September, and October, demonstrating the potential for ignitions during warm and dry periods in the early summer and fall.

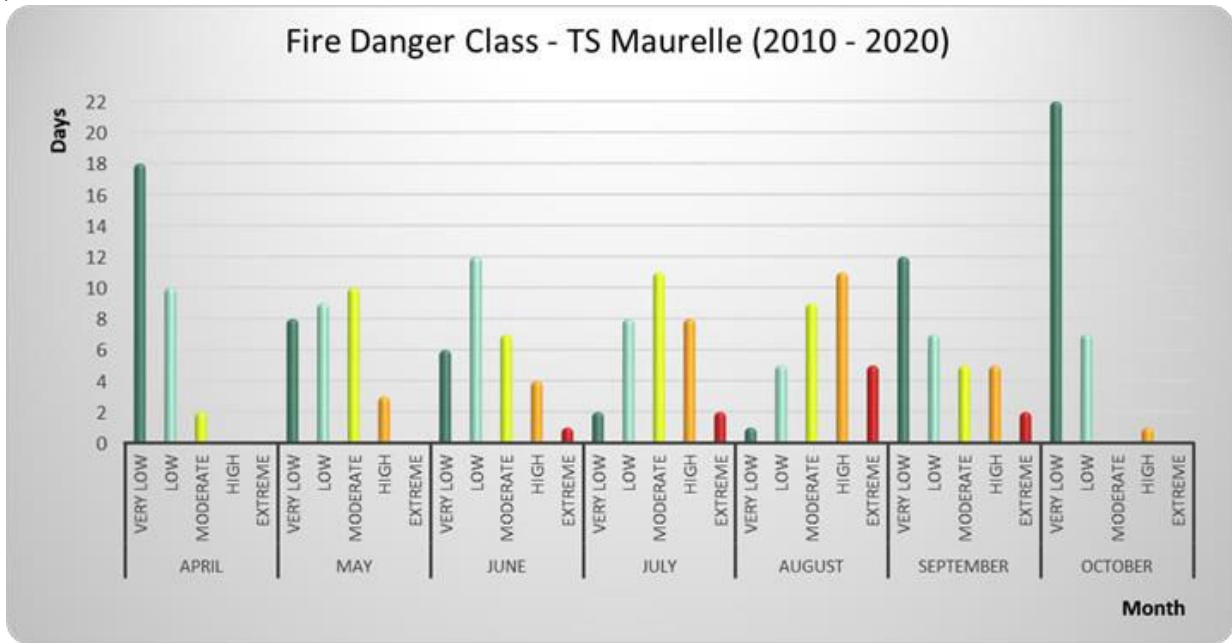


Figure 2. Average number of danger class days for the TS Maurelle fire weather station. Summary of fire weather data for the years 2010-2020.

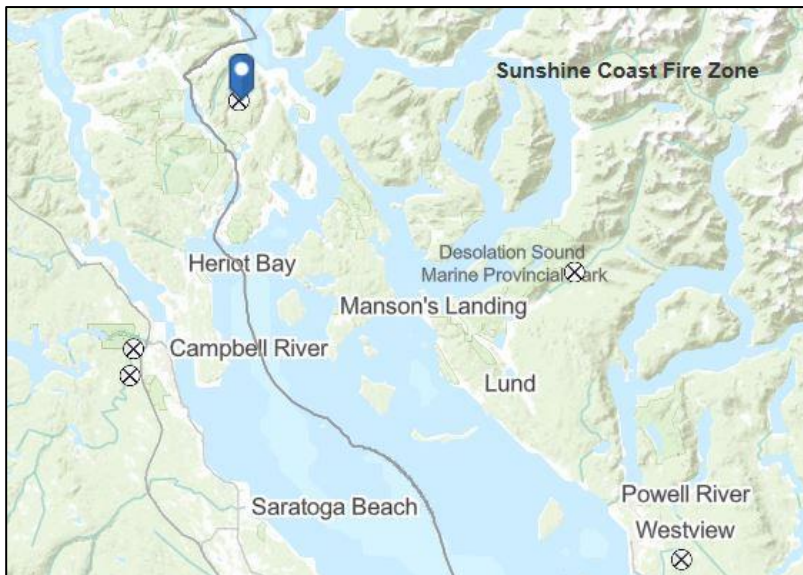


Figure 3. BCWS fire weather stations located in the Sunshine Coast Fire Zone and surrounding areas. TS Maurelle fire weather station is highlighted.



4.1.2 Climate Change

Climate change is a serious and complex aspect to consider in wildfire management planning. Numerous studies outline the nature of climate change impacts on wildland fire across Canada, and globally.³¹ Although there are uncertainties regarding the extent of these impacts on wildfire, it is clear that the frequency, intensity, severity, duration and timing of wildfire and other natural disturbances is expected to be altered significantly with the changing climate.³² Despite the uncertainties, trends within the data are visible.

As outlined the *Climate Summary for the West Coast*³³ the following climate predictions for the West Coast of BC are made, including Cortes Island:

- Year-round moderate increases in temperature (an increase in mean temperature of 1.4° C by the 2050s)
- Decline in summer precipitation by approximately 10% by the 2050s. This trend is associated with drier fuels and soils, increasing fire behaviour potential.
- Increase in precipitation in other seasons - annual average of +6% by 2050s.
- A decrease in snowfall of 28% in the winter and 51% in the spring by the 2050s. Maritime watersheds that shift from rain/snow-driven to rain-driven hydrological regime will likely experience the greatest shift in flow patterns, and resultant soil and groundwater storage.³⁴
- An additional 22 frost-free days and +327 growing degree days by the 2050s.

An increased frequency of natural disturbance events is expected to occur as a result of climate change with coincident impacts to ecosystems.^{37, 35} These include:

- Storm events, including catastrophic blowdown and damage to trees from high winds;
- Wildfire events and drought and;
- Increased winter precipitation which may result in slope instability, mass wasting, increased peak flows (loss of forest cover from fire or other disturbance may increase the chance of mass wasting) and;
- Severe river flooding and severe coastal storm surges, although these events are less likely to occur than preceding impacts.

Other research regarding the intricacies of climate change and potential impacts on wildfire risks to Canadian forests has found that:

³¹ Flannigan, M.D et al. 2009. Implications of changing climate for global wildland fire. *International Journal of Wildland Fire* 18, 483-507.

³² Dale, V., L. Joyce, S. McNulty, R. Neilson, M. Ayres, M. Flannigan, P. Hanson, L. Irland, A. Lugo, C. Peterson, D. Simberloff, F. Swanson, B. Stocks, B. Wotton. *Climate Change and Forest Disturbances*. *BioScience* 2001 51 (9), 723-734.

³³ Pacific Climate Impacts Consortium. *Climate Summary- West Coast*. 2013.

https://pacificclimate.org/sites/default/files/publications/Climate_Summary-West_Coast.pdf

³⁴ MFLNRO, 2016. BC Provincial Government extension note 'Adapting natural resource management to climate change in the West and South Coast Regions'. Accessed online at: <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nrs-climate-change/regional-extension-notes/coasten160222.pdf>

³⁵ BC Provincial Government. 2020. Preliminary Strategic Climate Risk Assessment. Retrieved from:

<https://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/risk-assessment>



- Fuel moisture is highly sensitive to temperature change and projected precipitation increases will be insufficient to counteract the impacts of the projected increase in temperature. Results conclude that future conditions will include drier fuels and a higher frequency of extreme fire weather days.³⁶
- The future daily fire severity rating (a seasonally cumulative value) is expected to have higher peak levels and head fire intensity is expected to increase significantly in Western Canada. A bi-modal (spring-late summer) pattern of peak values may evolve to replace the historical late summer peak which is the current norm.³⁷The length of fire seasons is expected to increase and the increase will be most pronounced in the northern hemisphere, specifically at higher latitude northern regions. Fire season severity seems to be sensitive to increasing global temperatures; larger and more intense fires are expected and fire management will become more challenging.^{38, 39}
- Incidence of foliar and stem pests and diseases such as spruce beetles, swiss needle cast, and western hemlock loopers may become more frequent in response to changes in season moisture.

In summary, climate scientists expect that the warming global climate will trend towards wildfires that are increasingly larger, more intense and difficult to control. Furthermore, it is likely that these fires will be more threatening to WUI communities due to increased potential fire behaviour, fire season length, and fire severity.

4.2 PROVINCIAL STRATEGIC THREAT ANALYSIS

The BCWS Provincial Strategic Threat Analysis (PSTA) evaluates multiple datasets to provide a coarse (high-level) spatial representation of approximate relative wildfire risks across BC. It provides a starting point to assess the local wildfire risk. Three inputs are combined to create the PSTA wildfire risk analysis component:⁴⁰

- 1) **Historic fire density:** represents the ignition and fire spread potential based upon historic patterns and fire density weighted by fire size (larger fire perimeters were given a higher weight in order to reflect the greater cost and damage usually associated with larger fires).
- 2) **Spotting impact:** represents the ability of embers or firebrands from a burning fire to be sent aloft and start new fires in advance of the firefront, or outside of the fire perimeter. Spotting is most associated with high intensity crown fires in coniferous fuels and structure losses. For the

³⁶ Flannigan, M.D., B.M. Wotton, G.A. Marshall, W.J. deGroot, J. Johnston, N. Jurko, A.S. Cantin. 2016. *Fuel moisture sensitivity to temperature and precipitation: climate change implications*. Climatic Change (2016) 134: 59 -71. Accessed online at <https://link.springer.com/content/pdf/10.1007%2Fs10584-015-1521-0.pdf>.

³⁷ deGroot, W. J., M. D. Flannigan, A.S. Cantin. 2013. *Climate change impacts on future boreal fire regimes*. Forest Ecology and Management. 294: 35 -44.

³⁸ Flannigan, M.D., A.S. Cantin, W.J. de Groot, M. Wotton, A. Newbery, L.M. Gowman. 2013. *Global wildland fire season severity in the 21st century*. Forest Ecology and Management (2013) 294: 54 - 61.

³⁹ Jandt, R. 2013. Alaska Fire Science Consortium Research Brief 2013-3.

⁴⁰ BC Wildfire Service. 2017. Provincial Strategic Threat Analysis: 2017 Update. Retrieved from: ftp://ftp.for.gov.bc.ca/HPR/external/!publish/PSTA/Documents/Provincial%20Strategic%20Threat%20Analysis_2017%20Update.pdf.



wildfire risk analysis, the spotting analysis is based on estimating the threat to a given point on the landscape from the fuels surrounding it, up to a distance of 2 km. Spotting distances greater than 2 km are rare and unpredictable.

- 3) **Head fire intensity (HFI):** represents the intensity (kW/m) of the fire front. HFI is correlated with flame length and fire behaviour. The greater the fire intensity (kW/m), or HFI and fire intensity class, the more extreme the fire behaviour is likely to be and the more difficult the fire will likely be to suppress. The HFI used in the wildfire risk analysis was developed using the 90th percentile fire weather index value.

The final wildfire risk analysis value was developed through an average weighting process of the aforementioned three layers.⁴¹ The values were then separated into 10 classes (1 – 10) which represent increasing levels of overall fire threat (the higher the number, the greater the fire threat); threat class 7 is considered the threshold. Threat classes of 7 and higher are locations where the threat is severe enough to potentially cause catastrophic losses in any given fire season, when overlapping with values at risk. Classes were grouped into the following general threat class descriptions: low (1 – 3); moderate (4 – 6); high (7 – 8); and, extreme (9 – 10).

There are considerable limitations associated with the PSTA wildfire risk analysis component based upon the accuracy of the source data and the modelling tools, the most notable being:

- Limited accuracy and variability of the fire history point data;
- Sensitivity to fuel type and the associated limitations of using fuel type approximations for fire behaviour modelling; and,
- 90th percentile rating for HFI, which represents a near worst-case scenario which may be artificial in some circumstances.

Consequently, the PSTA is complemented by a finer scale local wildfire risk analysis considering local factors to improve the wildfire risk assessment. The key steps to completing the local wildfire risk analysis and a detailed assessment of the local wildfire risk are described in Section 4.3 and Appendix A – Local Wildfire risk Process.

The fire threat ratings from the 2019 PSTA are summarized for the AOI in

Table 12 and spatially illustrated in Map 5. Approximately one third of the AOI (28%) is categorized as private land and has no data for wildfire risk in the PSTA dataset. Low threat areas cover 2% of the AOI and water covers 48%. Approximately 21% of the AOI is categorized as having a moderate wildfire risk rating in the provincial Wildfire risk Analysis (

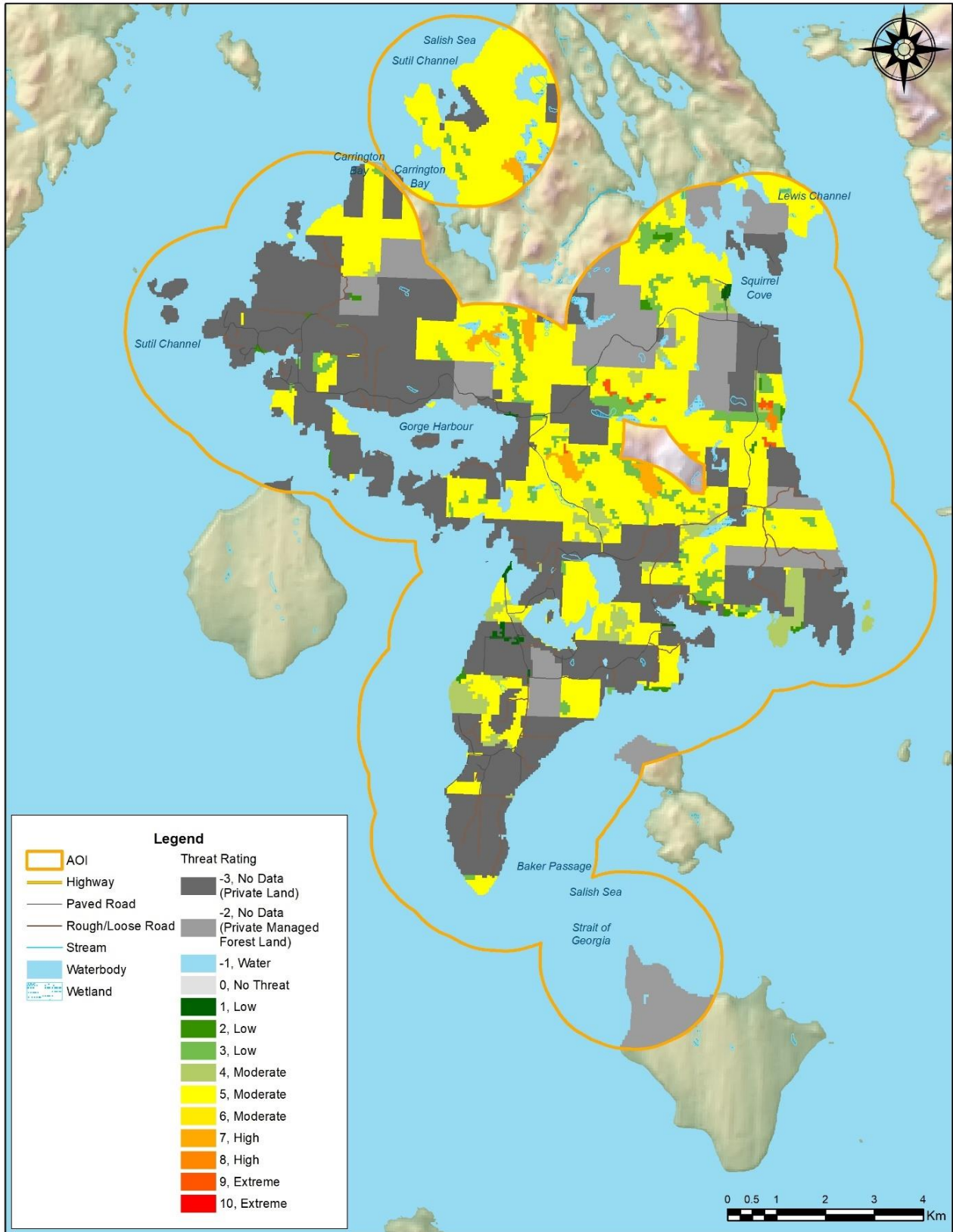
Table 12). High and extreme threat rating covers 1% of the study area, with the most notable high-threat areas being concentrated around Whaletown Road.

⁴¹ Weighting of the three PSTA wildfire threat analysis components: Fire density 30%; HFI 60%; spotting impact 10% (water bodies were automatically given a value of 'no threat' [-1])



Table 12. Overall PSTA Wildfire risk Analysis for the AOI (rounded to the nearest hectare)

Threat Class	Area (ha)	Threat Class Description	Percent of AOI
-3	3544.6	No Data (Private Land)	21%
-2	1255.3	No Data (Private Managed Forest Land)	7%
-1	8285.3	Water	48%
0	0.0	No Threat	0%
1	22.8	Low	2%
2	40.5		
3	350.9		
4	298.8	Moderate	21%
5	3325.2		
6	0.0		
7	99.4	High	1%
8	7.5		
9	17.0	Extreme	0%
10	0.0		
Total	17247.2	-	100%



Map 5. Provincial Strategic Threat Rating



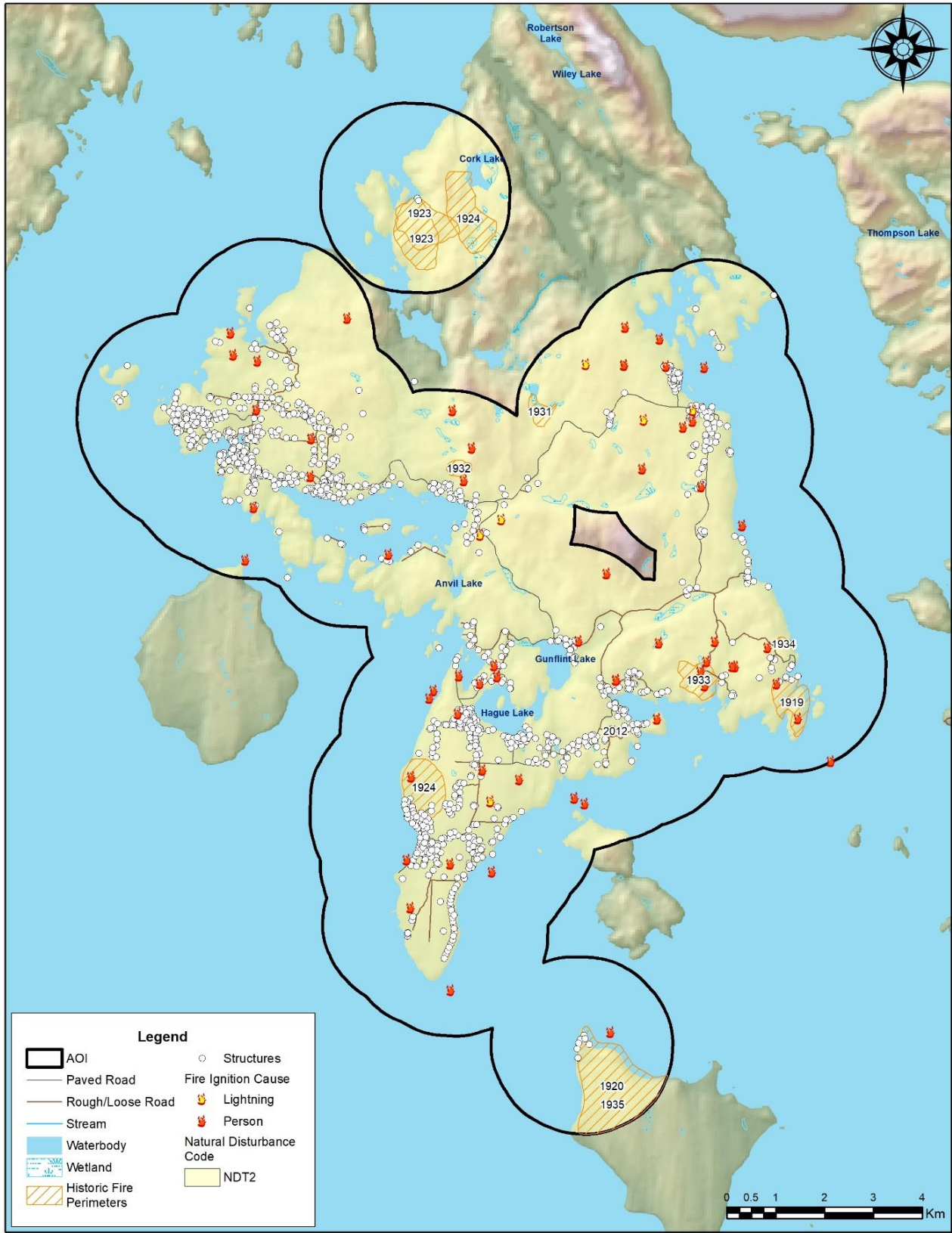
4.2.1 Fire History

Fire ignition and perimeter data are depicted in Map 6. The following PSTA fire ignition data is available from 1950-2018 and fire perimeter data is available from 1919-2018 for the area. Based on the BCWS historical wildfire dataset and several moderate size (~90- 105 hectares) fires burned in the AOI in the 1920s and 1930s. Fire incidents are more prevalent in the northwest portion of the AOI, and are scattered throughout the southern area of the island. This ignition data shows that within the AOI, approximately 90% of ignitions since 1950 have been human-caused (a conservative estimate not including miscellaneous and undetermined causes). Open burning was identified by BCWS as the cause of most human-caused ignitions.

Much larger historical fires have occurred in neighboring jurisdictions of the SRD. Quadra Island has experienced much more fire activity with a 1925 fire burning approximately 58% of the island at 15,908 ha in size. Likewise, the Sayward fire of 1938 on Vancouver Island burned approximately 25,000 ha and profoundly impacted the region. These fires occurred in similar fuels and within the same regional climate, suggesting that in the absence of active fire suppression, Cortes Island is capable of supporting similar fires during prolonged periods of high to extreme fire danger.

No fires have occurred on Cortes Island since 2012. The most recent fires on Cortes Island have all been small spot fires, mainly due to open burning. Six fires have burned in the AOI between 2005 and 2012, with the largest one only reaching 0.2 ha in size (~45 by 45 m). Regional BCWS representatives indicated that the most volatile fuel type in the fire zone represents areas of logging slash and dry, open rocky sites, as well as any site exhibiting continuous horizontal or vertical fuels such as a densely stocked forest stand.

BCWS has limited capabilities of monitoring and enforcing slash piling and slash burning within the AOI due to the remoteness of the island and the lack of a BCWS fire base. Although there have been no recent issues with the Wildfire Act compliance recorded, piled slash accumulations on private land and dispersed slash accumulations following logging and right-of-way clearing, particularly next to private mills and under powerlines, can become a wildfire hazard. Furthermore, as the Cortes Recycling Centre does not accept yard waste, private homeowners often burn yard waste, which has the potential of resulting in an escaped fire. Continuing the SRD driveway chipping program initiated in 2020 will mitigate this risk.



Map 6. Fire Regime, Ecology and Climate Change



4.3 LOCAL WILDFIRE THREAT ASSESSMENT

The local wildfire threat assessment process includes several key steps as outlined in Appendix A – Local Wildfire risk Process and summarized as follows:

- Fuel type attribute assessment, ground truthing/verification and updating as required to develop a local fuel type map (Appendix A-1).
- Consideration of the proximity of fuel to the community, recognizing that fuel closest to the community usually represents the highest hazard (Appendix A-2).
- Analysis of predominant summer fire spread patterns using wind speed and wind direction during the peak burning period using ISI Rose(s) from BCWS weather station(s) (Appendix A-3). Wind speed, wind direction, and fine fuel moisture condition influence wildfire trajectory and rate of spread.
- Consideration of topography in relation to values (Appendix A-4). Slope percentage and slope position of the value are considered, where slope percentage influences the fire's trajectory and rate of spread and slope position relates to the ability of a fire to gain momentum uphill.
- Stratification of the WUI according to relative wildfire risk based on the above considerations, other local factors and field assessment of priority wildfire risk areas.

WUI Threat Assessments were completed over five field days in July of 2020, in conjunction with verification of fuel types (see Appendix C – Wildfire risk Assessment Worksheets and Photos). WUI Threat Assessments were completed in interface (i.e., abrupt change from forest to residential development) and intermix (i.e., where forest and structures are intermingled) areas of the AOI to support development of priority treatment areas, and in order to confidently ascribe threat to polygons which may not have been visited or plotted, but which have similar fuel, topographic, and proximity to structure characteristics to those that were.

Field assessment locations were prioritized based upon:

- Proximity to values at risk – Field assessments were clustered in the intermix and interface, as well as around critical infrastructure.
- Prevailing fire season winds – More field time was spent assessing areas upwind of values at risk, especially in potential locations for landscape-level fuel breaks.
- Local knowledge – Areas identified as hazardous, potentially hazardous, with limited access/egress, or otherwise of particular concern as vulnerable to wildfire, as communicated by local fire officials and community forest representatives
- Observations – Additional areas potentially not recognized prior to field work were visually identified as hazardous and assessed during the week.
- Verifying provincial classification – areas classified as high threat in the provincial PSTA dataset, or with an uncommon fuel type, were assessed to ground-truth the fuel type and threat, even if they were relatively far from values

A total of 48 WUI threat plots were completed and over 400 other field stops (e.g., qualitative notes, fuel type verification, and/or photograph documentation) were made across the AOI (see Appendix F

for WUI threat plot locations). Although plots were concentrated in the areas listed above, observations were made in all parts of the AOI that had road or trail access, in order to build the most accurate assessment of local fire threat possible.

Using the verified and updated fuel types (Appendix A-1, Map 14) combined with field wildfire threat assessments and office-based analysis (Appendix A-1 to A-4), local wildfire threat for the AOI was updated. Using the Wildfire Threat Assessment methodology,⁴² there are two main components of the threat rating system: the wildfire behaviour threat class (fuels, weather and topography sub-components) and the WUI threat class (structural sub-component).

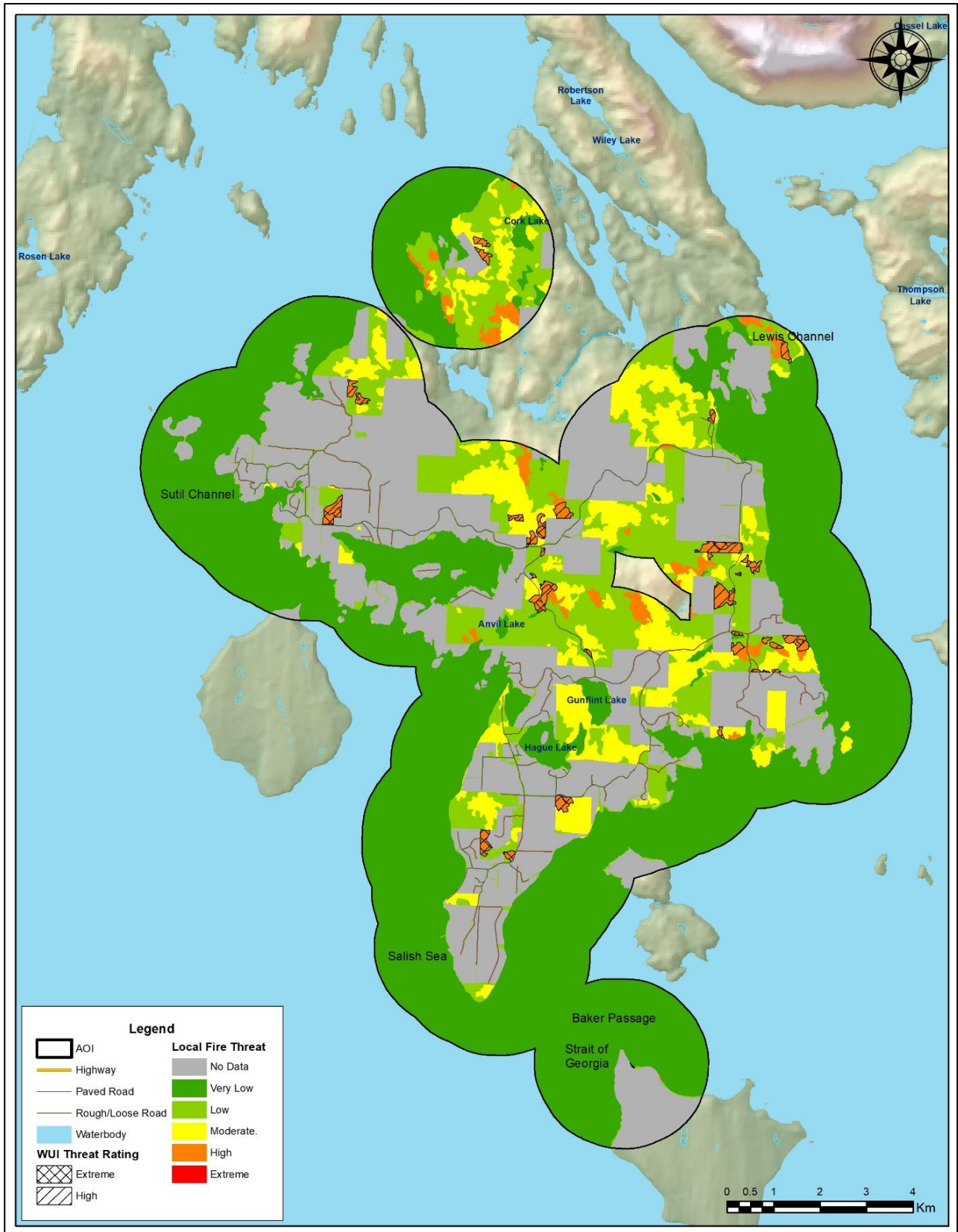
The result of the analysis shows that the AOI is composed of a mosaic of low, moderate and high threat class stands; the variability in wildfire risk is dictated primarily by the level of natural and anthropogenic disturbances that have historically occurred and persist on the land base. The AOI is 2% high threat class rating, 8% moderate, 14% low and 48% very low/water (Table 13). The remaining 28% of the AOI is classified as private land and as such has not been allocated fire threat data. Table 13 also indicates the differences between the original PSTA threat rating and this CWPP's corrected fire behaviour threat.

For detailed field data collection and spatial analysis methodology for the local threat assessment and classification, please see Appendix H – WUI Threat Assessment Methodology.

Table 13. Fire behaviour threat summary for the AOI.

Wildfire Behaviour Threat Class	2019 PSTA Data	2020 CWPP
	Percent of AOI	Percent of AOI
Extreme	0.0%	0.0%
High	1.0%	2.0%
Moderate	21.0%	8.0%
Low	2.0%	14.0%
Very Low/ No Threat (Water)	48.0%	48.0%
No Data (Private Land and Private Managed Forest Land)	28.0%	28.0%

⁴² UBCM. 2013. Wildland Urban Interface Threat Assessments in BC. Retrieved from: (<https://www.ubcm.ca/assets/Funding~Programs/LGPS/SWPI/Resources/swpi-WUI-WTA-Guide-2012-Update.pdf>)



Map 7. Local Fire Behaviour Threat Rating and WUI Threat Rating



SECTION 5: RISK MANAGEMENT AND MITIGATION FACTORS

Development of a successful wildfire risk mitigation strategy is dependent on hazard identification within the community, which accounts for forest fuels, high risk activities, frequency and type of human use, and other important environmental factors. The resulting wildfire risk management and mitigation strategy aims to build more resilient communities and produces strategic recommendations or actionable items that can be categorized as follows:

1. Fuel management opportunities to reduce fire behaviour potential in the WUI;
2. Applications of FireSmart approaches to reduce fire risk and impacts within the community and;
3. Implementation of communication and education programs to inform and remind the public of the important role it plays in reducing fire occurrence and impacts within its community.

5.1 FUEL MANAGEMENT

Fuel management, also referred to as vegetation management or fuel treatment, is a key element of wildfire risk reduction. For the purpose of this discussion, fuel management generally refers to native vegetation/fuel modifications in forested areas greater than 30 m from homes and structures (FireSmart priority Zone 3 and beyond).

No fuel treatments on public land have been completed within the AOI since development of the 2011 CWPP. Proposed fuel treatment areas from the prior CWPP were assessed in the field and were recommended for treatment in this CWPP if they were a) hazardous b) located on public land. Fuel treatment areas on private land were not proposed, as the assessment of private land as part of the CWPP process is not funded by the current UBCM CRI program. The objectives for fuel management are to:

- Reduce wildfire risk on private and public lands nearest to values at risk; and,
- Reduce fire intensity, rate of spread, and ember/spot fire activity such that the probability of fire containment increases and the impacts on the forested landscape and the watershed(s) are reduced (create more fire resilient landscapes).

Ideally, these objectives will enhance protection to homes and critical infrastructure. Caveats associated with the statement include: 1) wildfire behaviour will only be reduced if the fire burns in the same location as treatments occurred, and 2) protection of homes and critical infrastructure is highly dependent upon the vulnerability to ignition by embers (ignition potential) directly around the value at risk. In summary, fuel treatments alone should not be expected to protect a community from the effects of wildfire, namely structure loss.

Fuel management on local government and provincial Crown land may be funded by the Union of BC Municipalities (UBCM) through the Community Resiliency Investment (CRI) Program (subject to current program requirements) and by MFLNRORD through the Wildfire Risk Reduction (WRR) Program. The CRI Program (formerly the Strategic Wildfire Prevention Initiative or SWPI) also provides funding for selected



FireSmart activities and planning on private land (subject to program requirements and limits).⁴³ It is important to recognize that much of the AOI (33%) is located on private land, which increases some of the challenges encountered in mitigation of fuels on private lands. The best approach to mitigate fuels on private lands is to urge private landowners to comply with FireSmart guidelines (as described below in Section 5.2) and to conduct appropriate fuel modifications using their own resources (CRI program funding may be available).

The fuel treatment opportunities identified in this document include the use of interface and landscape fuel breaks as defined in Section 5.1.1, to reduce the wildfire potential around the AOI. Potential treatment activities include commercial or non-commercial thinning, stand conversion, pruning, surface fuel removal, pile burning, chipping, prescribed burning, or a combination of two or more of these activities.

In addition to the treatment units proposed in the following section, some of which are located adjacent to public roads, it is recommended that the SRD recognize important fuel treatment opportunities to improve emergency access/egress and public safety along community access roads (i.e. Siskin Lane, Mary Point Road, Talbot Way etc.) through reduction of hazardous fuels and landscape level fuel treatments. Some access roads, such as Mary Point Road, do not have adequate turnarounds and require roadside clearing to serve as a safe egress route and should be assessed by the SRD in collaboration with the Ministry of Transportation and Infrastructure (MOTI). Currently, the Tiber Bay community is situated outside of the CIFFA Fire Protection Area (FPA) as there are no turnabouts large enough for rescue vehicles to access the area.

5.1.1 Proposed Treatment Units

Funding opportunities from UBCM under the 2021 CRI Program, specifically under the FireSmart Community Funding and Supports program, will consider fuel management activities in Regional District parks, on municipal land, or First Nations land. Fuel treatments that represent contiguous, logical units that extend onto Crown land or outside of local government boundaries may also be considered for funding through the CRI Program if the fuel management activities are adjacent to community structures and the units extend no further than 1 km from the structure density threshold (density class greater than 6). Eligible activities include development of fuel management prescriptions and burn plans, as well as operational implementation of those plans (treatments or prescribed burns).⁴⁴

Fire prevention activities on private land that may be funded under the CRI Program are related to FireSmart activities (including FireSmart planning and assessments, local rebate programs for completion of eligible FireSmart activities, and provision of off-site disposal of vegetation management debris), subject to program requirements. This does not preclude other current and future funding opportunities or potential industrial partnerships and changes to existing programs.

⁴³ 2019 CRI FireSmart Community Funding & Supports – Program & Application Guide: <https://www.ubcm.ca/assets/Funding~Programs/LGPS/CRI/cr-2019-program-guide.pdf>

⁴⁴ The 2021 CRI program guide is available at <https://www.ubcm.ca/EN/main/funding/lgps/community-resiliency-investment.html>



Funding for fuel treatments located exclusively on Crown land, outside of municipal boundaries, Regional District parks or First Nations land is administered through MFLNRORD under the Crown Land Wildfire Risk Reduction (WRR) program.⁴⁵ These fuel treatment units are in the ‘Landscape Zone’; units within SRD park boundaries eligible for UBCM funding are in the ‘Community Zone’ (Table 14).

The potential treatment areas represent moderate, high or extreme fire hazard areas on public land which are close to values at risk (structures or infrastructure), or have been identified as landscape level fuel breaks. It should be noted that the location of proposed treatment units on public land does not imply that high and extreme hazard areas do not exist on private land within the AOI. As stated in Section 5.1, mitigation approaches should also be pursued on private land where hazard exists, bearing in mind the different funding resources and objectives on these land types. All polygons identified for potential treatment have been prioritized based on fire hazard, operational feasibility, type and number of values at risk, and common fire weather (wind direction).

Although potential treatment areas have been ground-truthed during field work, additional refinement of the polygons will be required at the time of prescription development. Prescription development must be carried out by a qualified forest professional and will require detailed site-level assessment to stratify treatment areas (and areas of no treatment), identify values and constraints, and identify and engage all appropriate provincial agencies, First Nations, and stakeholders.

Recommended potential treatment areas within the AOI are outlined in Table 14 and displayed in Map 7. Fuel treatment opportunities may be a fuel breaks (linear, beginning and ending at an anchor point, and a minimum of 1 km where possible) or polygon treatments (not necessarily forming a continuous fuel break unit or anchored into an anchor point).

The intent of establishing a fuel break (or fuel polygon) is to modify fire behaviour and create a fire suppression option that is part of a multi-barrier approach to reduce the risk to values (e.g., structures). A fuel break in and of itself, is unlikely to stop a fire under most conditions, but rather, should be designed to transition and keep the crown fire to the surface where wildfire crews have suppression opportunities.⁴⁶ The application of appropriate suppression tactics in a timely manner with sufficient resources is essential for a fuel break to be effective. Lofting of embers (i.e., “spotting”) over and across a fuel break is a possibility (increasing with more volatile fuel types and fire weather) and has the potential to create spot fires beyond the fuel break that can expand in size and threaten values at risk, or land directly on or near structures and ignite them. To address spotting, fuels between the fuel break and the values at risk should be evaluated and treated to create conditions where extinguishment of spot fires is possible and FireSmart Standards should be applied to structures and associated vegetation and other fuel to reduce the risk of structures igniting. A multi-barrier approach that reduces the risk to values can include: establishing multiple fuel breaks (fuel breaks and fuel polygons), and applying

⁴⁵ The 2020 -2021 Crown Land Wildfire Risk Reduction Planning Guide is available at

<https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/funding-for-wildfire-prevention/crip/wrr>.

⁴⁶ BC Wildfire Service. 2020. 2020 Fuel Management Prescription Guidance. https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020_fuel_management_prescription_guidance_final.pdf



FireSmart Standards to structures and the surrounding vegetation. Fuel treatment units require periodic maintenance to retain their effectiveness.

Table 14. Proposed Treatment Area Summary Table

FTU Name and Priority	Total Area (ha)	Treatment Unit Type/ Objective	Wildfire Behaviour Threat				Overlapping Values / Treatment Constraints	Treatment Rationale
			High	Mod	Low	Very Low		
ANVIL MOD	31.9	Landscape Fuel Break – Landscape Zone	5.1	0.74	25.9	0.1	Community Forest overlap. Private land abuts the unit to the south and north. Approximately half of the unit lies outside of the current Fire Protection Area. Appropriate riparian buffers on Anvil Lake will have to be considered when treating the unit. Prior to treatment implementation and CFGP should be consulted so that treatment is integrated with licensee planning, and impacts to values can be prevented or mitigated. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This unit is located upwind (northwest) < 600 m of homes along Mansons Bay and ~2km upwind of Gunflint Lake and Hague Lake residents. This unit, in conjunction with Anvil Lake will serve as a NE to SW fuel break for Mansons Landing. The unit is entirely composed of C-5 fuel types and is located at the base of a rocky bluff to the SW. Overstory hemlock mortality has led to moderate surface fuel loading and dead saplings are present throughout the understory. Treat due to proximity to homes and location upwind of values. The CFGP is looking at road building in this area starting in 2022, which would increase treatment feasibility.
CARR HI	26.9	Landscape Fuel Break – Landscape Zone	8.5	4.3	14.7	0.0	The treatment unit lies within the Community Forest, with private land bordering the unit to the west. BC Hydro overhead lines overlap the unit to the southwest. There is overlap with <i>Picea sitchensis/Rubus spectabilis</i> /Very Dry Maritime red-listed ecological community. Prior to treatment implementation, adjacent private land holders, BC Hydro and CFGP should be consulted so that treatment is integrated with licensee planning, and impacts to values can be prevented or mitigated. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This unit is located east ~300 m from homes along Coulter Bay Road and upwind (north) of the Gorgetown community. The unit is composed almost entirely of C-5 fuel types with C-3 fuel types in the north and D-1/2 fuel types to the west. Conifer stem densities are relatively high and suppressed stems and surface loading due to hemlock mistletoe exist. Treatment would create a large interface fuel break and be scheduled to coincide with planned community forest operations in the area. Treat due to location downwind of values and to reduce density and crown continuity; consider commercial thinning.
GRGRD MOD	8.4	Landscape Fuel Break – Landscape Zone	3.8	4.2	0.3	0.0	Private land borders the unit to the SW. Overlap with Klahoose First Nation Woodlot (~40%) and Community Forest (~60%). BC Hydro overhead lines are located along Gorge Harbour road through the treatment unit. Prior to treatment implementation, BC Hydro, adjacent private land holders, Klahoose Woodlot, and the CFGP should be consulted so that treatment is integrated with licensee planning, and impacts to values can be prevented or mitigated. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This unit is located along Gorge Harbour Road and ties in to a wetland to the south. Fuel types are a mix of C-5, mixed (75% conifer) and C-3 with moderate fine fuel loading. Treatment would improve the safety of Gorge Harbour Road as a primary access/egress route.



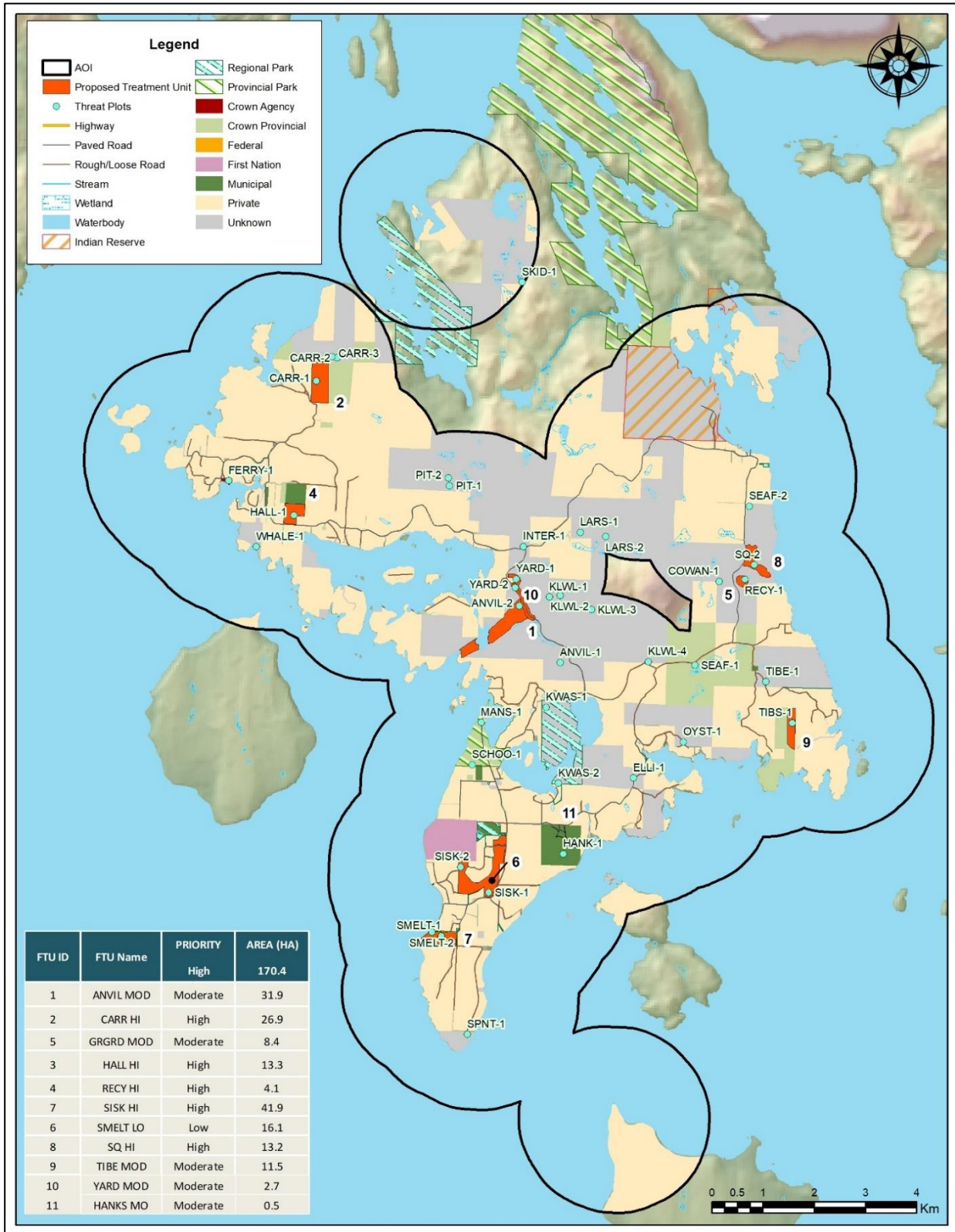
FTU Name and Priority	Total Area (ha)	Treatment Unit Type/ Objective	Wildfire Behaviour Threat				Overlapping Values / Treatment Constraints	Treatment Rationale
			High	Mod	Low	Very Low		
HALL HI	13.3	Interface Fuel Break – Community Zone	12.1	0.0	1.2	0.0	The unit overlaps an SRD Regional Park (Whaletown Commons) and the Whaletown Fire Hall. A heavily used trail network intersects the unit. Private land borders the unit to the west, south and east. Prior to treatment implementation, adjacent private land owners, an ecosystem biologist, CIFFA, and the Land Conservancy of BC should be consulted so that impacts to values can be prevented or mitigated, and treatment aligns with restrictions in the associated land covenant. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This unit surrounds the Whaletown Fire Hall, is <500 m from residences in Whaletown, and ~1000 m downwind from the BC Ferries terminal. High use of the Whaletown Commons trail system increases the likelihood of accidental ignition. The unit is composed almost entirely of hazardous C-3 fuel types result with C-5 and D-1/2 fuel types present in the NW and is the result of historical patch harvesting. Low grand fir crown base heights and suspended dead fuels throughout the unit. Treat due to location close to critical infrastructure and to reduce ladder fuels and debris accumulation; consider trailside treatment. Treatment will increase old-growth attributes of the stand as well as aesthetic/recreational value, by reducing overall stand density and retaining the largest-diameter trees.
RECY HI	4.1	Interface Fuel Break – Landscape Zone	0.6	0.0	3.5	0.0	Community Forest overlap. The Cortes Recycling Centre and Cortes Free Store are located within the unit. No private land borders the unit. Prior to treatment implementation, Recycling Centre stakeholders and CFGP should be consulted so that treatment is integrated with licensee planning, and impacts to values can be prevented or mitigated. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	The unit is located east of Squirrel Cove Road and surrounds hazardous infrastructure (Recycling Centre- flammable materials). Overstorey cedar mortality has led to moderate surface fuel loading and a dense understory. Fuel types are a mix of C-5 and mixed (25% - 75% conifer). Treatment would improve the ability of CIFFA to extinguish a wildfire ignited at or near the Recycling Centre, and increase the resiliency of the surrounding forest to spot fires. A fire at the Recycling Centre was identified by the Wildfire Working Group as a vulnerability.
SISK HI	41.9	Interface Fuel Break – Community Zone	12.6	4.9	24.3	0.0	SRD Regional Park: Siskin Lane Park, partial overlap. Private land borders the unit to the east, south and west. First Nation land borders unit to the NW. Prior to treatment implementation, an ecosystem biologist, adjacent land owners, and the Land Conservancy of BC should be consulted as well as a reconnaissance field visit by Tla’amin First Nation should be completed so that impacts to values can be prevented or mitigated, and treatment aligns with restrictions in the land covenant in Siskin Lane Park. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	The unit is located west of Sutil Point Road, east of Haynes Road and surrounds the Siskin Lane neighbourhood. Structures exist < 60m from the unit both upwind and downwind. The unit is a mosaic of C-5 and hazardous mixed (35% - 75% conifer) fuel types. Dead and suppressed conifers exist throughout overstorey. High use of the trail system increases the likelihood of accidental ignition. Treatment would reduce fire threat to residents of Siskin Lane. Treat due to proximity to homes and to reduce density and suppressed conifers. Treatment will increase old-growth attributes of the stand as well as aesthetic/recreational value, by thinning the dense immature understory conifers that are regenerating and moving the stand towards a C-3/C-4 fuel type.



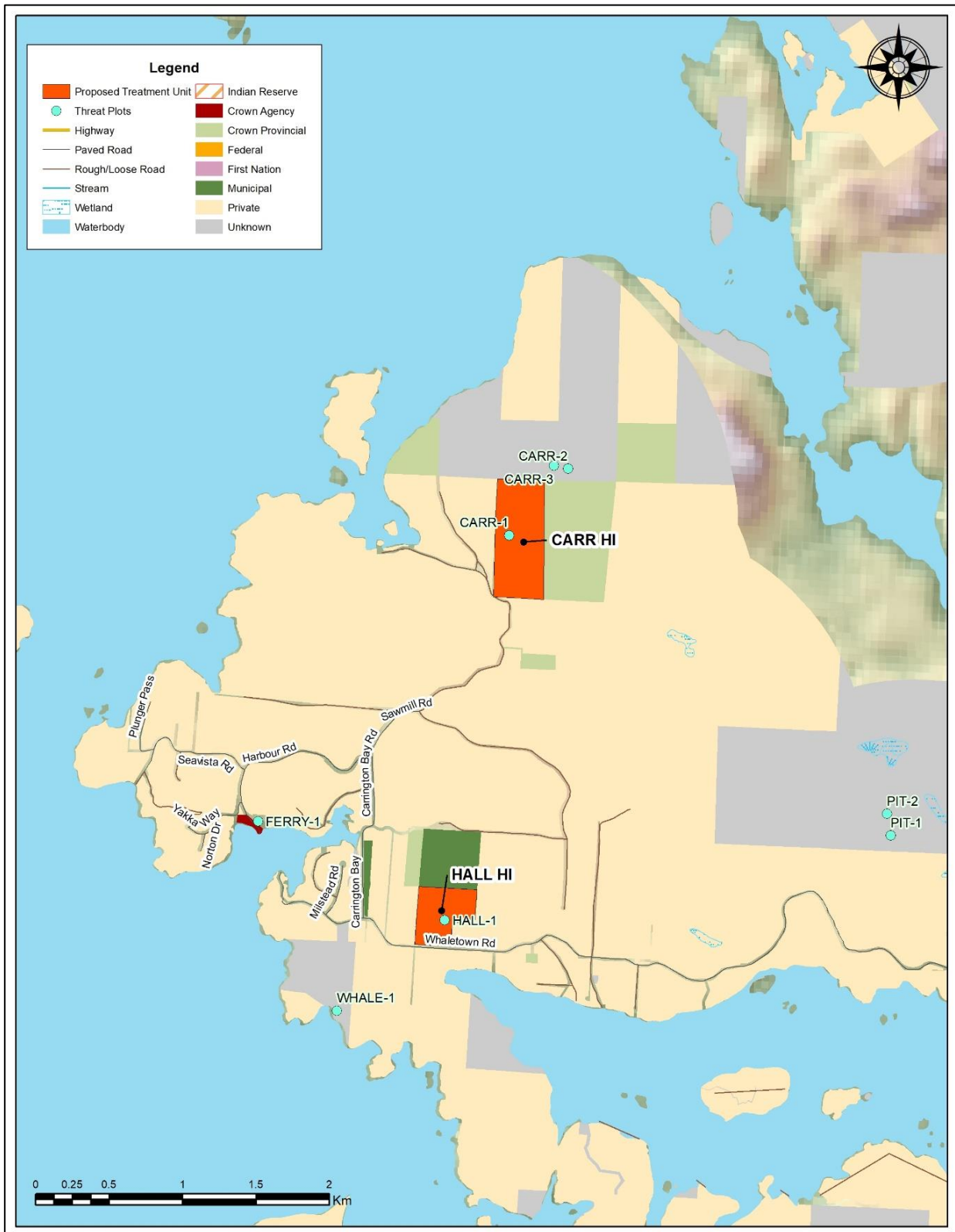
FTU Name and Priority	Total Area (ha)	Treatment Unit Type/ Objective	Wildfire Behaviour Threat				Overlapping Values / Treatment Constraints	Treatment Rationale
			High	Mod	Low	Very Low		
SMELT LO	16.1	Interface Fuel Break – Landscape Zone	12.1	0.0	4.0	0.0	Smelt Bay Provincial Park complete overlap. Private land borders the entire unit. Campsites and a day-use beach are located within the unit. Prior to treatment implementation, BC Parks, MFLNRORD, and adjacent private land owners should be consulted and a professional archeological assessment, as requested by Tla’amin First Nation, should be conducted so that treatment aligns with the management plan for Smelt Bay Provincial Park, and impacts to values can be prevented or mitigated. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	The unit surrounds Sutil Point Road and is located ~50m south (downwind) of private residences. Fuel types are majority C-5, with D-1/2 fuel types located in the day-use area. Low cedar crown base heights and moderate fine fuel loading are present. Campfire pits present an increased risk of accidental wildfire ignition. Treatment would improve wildfire resiliency throughout the park. Treatment will be refined at the prescription phase to address the most hazardous/highly used areas of the park. Treatment to reduce ladder fuels will protect nearby structures and recreation values.
SQ HI	13.1		5.3	3.2	4.6	0.0	Community Forest overlap. Prior to treatment implementation, CFGP should be consulted so that impacts to values can be prevented or mitigated, and treatment is integrated with licensee planning. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	The unit is located east of Squirrel Cove Road and south (downwind) of the Squirrel Cove community. The Wildfire Working Group identified this area as a priority for fuel management. Fuel types are mainly dense C-3, with some C-5 and mixed (60% - 75% conifer). Hemlock stem densities are very high and both horizontal and vertical fuel are continuous. Dead and suppressed conifers are hazardous. Treatment would improve safety of Squirrel Cove Road as a primary access/egress route and reduce local fire threat by reducing density and crown closure continuity.
HANK MOD	0.5	Demonstration Treatment – Landscape Zone	0.1	0.4	0.0	0.0	SRD Regional Park: Hank’s Beach, complete overlap. Private land borders the unit north of Bartholomew Road. Prior to treatment implementation, SRD staff, adjacent private land owners and the Land Conservancy of BC should be consulted and a professional archeological assessment, as requested by Tla’amin First Nation, should be conducted to prevent or mitigate impacts to values and to ensure that the treatment aligns with restrictions in the associated land covenant. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	Treatment in this unit is proposed as a trailside unit, buffering heavily used foot trails within the park as a demonstration project. This is a high-traffic unit that can use interpretive signage to demonstrate the removal of ladder fuels, surface fuels, and understorey conifers, and educate community members and tourists about wildfire risk within the AOI.
TIBE MOD	11.5	Landscape Fuel Break – Landscape Zone	0.0	0.0	11.5	0.0	Community Forest overlap. Prior to treatment implementation, an ecosystem biologist, adjacent private land holders and CFGP should be consulted so that impacts to values can be prevented or mitigated, and treatment is integrated with licensee planning. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This unit is located west of Tiber Bay and will serve as an upwind fuel break for the neighbourhood. C-5 and mixed (25% - 50% conifer) fuel types make up this unit. High surface fuel loading of fine and course fuels is present. There is moderate conifer density with minor understorey hemlock regeneration. Treatment to reduce fuel continuity will protect the neighbourhood from a fire moving from the west and increase the likelihood of successful suppression.



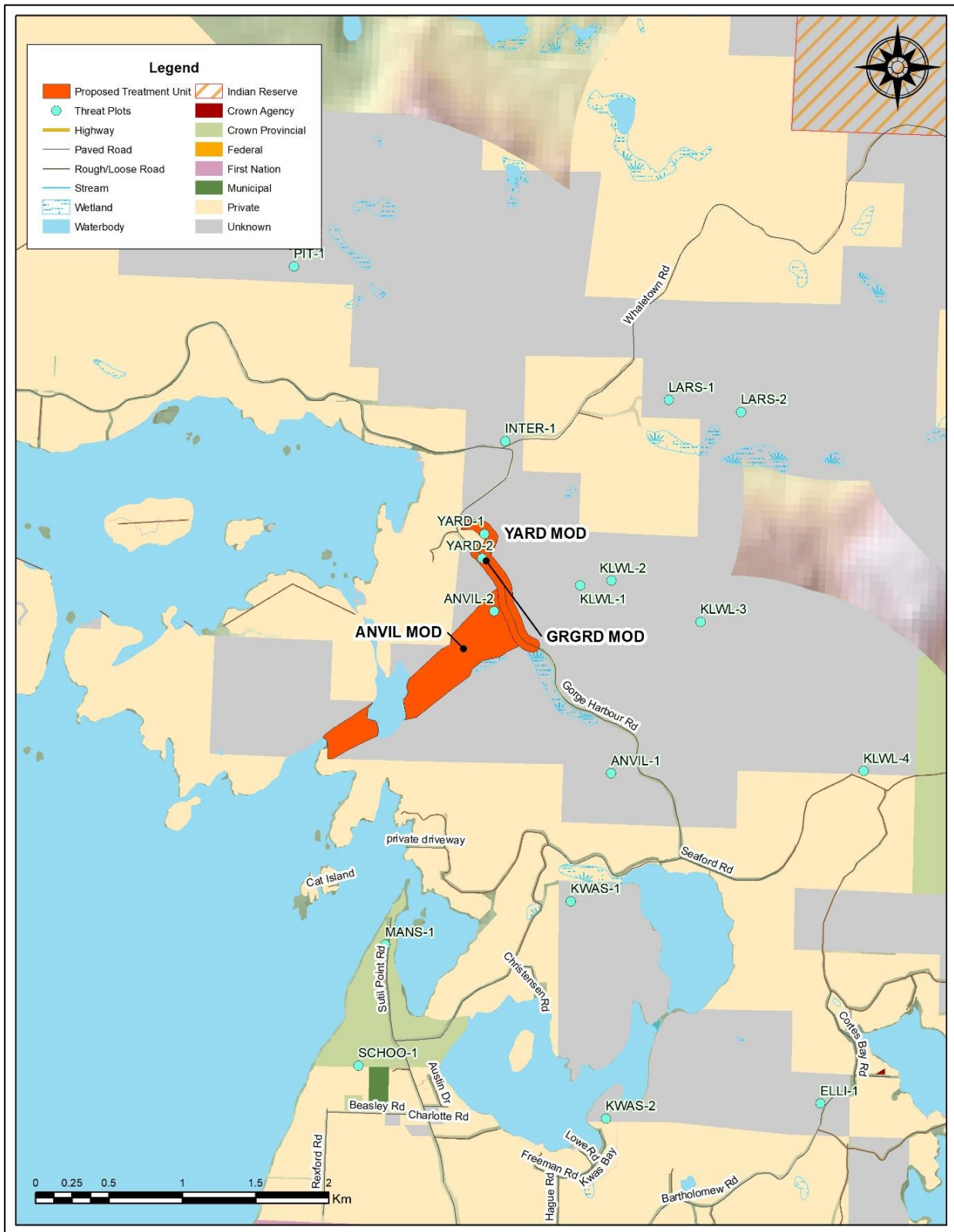
FTU Name and Priority	Total Area (ha)	Treatment Unit Type/ Objective	Wildfire Behaviour Threat				Overlapping Values / Treatment Constraints	Treatment Rationale
			High	Mod	Low	Very Low		
YARD MOD	2.7	Interface Fuel Break – Landscape Zone	0.6	0.3	1.8	0.0	Community Forest (~50%) and Klahoose First Nation woodlot (~50%) overlap. Private land (Mainroads Highway Yard) borders the unit to the east. Prior to treatment implementation, CFGP and Mainroads should be consulted so that impacts to values can be prevented or mitigated, and treatment is integrated with licensee planning. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	The unit is located east of Gorge Harbour Road and adjacent to the gated Mainroads Highway Yard. Suppressed and suspended conifer stem densities are high and surface fuel loading is high. Treat to reduce density of suppressed conifers and fine fuel loading.



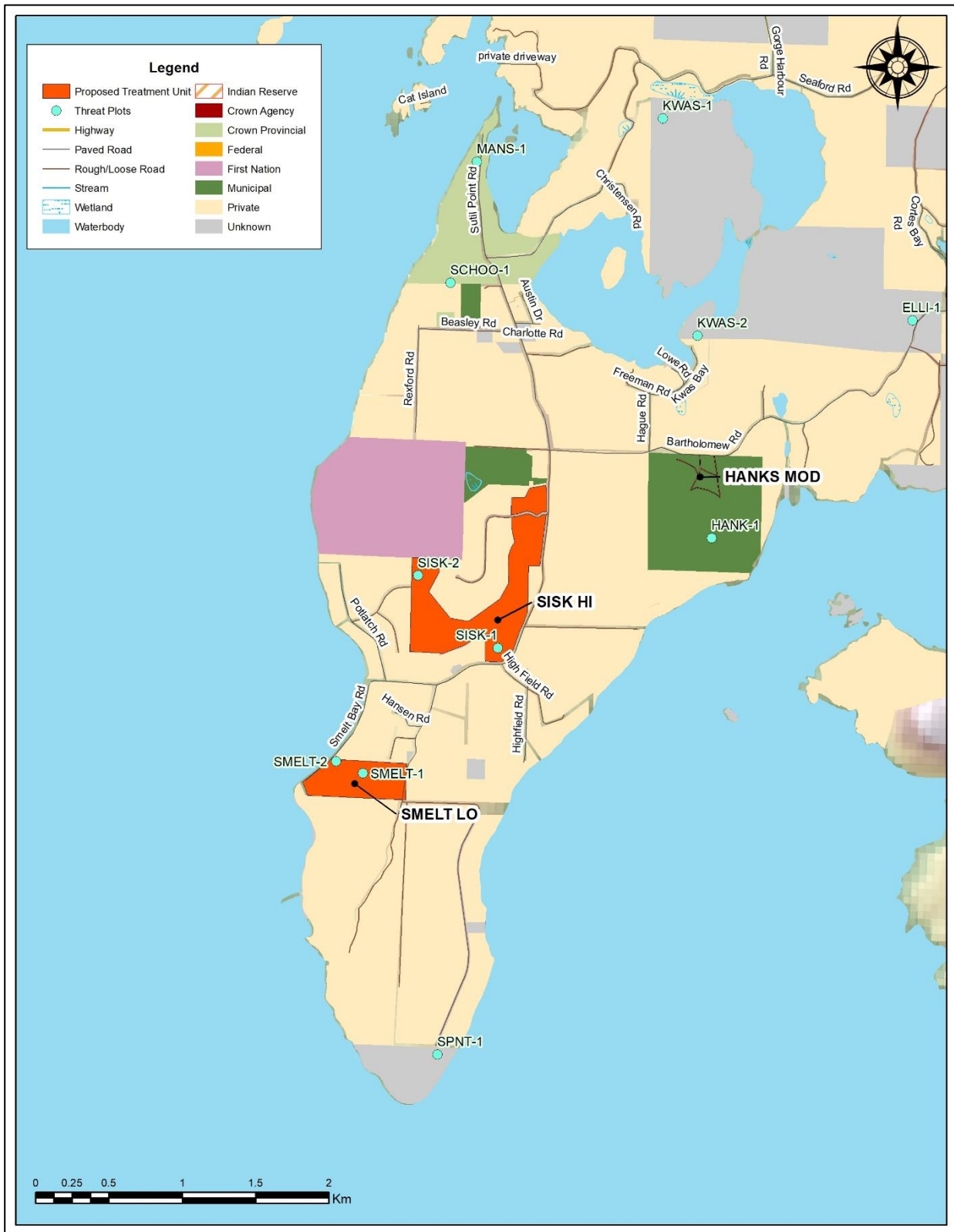
Map 8. Proposed Fuel Treatments



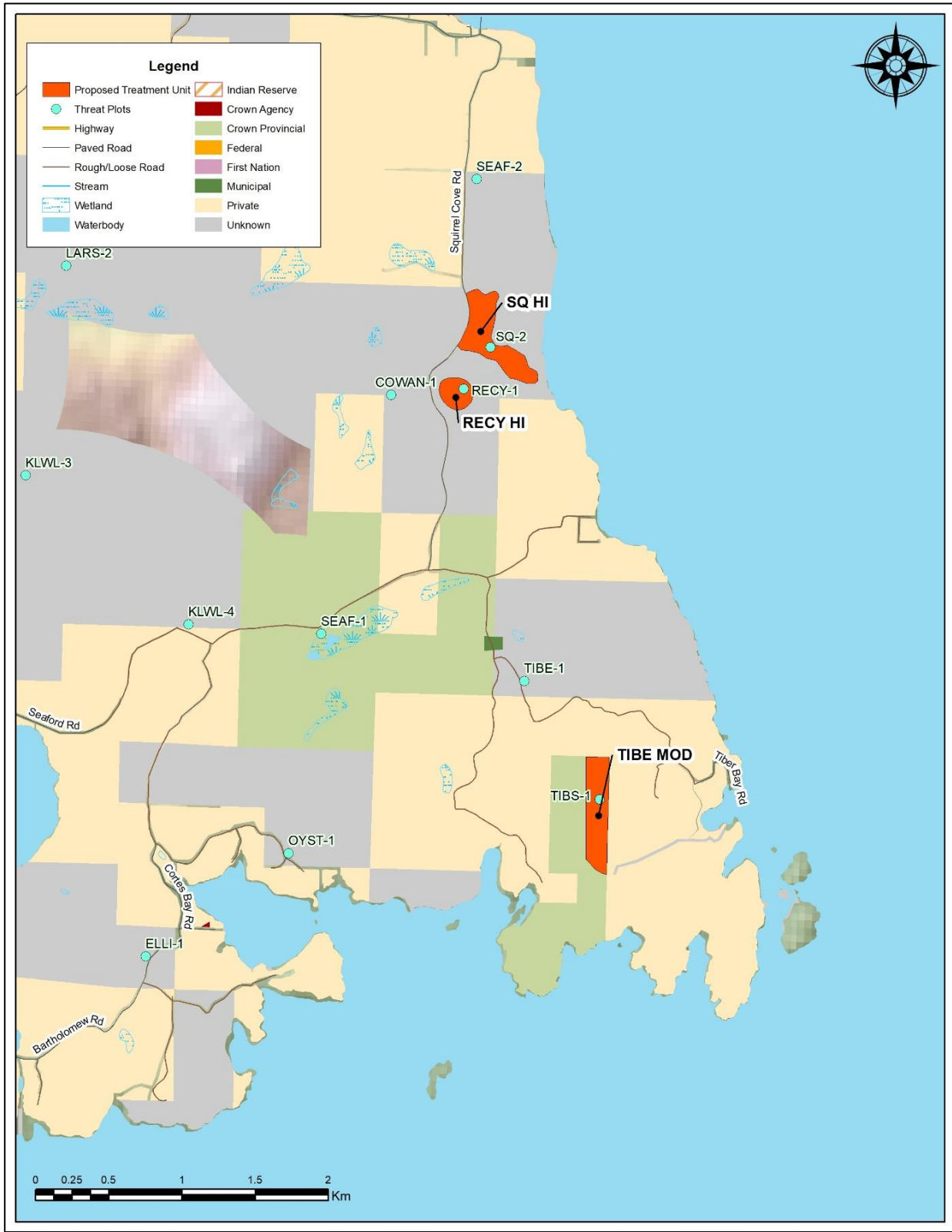
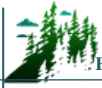
Map 9. Proposed Fuel Treatment Units in Carrington Bay



Map 10. Proposed Treatment Units in Gorge Harbour



Map 11. Proposed Treatment Units on Mansons Landing



Map 12. Proposed Treatment Units in Tiber Bay and Squirrel Cove



5.1.2 Maintenance of Previously Treated Areas

The return interval for maintenance of treatment units depends upon site productivity and type and intensity of treatment. Less productive areas can likely withstand a longer frequency between maintenance activities, while more productive areas would require treatments more often. Maintenance activities may include additional thinning, conifer regeneration reduction, or surface fuel continuity reduction (removal of excess woody debris).

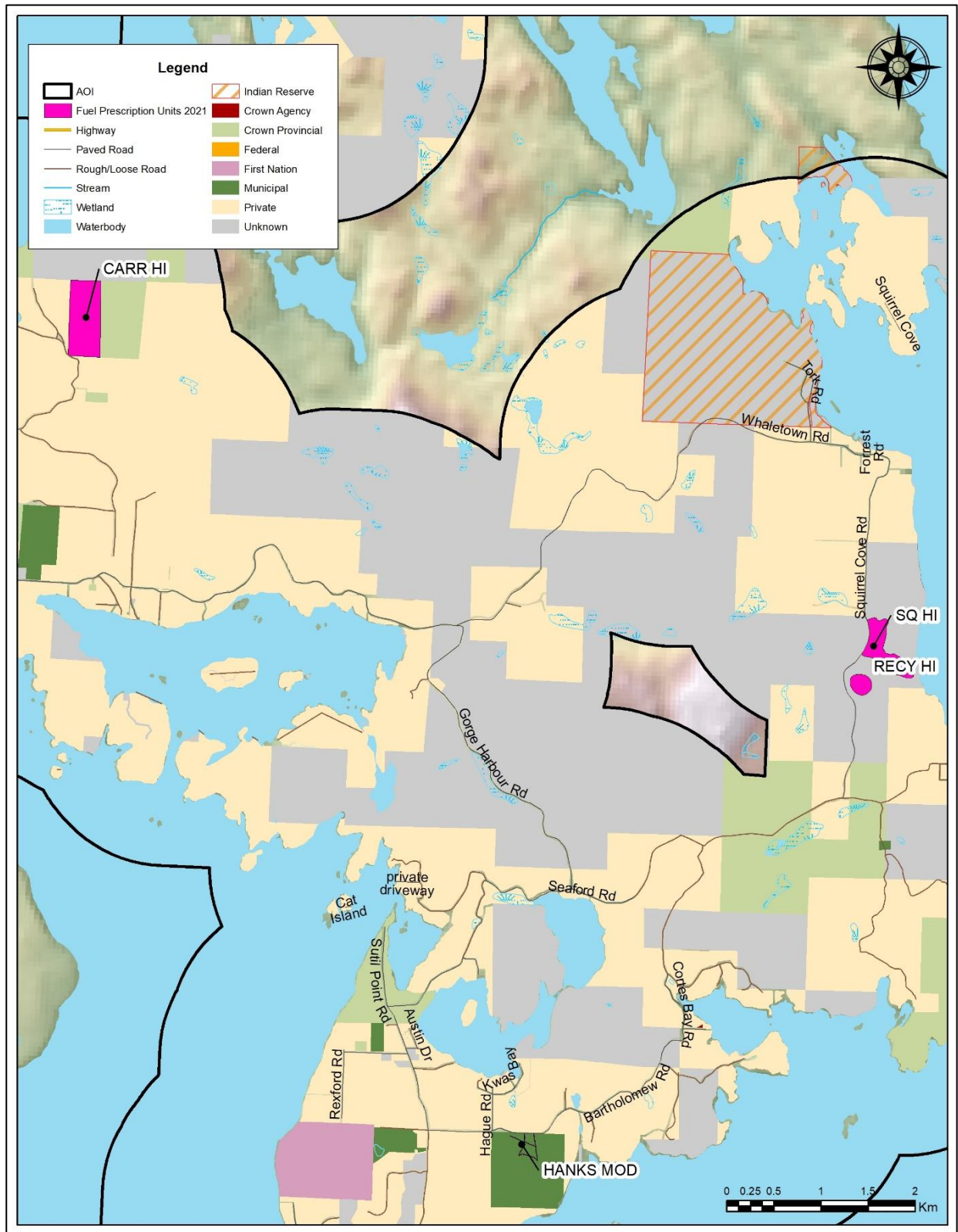
Dense regeneration of conifers was observed in mesic to wet sites that were historically cleared, or where canopy openings allowed sufficient sunlight penetration. Maintaining crown closure in the fuel treatment implementation phase will be an important factor in maximizing intervals between maintenance treatments, especially on flatter, productive sites that are limited by light, not moisture.

5.1.3 Treatment Implementation

Four of the fuel treatment units proposed in this document are currently in the prescription stage of implementation, as of the time of document preparation. Prescriptions are being developed for HANKS MOD, RECY HI, SQ HI and CARR HI as shown in to reduce fuel and subsequently reduce the potential fire behaviour. Prescription documents will describe recommended fuel management activities specific to each treatment unit to reduce fire behaviour attributes of each stand. The following principles will guide prescription documents:

- Contain site specific considerations related to wildfire risk reduction objectives;
- Prescribe detailed and measurable targets for fire behaviour reduction and;
- Meet legal, resource management and non-statutory objectives, including Fire Nation consultation requirements⁴⁷, as described in Section 3.3.2.

⁴⁷ BC Wildfire Service. 2020. *2020 Fuel Management Prescription Guidance*. Retrieved from: https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020_fuel_management_prescription_guidance_final.pdf



Map 13. 2021 Fuel Treatment Prescription Units



Table 15. Summary of Fuel Management Recommendations

Document Section 5.1 Fuel Management					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
13	High	Proceed with detailed assessment, prescription development and treatment of fuel treatment units identified and prioritized in this CWPP.	Reduce wildfire hazard in priority treatment units.	SRD funding or UBCM CRI Program; external forestry consultant	SRD Initiative
14	High	As part of fuel treatment implementation in SRD Parks (i.e., HANK MOD in Hank’s Beach Park and HALL HI in the Whaletown Commons), the SRD should develop interpretive signage to demonstrate pre- and post-fuel treatment forest stands.	Increase public awareness and support of fuel management practices. Example- BCWS Parksville base trail.	SRD funding or UBCM CRI Program	SRD Initiative
15	High	When operational fuel treatments are conducted, treatment monitoring 5-10 years out should be completed by a qualified professional. This can be completed with a CWPP update or as a stand-alone exercise.	Assess the efficacy of the treatment and to schedule maintenance activities. It is cheaper to perform maintenance early, when regeneration is small.	UBCM CRI Program funding/SRD funding. Forestry consultant.	SRD Initiative
16	High	Consider developing a rationale for reduced stocking standards applicable to Cortes Island by employing a qualified wildfire management professional, and in consultation with the Fuel Management Specialist (Powell River Fire Centre) and MFLNRORD. Engage Cortes Island Community Forest and the Klahoose Woodlot to add fire management stocking standards to their forest stewardship/license plans and consider applying them in portions of the wildland urban interface.	Reduce interface wildfire risk throughout managed forest lands that are closest to structures in the WUI. CFGP is open to developing and applying fire management stocking standards where appropriate. Some MFLNRORD Natural Resource Districts have already developed fire management stocking standards that could be applied.	~60 hours. Potential UBCM CRI Program funding (Interagency Cooperation)	SRD Initiative Collaboration with MFLNRORD/BC WS/CFGP



Document Section 5.1 Fuel Management					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
17	Medium	The SRD should look for opportunities to support and promote the Cortes Island Community Forest's wood waste removal initiative of providing community members with firewood. Fire wood distribution should be in conjunction with FireSmart education, specifically related to FireSmart firewood storage; consider having an LFR volunteer or CIFFA member during firewood pickup/delivery to educate community members.	Remove hazardous debris accumulation from operating areas while providing residents with firewood during winter months.	UBCM/CRI funding available ~8 in-house hours for support and education delivery	SRD/CFGP



5.2 FIRESMART PLANNING AND ACTIVITIES

This section provides detail on: 1) the current level of FireSmart implementation and uptake within the community; 2) identified FireSmart subdivisions and/or acceptance into the FireSmart Canada Community Recognition Program (FSCCRP); and 3) recommended potential FireSmart activities that can be applied within the AOI at a future date.

5.2.1 FireSmart Goals and Objectives

FireSmart[®] is the comprehensive nationally accepted set of principles, practices and programs for reducing losses from wildfire.⁴⁸ The FireSmart approach and concepts, including recommended FireSmart guidelines,⁴⁹ have been formally adopted by almost all Canadian provinces and territories, including British Columbia in 2000; FireSmart has become the de facto Canadian standard. FireSmart is founded in standards published by the National Fire Protection Association (NFPA). FireSmart includes seven disciplines: education, legislation and planning, development considerations, interagency cooperation, cross-training, emergency planning, and vegetation management. Together, these disciplines provide a sound framework for reducing wildfire risk to communities.

The overarching goal of FireSmart is to encourage communities and citizens to adopt and conduct practices to mitigate the negative impacts of wildfire to assets on public and private property. While responsibility for effectively mitigating hazards must be shared between many entities including homeowners, industry, businesses and governments;⁵⁰ the ultimate root of the WUI interface problem is the vulnerability of structures and homes to ignition during wildfire events, in particular vulnerability to embers. This leads to an emphasis on risk mitigations on private properties. Findings from an investigation of how homes survived and ignited during the Fort McMurray 2016 Horse River wildfire indicate that the vast majority of initial home ignitions in the WUI were caused by embers rather than direct contact by flames or radiant heat.⁵¹ Surviving homes in both urban and rural areas exhibited many attributes of FireSmart principles, regardless of the broader wildfire risk surrounding them.⁵¹

Home Ignition Zone

Multiple studies have shown that the principal factors regarding home loss to wildfire are the structure's characteristics and immediate surroundings.⁵¹ The area that determines the ignition potential of a structure to wildfire is referred to as the Home Ignition Zone (HIZ).^{52,53} The HIZ includes the structure

⁴⁸ FireSmart is the registered trademark held by the Partners in Protection Association.

⁴⁹ FireSmart guidelines first published in the 1999 manual "*FireSmart: Protecting Your Community from Wildfire*", with a second edition published in 2003. The most recent "*FireSmart Begins at Home Manual*" is available at <https://firesmartcanada.ca/resources/>. The "*British Columbia FireSmart Begins at Home Manual*" provides detailed guidance and is available at BC FireSmart: <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart>

⁵⁰ <https://www.firesmartcanada.ca>

⁵¹ 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.

⁵² Reinhardt, E., R. Keane, D. Calkin, J. Cohen. 2008. Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States. *Forest Ecology and Management* 256:1997 - 2006.

⁵³ Cohen, J. Preventing Disaster Home Ignitability in the Wildland-urban Interface. *Journal of Forestry*. p 15 - 21.



itself and four concentric, progressively wider Priority Zones out to 100 m from the structure (Figure 4). More detail on priority zones can be found in the FireSmart Manual.⁵⁴

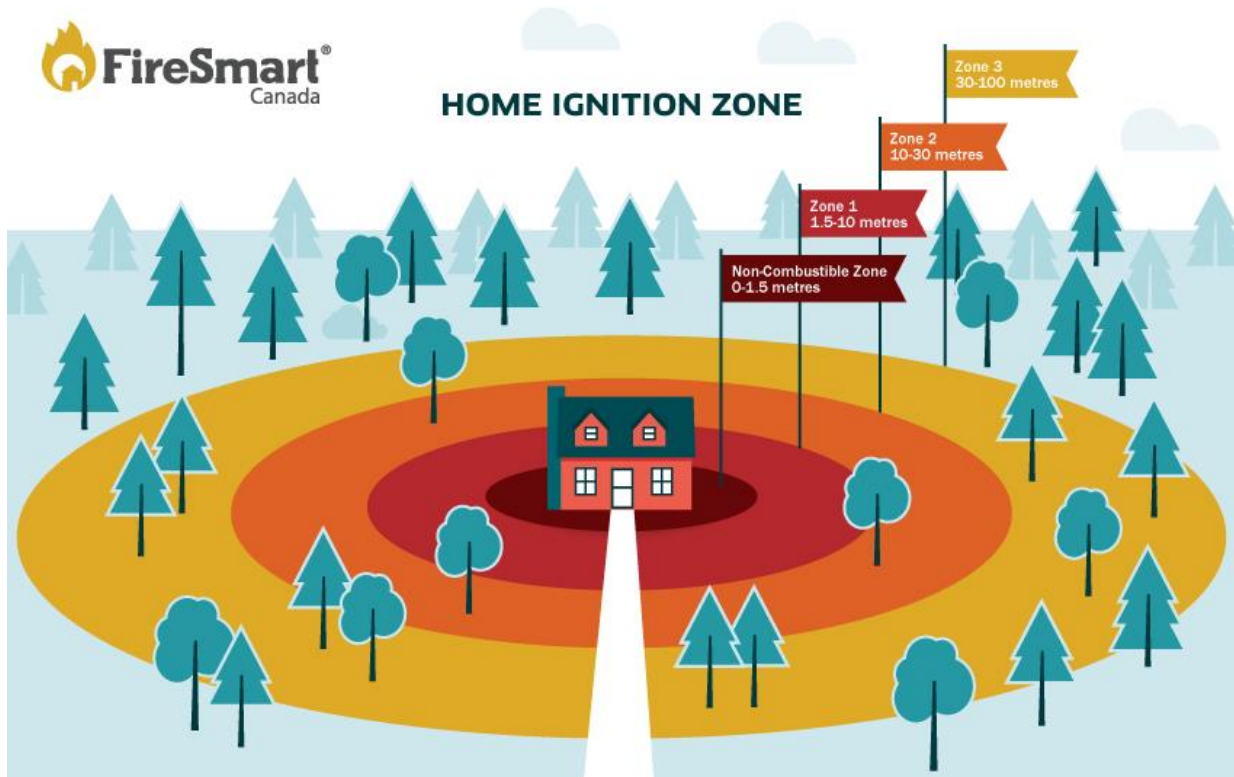


Figure 4. The Home Ignition Zone (HIZ) determines the likelihood of structure ignition during a wildfire event; the highest priority zones are located closest to the structure.⁵⁵

It has been found that during extreme wildfire events, most home destruction has been a result of low-intensity surface fire flame exposures, usually ignited by embers. Firebrands can be transported long distances ahead of the wildfire, across fire guards and fuel breaks, and accumulate within the HIZ in densities that can exceed 600 embers per square meter. Combustible materials found within the HIZ combine to provide fire pathways allowing spot surface fires ignited by embers to spread and carry flames or smoldering fire into contact with structures.

Because ignitability of the HIZ is the main factor driving structure loss, the intensity and rate of spread of wildland fires beyond the community has not been found to necessarily correspond to loss potential. For example, FireSmart homes with low ignitability may survive high-intensity fires, whereas highly ignitable homes may be destroyed during lower intensity surface fire events.⁵³ Increasing ignition resistance would reduce the number of homes simultaneously on fire; extreme wildfire conditions do

⁵⁴ <https://firesmartcanada.ca/> and <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart>

⁵⁵ FireSmart Canada. Understanding the Home Ignition Zone. <https://firesmartcanada.ca/what-is-firesmart/understanding-firesmart/home-ignition-zone/>

not necessarily result in WUI fire disasters.⁵⁶ It is for this reason that the key to reducing WUI fire structure loss is to reduce home ignitability. Mitigation responsibility must be centered on homeowners. Risk communication, education on the range of available activities, and prioritization of activities should help homeowners to feel empowered to complete simple risk reduction activities on their property.

FireSmart Canada Neighbourhood Recognition Program

A neighborhood approach to FireSmart can be an effective method of reducing ignition potential for all homes within priority neighborhoods. The FireSmart Canada Neighbourhood Recognition Program (FSCNRP), previously the FireSmart Canada Community Recognition Program, is a resident-led program facilitated by trained Local FireSmart Representatives that can help reduce fire risk at the neighborhood level. It provides groups of residents with critical information and a means of organizing themselves to progressively alter hazardous conditions within their neighborhood. The program also facilitates FireSmart knowledge and practices to quickly filter downwards onto the property of individual residents to further mitigate wildfire hazards at the single-home scale within the HIZ.

Overall, FireSmart leads to communities that are better adapted to wildfire, more resilient and able to recover following wildfires by sustaining fewer losses and disruption, and safer places to live and recreate. Action by homeowners is the number one priority for reducing structure loss in the event of a WUI fire, but the overall adaptation of the community to wildfire is multi-pronged and the landscape should not be ignored.⁵⁷



Figure 5. The wildland/urban interface disaster sequence and the possibility to break up the disaster sequence by decreasing the number of highly ignitable homes.⁵⁸

⁵⁶ Calkin, D., J. Cohen, M. Finney, M. Thompson. 2014. *How risk management can prevent future wildfire disasters in the wildland-urban interface*. Proc Natl Acad Sci U.S.A. Jan 14; 111(2): 746-751. Accessed online 1 June, 2016 at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3896199/>.

⁵⁷ <https://firesmartcanada.ca/> and <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart>

⁵⁸ Graphic adapted from Calkin et. al, by A. Westhaver.



5.2.2 Key Aspects of FireSmart for Local Governments

A community wildfire risk mitigation strategy requires coordinated action from local governments, developers, private land owners, and industrial operators. This section presents FireSmart activities, which when enacted, provide avenues for reducing fire risk on Cortes Island. An evaluation of the current level of FireSmart implementation within the AOI is also presented in this section. All the activities listed in Table 16 are eligible for funding under the 2021 CRI FireSmart Community Funding and Supports program.

Table 16. FireSmart activities fundable under the 2021 UBCM CRI program and their level of implementation in the AOI

FireSmart Discipline/CRI Funding Category	FireSmart Activities	Current Status
Education	<ul style="list-style-type: none"> Update public signage, social media, websites and/or newsletters 	<ul style="list-style-type: none"> CIFFA website has a FireSmart page, Tideline website updates wildfire events
	<ul style="list-style-type: none"> Distribute FireSmart educational materials and resources 	<ul style="list-style-type: none"> Available at community halls during fire season
	<ul style="list-style-type: none"> Develop education for the reduction of local human-caused fires 	<ul style="list-style-type: none"> Fire bans communicated to public by CIFFA
	<ul style="list-style-type: none"> Encourage community participation in Wildfire Community Preparedness Day Organize and/or host a FireSmart events and workshops 	<ul style="list-style-type: none"> 2018 table-top exercise (Recycling Centre)
	<ul style="list-style-type: none"> Support neighbourhoods to apply for FireSmart Canada Neighbourhood Recognition Program 	<ul style="list-style-type: none"> Not yet achieved (See Recommendation 22)
Planning	<ul style="list-style-type: none"> Develop or amend a CWPP 	<ul style="list-style-type: none"> 2011 CWPP and 2020 CWPP update
	<ul style="list-style-type: none"> Develop FireSmart policies for the design and maintained of public land, such as regional parks, or buildings 	<ul style="list-style-type: none"> Not achieved.
	<ul style="list-style-type: none"> Conduct FireSmart Assessments for publicly owned buildings 	<ul style="list-style-type: none"> Not yet achieved (<i>See Recommendation 20</i>)
Development Considerations	<ul style="list-style-type: none"> Amend OCPs or bylaws to incorporate FireSmart principles 	<ul style="list-style-type: none"> Not yet achieved (<i>See Recommendation 3</i>)
	<ul style="list-style-type: none"> Revise zoning and development permit documents to include FireSmart considerations 	<ul style="list-style-type: none"> Not achieved
	<ul style="list-style-type: none"> Establish Development Permit Areas for Wildfire Hazard 	<ul style="list-style-type: none"> Not achieved



FireSmart Discipline/CRI Funding Category	FireSmart Activities	Current Status
	<ul style="list-style-type: none"> • Include wildfire prevention and suppression considerations in the design of subdivisions 	<ul style="list-style-type: none"> • Not achieved
	<ul style="list-style-type: none"> • Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management personnel, are included 	<ul style="list-style-type: none"> • Not achieved
Interagency Cooperation	<ul style="list-style-type: none"> • Develop, coordinate and/or participate in a Community FireSmart Resiliency Committee or multi-agency fire and/or fuel management planning table 	<ul style="list-style-type: none"> • Emergency Planning Committee established- could be expanded on
	<ul style="list-style-type: none"> • Provide Indigenous cultural safety and humility training to emergency management personnel 	<ul style="list-style-type: none"> • Not achieved
	<ul style="list-style-type: none"> • Attend 2021 FireSmart BC Conference, to be hosted by the BC FireSmart Committee 	<ul style="list-style-type: none"> • Not achieved.
Cross-Training	<ul style="list-style-type: none"> • Provide or attend training for Local FireSmart Representatives (LFR) 	<ul style="list-style-type: none"> • Not achieved (<i>See Recommendation 23</i>)
	<ul style="list-style-type: none"> • Support LFRs to attend facilitator training 	<ul style="list-style-type: none"> • Not achieved (<i>See Recommendation 23</i>)
	<ul style="list-style-type: none"> • Cross-train fire department members <ul style="list-style-type: none"> ○ SPP-WFF1 Wildland Firefighter Level 1 ○ S-100 Basic fire suppression and safety ○ S-185 Fire entrapment avoidance and safety ○ ICS-100 	<ul style="list-style-type: none"> • Annual cross-training with BCWS ○ All CIFFA personnel maintain SPP-WFF1 or S-100 training at minimum ○ See Recommendation 39.
	<ul style="list-style-type: none"> • Professional development to increase capacity for FireSmart activities 	<ul style="list-style-type: none"> • See Recommendation 23
Emergency Planning	<ul style="list-style-type: none"> • Develop and/or participate in cross-jurisdictional meetings and tabletop exercises focused on wildfire preparedness 	<ul style="list-style-type: none"> • Annual cross-training with BCWS, 2018 tabletop exercise conducted on Cortes



FireSmart Discipline/CRI Funding Category	FireSmart Activities	Current Status
	<ul style="list-style-type: none"> Assess structural protection capacity 	<ul style="list-style-type: none"> See Recommendation 37
	<ul style="list-style-type: none"> Use and/or promote EMBC Wildfire Preparedness Guide for community emergency preparedness events focused on wildfire 	<ul style="list-style-type: none"> Evacuation Plan developed in 2016 and an Updated Evacuation Plan is currently being developed
Vegetation Management	<ul style="list-style-type: none"> Undertake fuel management on publicly owned land (fuel management prescriptions, treatments, maintenance, or prescribed burns) 	<ul style="list-style-type: none"> Not yet achieved (<i>See Recommendation 14</i>)
FireSmart Projects for Critical Infrastructure	<ul style="list-style-type: none"> Replace building materials with fire-resistant materials 	<ul style="list-style-type: none"> Class A metal roofing is common throughout island
	<ul style="list-style-type: none"> Remove or reduce flammable vegetation up to 100 m from critical infrastructure 	<ul style="list-style-type: none"> Not yet achieved (<i>See Recommendations 21-26</i>)
FireSmart Activities for Residential Areas	<ul style="list-style-type: none"> Develop plans for residential areas <ul style="list-style-type: none"> Conduct HIZ assessments for individual properties Develop FireSmart Neighbourhood Plans Undertake Neighbourhood Wildfire Risk Assessments for neighbourhoods pursuing FSCCRP 	<ul style="list-style-type: none"> Not achieved <ul style="list-style-type: none"> Not yet achieved (<i>See Recommendation 23</i>)
	<ul style="list-style-type: none"> Offer FireSmart rebate program 	<ul style="list-style-type: none"> Not yet achieved (<i>See Recommendation 25</i>)
	<ul style="list-style-type: none"> Provide vegetative debris disposal for homeowners <ul style="list-style-type: none"> Provide a dumpster or chipper Waive tipping fees 	<ul style="list-style-type: none"> Chipping services offered by SRD in 2019 (<i>See Recommendation 26</i>)

5.2.3 Priority Areas within the AOI for FireSmart

This section identifies priority areas within the AOI that would benefit from FireSmart activities, assesses FireSmart compliance within the AOI, and provides recommendations for FireSmart programs to improve compliance (Table 18). Recommendations surrounding communication and education are in Section 5.2.

Priority areas are based on informal field observations, communication with the Wildfire Working Group, local wildfire risk (Section 4.3), and level of FireSmart implementation. Recommended FireSmart activities are essentially the same for each neighborhood or area; however, it is recommended that the SRD prioritize the neighborhoods in Table 17.

Table 17. Summary of FireSmart Priority Areas.

Area/Neighbourhood	FireSmart Rationale	Suggested Priority Actions
Priority Area #1: Siskin Lane	Highly intermixed; single access (Siskin Lane); central to island; already self-organized (strata)	Widen road/thin roadside trees; explore secondary egress connection to Hayes Road; keep existing 1000-gallon water tanks full
Priority Area #2: Tiber Bay Road	Highly intermixed, isolated, not in FPA; self-organized	Consider including in FPA; promote FireSmart, especially vegetation setbacks, and residential exterior sprinkler systems/water cisterns
Priority Area #3: Carrington Bay ocean-accessed community	Highly intermixed; no road access, not in FPA	Promote FireSmart and residential exterior sprinkler systems
Priority Area #5: Mansons Landing (general)	Population centre; common lack of defensible space (cedar branches)	Promote FireSmart, especially vegetation setbacks
Priority Area #6: Cortes Island Seniors Society (Beasley Road)	Highly intermixed; higher population density; evacuation concerns with mobility	Promote FireSmart, address in island evacuation planning
Priority Area #7: Kwas Bay Road	Highly intermixed; single access	Promote FireSmart
Priority #8: Larson's Meadow Road	Very highly intermixed	Promote FireSmart
Priority Area #6: Critical Infrastructure – community halls, Fire Halls, Cortes Island School	See Figure 6. Intermix structures with wood siding and combustible material stored within ignition zone, typical throughout the AOI.	Promote FireSmart, especially vegetation setbacks, firewood/fuel storage, deck enclosure, vent screening, and the non-combustible zone.
		The SRD should work with societies and institutions on Cortes Island to FireSmart Mansons Hall, Gorge Hall, Cortes Island School, and fire halls.



FireSmart Compliance within the Area of Interest

FireSmart compliance on private properties in the AOI is generally low (Figure 6). Generally speaking, most homes do not maintain 10 m defensible space. The main concern is the lack of defensible space between structures and adjacent forested areas, although the ubiquity of wooden siding and cedar shakes was also noted. The majority of homes in the AOI are intermixed, residing on small acreages surrounded by forest. Properties with cedar vegetation that have draping branches within 10 m of structures are of the utmost concern. Of particular concern were Siskin Lane, Mansons Landing and Tiber Bay neighbourhoods, all of which all have many homes lacking setbacks and have wood construction, including wooden fences, porches and decks within the Home Ignition Zone. Storage of combustible items (firewood, propane cylinders) adjacent to homes was common. On the other hand, most residences along oceanside roads (i.e., Sutil Point) are surrounded by irrigated lawn, which is FireSmart compliant, and do not have conifers within 10 m of structures. However, the majority of structures within the AOI have Class A (high resistant to fire) roofing materials, which is a critical component of preventing structure ignition.

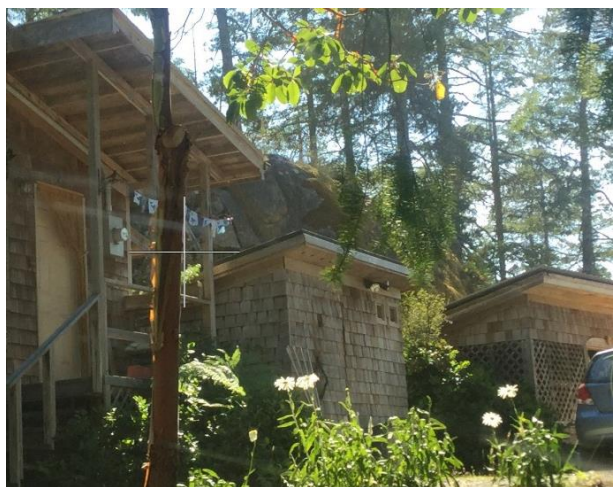


Figure 6. Intermix structures with wood siding and combustible material stored within ignition zone, typical throughout the AOI.



The best approach to mitigate fuels on private lands is to urge private landowners to comply with FireSmart guidelines and to conduct appropriate fuel modifications using their own resources. CRI program funding may be available subject to current funding requirements. The SRD can facilitate uptake within the AOI by: 1) encouraging self-organization under the FireSmart Canada Neighbourhood Recognition Program; 2) encouraging completion of Home Ignition Zone assessments; 3) targeting delivery of FireSmart presentations and workshops in these neighbourhoods; 4) offering FireSmart rebate programs to homeowners who complete eligible retrofits and yard work; 5) providing off-site debris disposal for private landowners who undertake their own vegetation management (with a focus on pruning, yard and thinning debris). Off-site debris disposal options include providing a dumpster, chipper or other collection method or providing curbside debris pick-up. The Island's transfer station is the Recycling Centre, and does not currently accept residential yard waste and wood debris, although construction waste is accepted.

As mentioned above, the FireSmart Canada Neighbourhood Recognition Program (FSCNRP) is a really useful tool to enable FireSmart uptake in priority neighbourhoods. FSCNRP provides a framework and collective motivation for community members to work on FireSmart actions. FSCNRP can be particularly successful in neighbourhoods that already have some level of self-organization or identified leadership. Possible incentives for neighbourhood engagement could be eligibility for rebates or chipping opportunities. Explore opportunities to engage CIFFA personnel in the program, such as encouraging members to become Local FireSmart Representatives (LFRs), who are required to lead the FSCNRP program.

The SRD can also provide support for neighbourhoods by advocating to the Ministry of Transportation and Infrastructure (MOTI) to improve emergency access and egress through road widening, turnaround development, and secondary access routes. Other forms of neighbourhood support include considering the modification of FPA boundaries (i.e., Tiber Bay) and the provision of on-site water cisterns (i.e., Siskin Lane). There have already been some actions taken by self-organized neighbourhoods on these fronts. Promoting exterior sprinkler systems can also help isolated priority neighbourhoods. Residential sprinklers can be used in a wildfire event to reduce the likelihood of structure ignition and help 'buy time', especially for isolated areas.

Based on field observations, the majority of critical infrastructures are partially FireSmart (Figure 7). Wooden construction materials are common, but so is Class A metal roofing. Some critical infrastructure sites (Cortes Island School, fire halls) have on-site water supply for fire suppression. Yet, few sites have FireSmart setbacks from forested areas, and open vents are common. Wooden decks and porches, as well as highly flammable vegetation (i.e., cedar shrubs and trees) within Zone 1 exist. Debris accumulation from overtopping vegetation on roofs and in gutters is also present, increasing ignition potential.

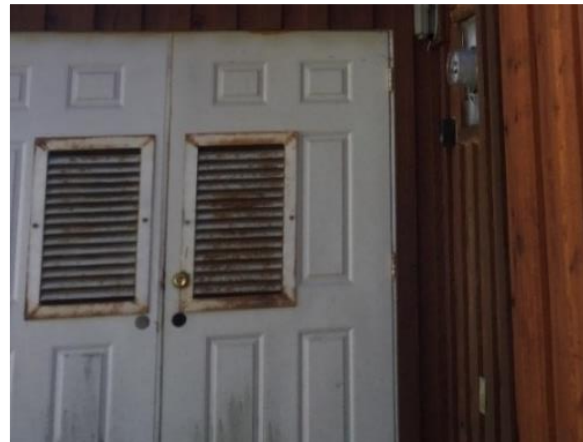


Figure 7. Examples of FireSmart non-compliance of critical infrastructure throughout the AOI. Clockwise from top left: Whaletown Fire Hall, Mansons Fire Hall (unscreened vents; gas storage); Gorge Hall, Cortes Island School (non-combustible zone).



Although critical infrastructure on Cortes is not owned or operated by the SRD, Fire Halls, schools, and community halls are critical for emergency response and recovery. The SRD can work to fund⁵⁹ and/or encourage FireSmart awareness, assessments, and compliance. For example, critical infrastructure FireSmart assessments can be conducted for all infrastructure on the island. It is recommended that fuel treatments for areas adjacent to critical infrastructure, such as HALL HI Proposed Treatment Unit (Whaletown Commons), be prioritized, in conjunction with FireSmart retrofits and landscaping of the buildings and surrounding structure ignition zones. FireSmart landscaping may include implementing ‘hardscaping’ like gravel immediately adjacent to the structures, and pruning nearby conifers. Brushing and mowing should be part of the maintenance schedule to control weeds and grasses around critical infrastructure.

⁵⁹ The 2021 UBCM CRI program does not fund FireSmart assessments or upgrades for buildings that are not owned by local governments

**Table 18. Summary of Recommendations for FireSmart Priority Areas.**

Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
18	High	Engage a qualified professional (LFR) to complete formal FireSmart assessments of critical infrastructure such as fire halls, community centers, and water infrastructure as identified in this CWPP (Table 7).	Increase critical infrastructure wildfire resiliency through achieving FireSmart principles.	\$680/site-consultant costs (8 hrs @ \$85/hr) UBCM/CRI funding available	Local Initiative (CIFFA)
19	High	Work with societies on Cortes Island to support the use of fire-resistant construction materials (i.e., aluminum roofing), building design and landscaping for all CI when completing upgrades or establishing new infrastructure. Additionally, vegetation setbacks around critical infrastructure should be compliant with FireSmart guidelines (no combustible material within 10 m of structures). See Section 5.2.3 Priority Areas within the AOI for FireSmart for consultant field observations of Critical Infrastructure.	Increase critical infrastructure wildfire resiliency through achieving FireSmart principles.	Negligible in-house cost. Campbell River FireSmart Guide to Gardening available free online. ⁶⁰	Local Initiative SRD Advocacy
20	Medium	Encourage and facilitate priority neighborhoods to self-organize to attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status. Leverage the leadership of a Local FireSmart Representative. Consider utilizing the local FireSmart rebate program or neighbourhood chipping opportunities as incentives.	Increase wildfire resiliency throughout priority neighbourhoods identified in the CWPP by collectively FireSmarting homes.	\$5,000/neighbourhood and an additional 40 hours/initiative UBCM CRI Program funding available	CIFFA Advocacy

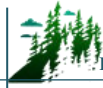
⁶⁰ <https://srd.ca/wp-content/uploads/2020/10/final-cr-firesmart-guide-to-gardening-pdf-version-min-1.pdf>



Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
21	High	Apply for funding from the UBCM CRI Program to hire a Local FireSmart Representative (LFR) to assist neighbourhoods and homeowners in complying with FireSmart principles at both the neighborhood and individual home-level. Encourage CIFFA personnel and/or the Emergency Response Committee members to become certified LFRs by participating in the FireSmart 101 course and subsequent LFR workshop.	There are currently no LFRs located on Cortes Island. LFRs should be engaged in neighbourhood and individual home FireSmart assessments.	UBCM CRI grant(s) available. Example cost \$14,000: \$12,000 for LFR contract pay (~\$500/week compensation for 20 weeks plus \$2,000 SRD administration for new contract)	SRD Initiative
22	High	Provide outreach materials to encourage homeowners to complete a FireSmart home assessment using the Home Assessment guide or the FireSmart Begins At Home mobile app, through a Local FireSmart Representative, or through the FireSmart Home Partners Program.	Educate homeowners of FireSmart principles and encourage residents to FireSmart homes.	UBCM CRI funding available for LFR training and employment and public education materials	SRD/CIFFA Initiative



Document Section 5.2.3 Priority Areas					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
23	High	Apply for funding from the UBCM CRI Program to develop a local FireSmart rebate program. The rebate program is described in detail in the CRI Program 2020 FireSmart Community Funding and Supports – Program & Application Guide and must adhere to the goals and objectives of FireSmart, as outlined in Section 5.2.1. Before applying for funding, SRD resources available to execute the program should be reviewed. An LFR could be engaged to support the program.	Incentivize homeowners to FireSmart activities on their properties by allowing them to access partial rebates for, if rated as high or extreme risk in a FireSmart home assessment.	20-35 in-house hours plus additional hours to administer the rebate program, UBCM CRI funding available for rebate (max \$500/property)	SRD Initiative
24	High	Continue to implement the community chipping program with the help of neighbourhood champions, LFRs, and Neighbourhood FireSmart Committees, if possible. Consider offering chipping services as an incentive for neighbourhoods to join the FireSmart Neighbourhood Recognition Program. Education of FireSmart yard and landscaping principles, including chipping specifications should be incorporated into the program.	Aid homeowners in removing hazardous debris off of properties, while educating residents on FireSmart yard and landscaping principles.	Eligible for UBCM CRI Program funding. Example cost is \$7,400: chipping contractor costs (four 8-hour days @ ~\$200 per hour); \$1000 for outreach/advertising	SRD Initiative
25	Moderate	The SRD should consult with the Recycling Centre staff to assess the capacity of accepting residential yard waste. Subsequently, the SRD should consider supplying an on-site wood-waste bin.	Wood waste is currently not accepted at the Recycling Centre, nor anywhere within the AOI. Free disposal is a fire-safe alternative to burning waste and debris on private properties.	~\$3000 UBCM CRI funding or SRD funding	SRD Initiative in collaboration with the Recycling Center



5.3 COMMUNICATION AND EDUCATION

Community education and engagement is a key aspect of a successful wildfire risk mitigation strategy. Moving from a CWPP to the implementation of specific actions requires that the public and stakeholders are aware of the reasons for and benefits of specific activities. A communication strategy must be enacted to effectively build support for actions that are being undertaken in the community.

FireSmart educational material is readily available and simple for governments to disseminate. It provides concise and easy-to-use guidance that allows homeowners to evaluate their homes and take measures to reduce fire risk. However, the information needs to be supported by locally relevant information that illustrates the vulnerability of individual houses to wildfire. To strengthen community engagement, the CWPP must be made available to the public.

The SRD has undertaken some public education outreach in the community and online. These efforts can be expanded upon and/or adapted to further enhance wildfire preparedness and education. CIFFA is active in the community and aids the SRD in distributing education materials. SRD staff utilize the Island's local website (Tideline) to post 4 – 6 times each year along with regular updates on the Regional District website to engage the public with fire danger information, advisories and educating homeowners about Firesmarting their properties. BCWS has also been involved in public education regarding wildfire prevention at a tabletop exercise at the Cortes Island School. Other FireSmart info session and workshops have occurred on occasion; however, community participation was minimal.

The SRD should consider encouraging School District 72 to utilize the FireSmart BC Education Package as an element of wildfire preparedness education to be presented annually at the Cortes Island Public School. Programming could include volunteer/advocacy work from professional foresters, wildland firefighters or CIFFA personnel, LFRs, and SRD staff. The SRD/CIFFA should consider holding a wildland specific Fire Prevention Day or Week, or similarly formatted event, in the spring prior to the wildfire season. Timely educational materials to increase preparedness would be most effective immediately prior to the fire season.

Moving from the CWPP to the implementation of specific activities requires that the community is well informed of the reasons for, and the benefits of specific mitigation activities. In order to have successful implementation, communication and public education recommendations have been developed.



Table 19. Summary of Communication and Education Recommendations.

Document Section 5.3 Communication					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
26	Medium	Encourage the Cortes Island School to adopt and deploy existing wildfire education programs. There is emergency preparedness curriculum available provincially, which includes preparedness for a variety of natural hazards, including wildfire (Master of Disaster, FireSmart BC Education box). Other options/value-added activities include consulting with Association of BC Forest Professionals (ABCFP) and BCWS (Coastal Fire Centre) as well as local fire department and FireSmart representatives to facilitate and recruit volunteer teachers and experts to help with curriculum development to be delivered in the school (field trips, guest speakers, etc.).	Engage and educate youth in wildfire management and risk reduction.	~5-10 in-house staff hours UBCM CRI Program funding available FireSmart BC Education box - \$800 (<i>Junior Kindergarten - Grade 12</i>)	Local Advocacy
27	Medium	Work towards educating homeowners within unprotected areas (i.e., outside of Fire Protection Areas) of their level of risk.	It is common, especially in the case of second homeowners/vacation owners, for them to be unaware of the lack of fire services in their area (in the event they call 911).	~8 in-house staff hours. UBCM CRI Program Funding available	SRD/CIFFA Initiative
28	Low	Promote and provide information to private landowners related to exterior residential sprinklers as a FireSmart prevention measure. At FireSmart events distribute information on exterior sprinkler component parts, manufacturers, and water supply system requirements. Develop general costs of exterior sprinkler equipment for property owners.	Educate homeowners on effectively wetting down homes and Fire Priority Zones to discourage home ignition during a wildfire event.	~12 in-house staff hours UBCM CRI Program funding available (Education)	SRD/CIFFA Initiative

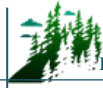


Document Section 5.3 Communication					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
				~\$200 for 1 gutter-mount sprinkler kit ⁶¹	
29	Medium	Additional signage of danger class rating, fire bans and general fire safety related warnings should be posted as required in the AOI. Signs should be updated at least weekly during the fire season by a CIFFA member or designate.	Island tourism during the wildfire season increases. It is important to ensure the island residents and visitors understand current fire bans and Danger Class Ratings.	~\$5,000 for new danger rating signs SRD funding	SRD/CIFFA Initiative
30	High	Develop a FireSmart/Wildfire Preparedness page on the SRD website with links on Tideline.com. Updates and opportunities should also continue to be communicated regularly through the Cortes Island Radio.	This page can serve as a platform to promote workshops, waste disposal opportunities and other community FireSmart initiatives. Updates on fire bans, high or extreme Fire Danger days, and current fires can be integrated with this page.	~40 hours for set-up. Additional hours for updates as required. UBCM CRI Program funding available	SRD Initiative
31	High	Continue to promote FireSmart approaches for wildfire risk reduction to Cortes residents through FireSmart workshops, open houses, and/or presentations. Aim to conduct the engagement/promotion campaign prior and during the fire season. Supply FireSmart resources to homeowners during these engagement campaigns and promote the FireSmart Begins At Home mobile app as a method of conducting home assessments. Include education specific to island residents including emphasizing the importance of visible addresses and widened driveways for emergency response, safe debris removal methods and FireSmart firewood storage.	Increase community education on wildfire risk and FireSmart principles.	~20 hours. UBCM CRI Program funding available. Example workshop cost: \$1,700 consultant costs (20 hrs @ 85/hr); \$1,500 advertising costs	SRD/CIFFA Initiative

⁶¹ Example: <https://shop.waspwildfire.ca/collections/all-products/products/complete-wildfire-protection-kit>



Document Section 5.3 Communication					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
32	High	This CWPP report and associated maps should be made publicly available through the SRD's Wildfire Protection page, the Cortes Island website and shared on social media. In addition, this CWPP should be shared with local industry partners who may be interested in collaborating on fuel treatments.	Increase community education on island-specific wildfire risk.	~3-6 hours depending on method of distribution	SRD Initiative



5.4 OTHER PREVENTION MEASURES

In addition to policy changes (Section 2.5), fuel management (Section 5.1), FireSmart planning and activities (Section 5.2), public communication and education (Section 1.1), and wildfire response resources (Section 6), there are additional measures that local governments can take as part of a wildfire risk mitigation strategy. Working with local BC Parks staff, forest land managers and emergency services can reduce wildfire risk, increase UBCM funding opportunities and allow the SRD to obtain valuable local knowledge.

Bringing organizations together to address wildfire issues that overlap physical, jurisdictional or organizational boundaries is a good way to help develop interagency structures and mechanisms to reduce wildfire risk. Engagement of various stakeholders can help with identifying valuable information about the landscape and help provide unique and local solutions to reducing wildfire risk. Engagement can be formal or informal and can take place through existing communication channels, such as the Cortes Island Emergency Preparedness Committee (CIEPC).



Table 20. Summary of Other Measures Recommendations.

Document Section 5.4 Other Measures					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
33	Medium	Encourage BC Parks to communicate fire risk and enforce provincial fire bans when patrolling in Hathayim/Von Donop Marine Provincial Park.	Educate island visitors of wildfire risk and current fire bans during wildfire seasons.	~2 in-house hours	BC Parks Advocacy
34	Medium	Encourage CIFFA to report wildfire incident calls to increase UBCM funding opportunities and to obtain valuable data regarding wildfire risk.	Currently, fire incident calls are not categorized by interface or wildfire, reducing UBCM funding opportunities.	~1 in-house hour	CIFFA Initiative
35	High	Work with CFGP and the Klahoose Woodlot to ensure that high risk activities, such as vegetation management, pile burning and harvesting do not occur during high/extreme fire danger times. CFGP should ensure that adequate fire suppression tools (as per wildfire act and regs) are on-site during high-risk activities conducted in the community forest and Klahoose woodlot.	Reduce chance of ignitions as per the <i>Wildfire Act</i> and reduce spread potential during an ignition event.	~4-8 in-house hours for communication. UBCM CRI funding may be available (Interagency Cooperation)	SRD/CIFFA Advocacy with CFGP/KFN Woodlot
36	High	Develop utility right-of-way best management practices (BMPs) for regular brushing and clearing of woody debris and shrubs in coordination with BC Hydro to help reduce fire risk, utility pole damage and subsequent outages. In addition, BC Hydro and the Ministry of Transportation and Infrastructure should ensure rights-of-way do not contain fine fuel accumulations (< 7.5 cm, easily cured) and significant regeneration of conifer vegetation prior to and during the fire season and are maintained in a low hazard state.	Tree failures adjacent to power lines (transmission and distribution) are common occurrences and represent significant risks to ignition within the AOI. CIFFA identified that majority of brush fires occur under powerlines and encroachment of understory vegetation and overhanging trees were noted by consultants in various locations throughout the island.	~12 hours (local government hours for 2 meetings with BC Hydro). Potential UBCM CRI funding (Interagency Cooperation)	BC Hydro Advocacy



SECTION 6: WILDFIRE RESPONSE RESOURCES

This section provides a high-level overview of the local government resources available for interface wildfire suppression. In emergency situations when multiple fires are burning in different areas of the Province, BCWS resource availability may be scarce. Deployment of provincial resources occurs as per the process detailed in the Provincial Coordination Plan for Wildland Urban Interface Fires.⁶² Therefore, local government preparedness and resource availability are critical components of efficient wildfire prevention and planning.

6.1 LOCAL GOVERNMENT FIREFIGHTING RESOURCES

Fire protection within the AOI is provided by the CIFFA, which is a non-profit society under contract with the SRD. The CIFFA Fire Protection Area (FPA) covers approximately 6,400 hectares and 44% of the land area of the AOI. Mutual aid with BCWS is utilized for response or standby 2-3 times each year, and the association cross trains with BCWS at the Powell River Fire Centre on an annual basis. Table 21 provides an overview of the fire services capacity in the AOI, including fire department personnel and equipment stationed at each fire hall. Response resources would come from both halls.

The CIFFA FPA excludes Tiber Bay, Uganda Passage, Protection Island, Deadman Island, Sutil Point, Squirrel Cove and forested areas in the northern section of the island (Von Donop Marine Provincial Park). However, the CIFFA may provide services beyond the FPA, in accordance to the Cortes Island Fire Protection Service Agreement Authorization (SRD Bylaw 346). Under BCWS direction, CIFFA are able to initially respond to wildfires on Cortes Island, and can assist BCWS in responding to wildfires outside of the FPA. However, the areas outside of FPA are primarily under BCWS jurisdiction, and response resources would be supplied via the Powell River Fire Centre/Sunshine Coast Fire Zone.

Wildfire suppression impediments exist due to the nature of the CIFFA being a society. The SRD has no ability to grant the CIFFA the authority to enter onto private land, and breaching this condition holds the association liable for undertaken risks such as damages and loss of life. This includes fire suppression efforts and the removal of combustible and hazardous materials on private property. As the island is 33% private land, this limitation may impede emergency response throughout the island. Furthermore, under the current contract, CIFFA does not have the authority to impose a fire ban.

The emergency services industry considers the society model of fire services provision precarious and outdated given that the risks faced by volunteer departments are as great or greater than those in career departments.⁶³ It is recommended that the SRD contract an emergency services consultant to perform a Fire Department Governance Review⁶⁴ to facilitate change of the current CIFFA contractual model, increase service effectiveness, and reduce liability issues. This document should review current administrative structures, operating environments and subsequently propose an emergency services model on Cortes Island that reflects the current fire industry environment, for example, a regional

⁶² Provincial Coordination Plan for Wildland Urban Interface Fires. 2016. Retrieved from: https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/provincial-emergency-planning/bc-provincial-coord-plan-for-wuifire_revised_july_2016.pdf

⁶³ The consultant interviewed an external consultant in the fire services industry

⁶⁴ Example: Dave Mitchell & Associates Ltd. 2019. *Nanaimo Fire Department Governance Review*.

approach to fire services. Resources and steps needed, as well as an implementation plan, should be incorporated into the review.

6.1.1 Equipment

In consultation with the CIFFA, it was determined that the wildfire fighting equipment deficiencies noted in the 2011 CWPP, including a lack of basic wildfire gear and limited number of pumps and sprinklers, have been improved upon but should be maintained and augmented. Currently, the CIFFA has two tenders, two engines, one command truck, one rescue vehicle and a new wildfire skid unit, of which the CIFFA is sufficiently trained upon to be incorporated as part of the fleet (Table 21). The skid unit is a self-contained fire-fighting apparatus constructed on a 4x4 F-350 pick-up truck, equipped with 3 Honda pumps, wildland hose and appliances, a 300-gallon water tank and a 250’ booster line reel of 1” hose. The skid unit also has foam capabilities. It is recommended that CIFFA continues to work with BCWS to train with wildfire fighting equipment and regularly evaluate the need for more equipment and training, as discussed in Section 6.1.3.

Table 21. CIFFA capacity and equipment within the AOI.

Fire Protection Zones	Fire Department	Station	Number of Members	Apparatus type and number ⁶⁵
Electoral Area ‘B’ “Cortes Island”	Cortes Island Fire Fighting Association (CIFFA)	Hall 1 – Mansons Landing	14 (13 volunteer)	1 tender (840/1200) 1 engine (850/500) 1 command truck 1 rescue truck 1 F-350 wildland truck (skid unit) (?/350)
		Hall 2 - Whaletown		1 tender (?/1750) 1 engine (1050/1000)

Over the previous 3 years (2017-2019), the CIFFA responded to an average of 49 calls per year. 36 (73%) of these calls were to fires. The CIFFA will also respond to calls for medical aid, motor vehicle accidents, and other non-fire emergencies. No data has been collected for the number of wildland fires calls that the CIFFA has responded to. It is recommended that the association collect this data to aid in rationalizing investments in wildland equipment and training.

6.1.2 Water Availability for Wildfire Suppression

Water is the single most important suppression resource. In an emergency response scenario, it is critical that sufficient water is available. The Fire Underwriters Survey summarizes their recommendations regarding water works systems fire protection requirements, in *Water Supply for Public Fire Protection* (1999).⁶⁶ Some key points from this document include the need for:

⁶⁵ Information from CIFFA; apparatus specifications from https://fire.fandom.com/wiki/Cortes_Island_Fire_Department. Volume in imperial gallons (pumping capacity/water tank capacity).

⁶⁶ Canadian Insurance Industry. 1999. *Water Supply for Public Fire Protection*. Retrieved from: <http://www.scm-rms.ca/docs/Fire%20Underwriters%20Survey%20-%201999%20Water%20Supply%20for%20Public%20Fire%20Protection.pdf>



- Duplication of system parts in case of breakdowns during an emergency;
- Adequate water storage facilities;
- Distributed hydrants, including hydrants at the ends of dead-end streets;
- Piping that is correctly installed and in good condition; and
- Water works planning should always take worst-case-scenarios into consideration. The water system should be able to serve more than one major fire simultaneously, especially in larger urban centers.

There are known limitations to water supply in the AOI. Outside of Squirrel Cove, there is no public water system on Cortes Island. Water supply for fire suppression in the AOI is sourced from CIFFA-installed water cisterns, private cisterns, and natural water sources. Beyond the Squirrel Cove system (Klahoose First Nation jurisdiction) only one fire hydrant exists within the fire services area boundary, located at the Cortes Island School in Mansons Landing. See Table 8 in Section 3.2.3 for a list of artificial water sources and their locations. The non-reliance on a public water system means that water availability for fire suppression is not tied to electrical power, which can be compromised in an interface wildfire event. However, suppression volumes are limited and there are areas within the FPA that could benefit from additional water supply. The Wildfire Working Group identified the bottom of Gorge Hall and Tiber Bay as good locations for additional water cisterns.

Although CIFFA is well-equipped to draft from natural water sources and has two large volume (>1000 gallons) tanker trucks, some of these water sources are also at risk of drying or experiencing reduced water levels during drought events, which typically coincide with high and extreme fire danger rating days. Further, as drafting is a complicated process, issues can arise that can impact fire suppression efficiency and effectiveness. It is recommended that CIFFA and BCWS develop a contract to outsource a water tender that can be utilized in a wildfire event where CIFFA resources may be stretched thin. It is also recommended that existing sumps, e.g., at the Recycling Center, are deepened to improve water retention during the wildfire season. Known water sources should be regularly inspected by the CIFFA to ensure they have adequate supply in the event of a fire.

It is also recommended that the SRD conduct a water supply vulnerability assessment. This assessment should include an analysis of the vulnerability of cisterns and natural water sources to wildfire and/or drought, tanker truck access to natural water sources (e.g., Hague and Gunflint Lakes) and the duration and quality of supply during sustained pumping effort. Within the assessment, the feasibility of installing 500-gallon water tanks in Tiber Bay and at the bottom of Gorge Hill should be considered.

6.1.3 Access and Evacuation

Emergency access and evacuation planning is of particular importance in the event of a wildfire event or other large-scale emergency. In accordance with 2011 CWPP recommendations, the SRD has developed an official evacuation plan for Cortes Island. The evacuation plan outlines basic contingencies in the event of a wildland/interface fire, including specific and alternate evacuation routes to be used during an emergency situation, and a list of key contacts and the roles of local government personnel in the event of a wildfire.



An evacuation recording procedure established within the evacuation plan will ensure that the status of each home within an evacuation zone is identified and recorded. Houses will be coded as 'Not Home', 'Notified', 'Evacuated', 'Refused' or 'Needs Assistance' with a 2 – 3 ft. long ribbon tape visible from the street. As noted in section 6.1.1, issues with access to private land for fire suppression are present, as the CIFFA does not have legal authorization to enter private property and may be held liable for any associated risk that is undertaken on private property during an evacuation event.

Road networks in a community serve several purposes including providing access for emergency vehicles, providing escape/evacuation routes for residents, and creating fuel breaks. Access and evacuation during a wildfire emergency often must happen simultaneously and road networks should have the capacity to handle both. In the event of a wildfire emergency, arterial routes in the AOI consist of Whaletown Road, Gorge Harbour Road, Seaford Road, Bartholomew Road, Carrington Bay Road, Harbour Road, Cortes Bay Road, Squirrel Cove Road and Sulti Point Road. If a wildfire were to block an arterial route, evacuation from the AOI would be challenged; however, as multiple arterial roads are parallel to one another and assembly points have been identified at each major intersection, alternate routes for many parts of the AOI exist. For example, Squirrel Cove Road connects to Seaford Road and runs parallel to Gorge Harbour Road, presenting an alternate evacuation route for Evacuation Zones A, B, C and H (see Map 2 in Section 2.5.1) in an event where Gorge Harbour Road was compromised. Contrary, if one of the arterial roads west of the Gorge Harbour Road and Whaletown Road intersection became obstructed, evacuation would be increasingly challenged as no alternative routes to the BC Ferries terminal exist, which is the main evacuation point off of the island.

Many roads throughout the AOI, including some major roads, are single access with limited turnabouts, limiting the ability of fire crews to respond to fires and safely evacuate residence. A number of single access routes or isolated neighborhoods that cause suppression or evacuation concerns were identified during field visits and in consultation with the Wildfire Working Group and are included in the list of priority neighbourhoods in Table 17. In addition, driveways to some individual properties are too narrow for water tenders to enter, which prohibits water shuttling. Few unpaved recreational and industrial backroads exist, and residential streets are primarily paved and kept in good condition, although the extent of plowing in the winter can be limited. Smoke and poor visibility, car accidents, wildlife, and other unforeseen circumstances can further complicate evacuations and hinder safe passage.

There is a significant portion of land within the AOI which is inaccessible by roads. There is only one access road to the northern section of the island, and a combination of rough and loose surfaces and encroachment of deciduous stems makes the road impassable. Landscape level fuel breaks, in conjunction with adequate access, are a valuable fire suppression tool in rural areas such as this. Well-designed fuel breaks can slow down the spread of a fire, allowing more time for firefighters to initiate suppression activities and for evacuation to take place.

In consultation with CIFFA and SRD, it was noted that many home addresses are unreflective and often not adequately visible throughout the island. As many properties on Cortes Island have long driveways, having well-marked addresses is imperative to a safe and effective evacuation and education of this significance to community members is recommended. A spatial layer of home addresses within the AOI is available to the CIFFA and BCWS. In addition to the spatial distribution of addresses, it is useful for fire



departments and BCWS to have the most recent information on gate locations for large properties as well as associated ownership status.

6.1.4 Training

All members of the CIFFA receive wildfire specific training (SPP-WFF1 at a minimum) in addition to significant training focused on structural firefighting. CIFFA has a mutual agreement with BCWS and conduct annual cross-training with the Powell River Initial Attack crew to the exterior operations Playbook standard. Exterior operations is a level of service of which a fire department does not undertake interior attack of rescue operation on a fire-involved structure or object, nor operate in an environment that is “immediately dangerous to life and health”.⁶⁷A principal minimum training is required to qualify for this level of service, as determined by the Fire Services Act of BC.

Other off-island training courses are taken by crew members, consist of auto extrication and rope rescue courses. Past on-island collaboration with BCWS include a 2018 tabletop exercise in Squirrel Cove and S-100 courses. Additionally, BCWS has in the past hosted community engagement events on the island such as public educational sessions.

It is recommended that CIFFA members continue to engage in annual practical wildland fire training with BCWS that covers at a minimum: pump, hose, air tanker awareness, and employment of structural protection units (SPUs). The aforementioned cross-training opportunity could include, for example, a joint wildfire simulation exercise and the opportunity to discuss working together on inter-agency fires. Provision of training opportunities for structural firefighters in the realm of wildland firefighting is critical to building capacity for suppression and emergency management at the local level. It must be noted that SPP-WFF1 (Wildland Firefighter Level 1 for structural firefighters) is a new S100 equivalent course for structure firefighters only, and as such BCWS has phased out instruction of S100 training for fire departments. In addition to upholding SPP-WFF1 certification, it is suggested that all fire crew members undertake the SPP 115 course to train structural firefighters in the deployment of SPUs.

6.2 STRUCTURE PROTECTION

CIFFA is well resourced in structural fire suppression equipment with some wildland equipment, including the new wildland skid truck, although they do not have an SPU. The UBCM also owns four complete SPUs, each equipped with sprinklers, hose, pumps and fittings to protect 30 – 35 structures.⁶⁸ The kits are deployed by the MFLNRORD/BCWS incident command structure and are placed strategically across the province during the fire season based on fire weather conditions and fire potential. When the

⁶⁷ Office of the Fire Commissioner. 2015. Structure Firefighters Competency and Training Playbook. Retrieved from: <https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/emergency-preparedness-response-recovery/embc/fire-safety/playbook.pdf>

⁶⁸ Union of BC Municipalities. 2020. *Structural Protection Unit Inventory Specifications*. Retrieved from: <https://www.ubcm.ca/assets/Services/Documents/structural-protection-units-technical-specifications.pdf>



kits are not in use, they may be utilized by fire departments for training exercises. SPUs can be useful tools in the protection of rural/interface homes in the event of a wildfire.

An important component of structure protection is ensuring homes are as fire-resilient as possible. The application of FireSmart principles in the AOI are described in Section 5.2.3. It is recommended that homeowners take a building envelope – out approach, that is, starting with the home and working their way out. Addressing little projects first can allow for quick, easy, and cost-effective risk reduction efforts to be completed sooner, while larger, more costly projects can be completed as resources and planning allow. For example, prior to the fire season, clearing roofs and gutters of combustible materials (leaves and needles), cleaning out any combustible accumulations or stored materials from under decks, moving large potential heat sources such as firewood, spare building materials or vehicles as far from the structure as possible, maintaining a mowed and watered lawn, removing dead vegetation, and pruning trees are actionable steps that residents can start working on immediately. The following link accesses an excellent four-minute video demonstrating the importance of FireSmart building practices during a simulated ember shower: <http://www.youtube.com/watch?v=Vh4cQdH26g>.



Table 22. Summary of Wildfire Response Recommendations.

Document Section 6: Wildfire Response Resources					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
37	High	Develop a Fire Department Governance Review that outlines a recommended governance and administration structure to facilitate change of the current CIFFA contractual model. This document should review current administrative structures, operating environments and subsequently propose an emergency services model on Cortes Island that reflects the current fire industry environment e.g., a regional approach to fire services. Resources and steps needed, as well as an implementation plan should be incorporated into the review.	Upon discussion with an external consultant, it has been determined that the current Emergency Services structure on Cortes Island does not reflect requirements of the current fire services industry. Since the establishment of the Office of the Fire Commission, an increased level of training, equipment and supervision is now required throughout all fire service departments. ² A Fire Department Governance Review will allow the SRD to identify and establish approaches to amend administration and governance, increase service effectiveness and reduce liability issues. Example Fire Department Governance Review: Regional District of Nanaimo ⁶⁹	~120 in-house hours/consultant hours	SRD initiative
38	High	The SRD should conduct a water supply vulnerability assessment that includes an analysis of the vulnerability of water supply tanks and natural water sources to wildfire, mass wasting, and/or drought, and the duration and quality of supply during sustained pumping effort. Within the assessment, the feasibility of installing 500-gallon water tanks in Tiber Bay and at the bottom of Gorge Hill should be considered to increase the availability and distribution of water for wildfire suppression to each community throughout the Island. Water sources should be regularly inspected by the CIFFA to ensure they have adequate supply in the event of a fire.	Determine potential supply issues in the event of a large interface wildfire event. CIFFA identified Tiber Bay and Gorge Hill as locations deficient of adequate water sources. Some CIFFA owned water tanks were noted as low or empty during field visits.	~\$2,000 for the assessment (consultant). (UBCM CRI Program Funding-Emergency Planning) Additional time and cost for water tank consultation,	SRD Initiative/external consultant

⁶⁹ Dave Mitchell & Associates Ltd. 2019. *Nanaimo Fire Department Governance Review*.



Document Section 6: Wildfire Response Resources					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
				implementation and monitoring	
39	Medium	Augment existing sumps to prevent water depletion during the wildfire season. Specifically, expand the existing sump adjacent to the hazardous Recycling Centre to facilitate water retention.	Recycling Centre staff identified an on-site sump that frequently dries up during summer months.	~4 in-house hours (Local Government funding)	7
40	High	Fire departments should continue training and working with BCWS. As part of the training, it is recommended to conduct annual reviews to ensure PPE and wildland equipment resources are complete, in working order, and the crews are well-versed in their set-up and use. It is recommended the CIFFA continue to engage in annual practical wildland fire training with BCWS that covers at a minimum: pump, hose, hydrant, air tanker awareness, and employment of SPUs. Interface training should include completion of a joint wildfire simulation exercise and safety training specific to wildland fire and risks inherent with natural areas. It is recognized that BCWS crew resources are limited and their availability and is highly dependent upon the current fire season and other BCWS priorities.	Maintain an annual structural and interface training program and foster a strong relationship between CIFFA and BCWS.	Time/cost dependent on numbers and training done. Wildfire training courses qualify for UBCM CRI Program funding	CIFFA Initiative
41	High	Ensure all fire personnel continue to maintain their SPP-WFF1 certification at a minimum. Consider expanding the training program to maintain a high level of member education and training specific to interface and wildland fires (i.e., SPP-115). SPP-115 provides training to structural firefighters on the use of wildfire pumps and hose (and fire service hose and hydrants) in the application of structural protection units (SPUs). The fire departments should continue the practice of staying up to date on wildfire training opportunities, and to train members in this capacity, as training resources/budgets allow.	Ensure all CIFFA personnel are qualified to respond to wildfire emergencies and use wildfire suppression equipment. CIFFA Fire Chief noted that currently all CIFFA members must maintain SPP-WFF1 certifications.	Time/cost dependent on numbers and training done. Wildfire training courses qualify for UBCM CRI Program funding	CIFFA Initiative



Document Section 6: Wildfire Response Resources					
Item	Priority	Recommendation / Action	Rationale	Estimated Cost (\$) or Person Hours	Resources
42	High	Continue to improve CIFFA wildfire equipment supply by purchasing new or replacing old equipment. Specifically, the CIFFA should work towards obtaining funding for an SPU with hoses, pumps and sprinklers that can be deployed during a wildfire event. Consider applying for funding opportunities through the UBCM Volunteer & Composite Fire Department Training program.	Augment wildfire resources so that CIFFA is equipped to respond to wildfire emergencies.	~16 in-house hours for applications Cost dependent on equipment purchased; UBCM funding may be available.	SRD/CIFFA Initiative



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APPENDIX A – LOCAL WILDFIRE RISK PROCESS

The key steps to complete the local wildfire risk assessment are outlined below:

1. Fuel type attribute assessment, ground truthing/verification and updating as required to develop a local fuel type map (Appendix A-1).
2. Consideration of the proximity of fuel to the community, recognizing that fuel closest to the community usually represents the highest hazard (Appendix A-2).
3. Analysis of predominant summer fire spread patterns using wind speed and wind direction during the peak burning period using ISI Rose(s) from BCWS weather station(s) (Appendix A-3). Wind speed, wind direction, and fine fuel moisture condition influence wildfire trajectory and rate of spread.
4. Consideration of topography in relation to values (Appendix A-4). Slope percentage and slope position of the value are considered, where slope percentage influences the fire's trajectory and rate of spread and slope position relates to the ability of a fire to gain momentum uphill.
5. Stratification of the WUI based on relative wildfire risk, considering all of the above.
6. Consider other local factors (i.e., previous mitigation efforts, and local knowledge regarding hazardous or vulnerable areas)
7. Identify priority wildfire risk areas for field assessment.

The basis for the prioritization of field assessment locations is further detailed in Section 4.3. Wildfire risk Assessment plot worksheets are provided in Appendix C (under separate cover), plot locations are summarized in Appendix F, and the field data collection and spatial analysis methodology is detailed in Appendix H.



A-1 FUEL TYPE ATTRIBUTE ASSESSMENT

The Canadian Forest Fire Behaviour Prediction (FBP) System outlines five major fuel groups and sixteen fuel types based on characteristic fire behaviour under defined conditions.⁷⁰ Fuel typing is recognized as a blend of art and science. Although a subjective process, the most appropriate fuel type was assigned based on research, experience, and practical knowledge; this system has been used within BC, with continual improvement and refinement, for 20 years.⁷¹ It should be noted that there are significant limitations with the fuel typing system which should be recognized. Major limitations include: a fuel typing system designed to describe fuels which do not occur within the AOI, fuel types which cannot accurately capture the natural variability within a polygon, and limitations in the data used to create initial fuel types.⁷¹ Details regarding fuel typing methodology and limitations are found in Appendix G. There are several implications of the aforementioned limitations, which include: fuel typing further from the developed areas of the study has a lower confidence, generally; and, fuel typing should be used as a starting point for more detailed assessments and as an indicator of overall wildfire risk, not as an operational, or site-level, assessment.

Table 23 summarizes the fuel types by general fire behaviour (crown fire and spotting potential). In general, the fuel type that may be considered hazardous in terms of fire behaviour and spotting potential in the AOI are C-3 and C-7, particularly if there are large amounts of woody fuel accumulations or denser understory ingrowth. C-5 fuel types have a moderate potential for active crown fire when wind-driven.⁷¹ An M-1/2 fuel type can sometimes be considered hazardous, depending on the proportion of conifers within the forest stand; conifer fuels include those in the overstory, as well as those in the understory. An O-1b fuel type often can support a rapidly spreading grass or surface fire capable of damage or destruction of property, and jeopardizing human life, although it is recognized as a highly variable fuel type dependent upon level of curing.⁷² These fuel types were used to guide the threat assessment.

Forested ecosystems are dynamic and change over time: fuels accumulate, stands fill in with regeneration, and forest health outbreaks occur. Regular monitoring of fuel types and wildfire risk assessment should occur every 5 – 10 years to determine the need for threat assessment updates and the timing for their implementation.

⁷⁰ Forestry Canada Fire Danger Group. 1992. Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3.

⁷¹ Perrakis, D.B., Eade G., and Hicks, D. 2018. Natural Resources Canada. Canadian Forest Service. *British Columbia Wildfire Fuel Typing and Fuel Type Layer Description* 2018 Version.

⁷² Ibid.



Table 23. Fuel Type Categories and Crown Fire Spot Potential. Only summaries of fuel types encountered within the AOI are provided (as such, other fuel types, i.e., C-1, C-2, C-4, S-1, S-2 and S-3 are not summarized below).

Fuel Type	FBP / CFDRS Description	AOI Description	Wildfire Behaviour Under High Wildfire Danger Level	Fuel Type – Crown Fire / Spotting Potential
C-3	Mature jack or lodgepole pine	Fully stocked, late young forest (Douglas fir, hemlock, cedar), with crowns separated from the ground	Surface and crown fire, low to very high fire intensity and rate of spread	High*
C-7	Ponderosa pine and Douglas-fir	Low-density, uneven-aged forest, crowns separated from the ground, understory of discontinuous grasses and shrubs. Exposed bed rock and low surface fuel loading.	Surface fire spread, torching of individual trees, rarely crowning (usually limited to slopes > 30%), moderate to high intensity and rate of spread	Moderate
O-1a/b	Grass	Matted and standing grass communities; sparse or scattered shrubs, trees and down woody debris. Seasonal wetlands that have the potential to cure.	Rapidly spreading, high-intensity surface fire when cured	Low
M-1/2	Boreal mixedwood (leafless and green)	Moderately well-stocked mixed stand of conifers and deciduous species, low to moderate dead, down woody fuels; areas harvested 10-20 years ago	Surface fire spread, torching of individual trees and intermittent crowning, (depending on slope and percent conifer)	<26% conifer (Very Low); 26-49% Conifer (Low); >50% Conifer (Moderate)
D-1/2	Aspen (leafless and green)	Deciduous stands	Always a surface fire, low to moderate rate of spread and fire intensity	Low
W	N/A	Water	N/A	N/A
N	N/A	Non-fuel: irrigated agricultural fields, golf courses, alpine areas void or nearly void of vegetation, urban or developed areas void or nearly void of forested vegetation	N/A	N/A

*C-3 fuel type is considered to have a high crown fire and spotting potential within the AOI due to the presence of moderate to high fuel loading (dead standing and partially or fully down woody material), and continuous conifer ladder fuels.

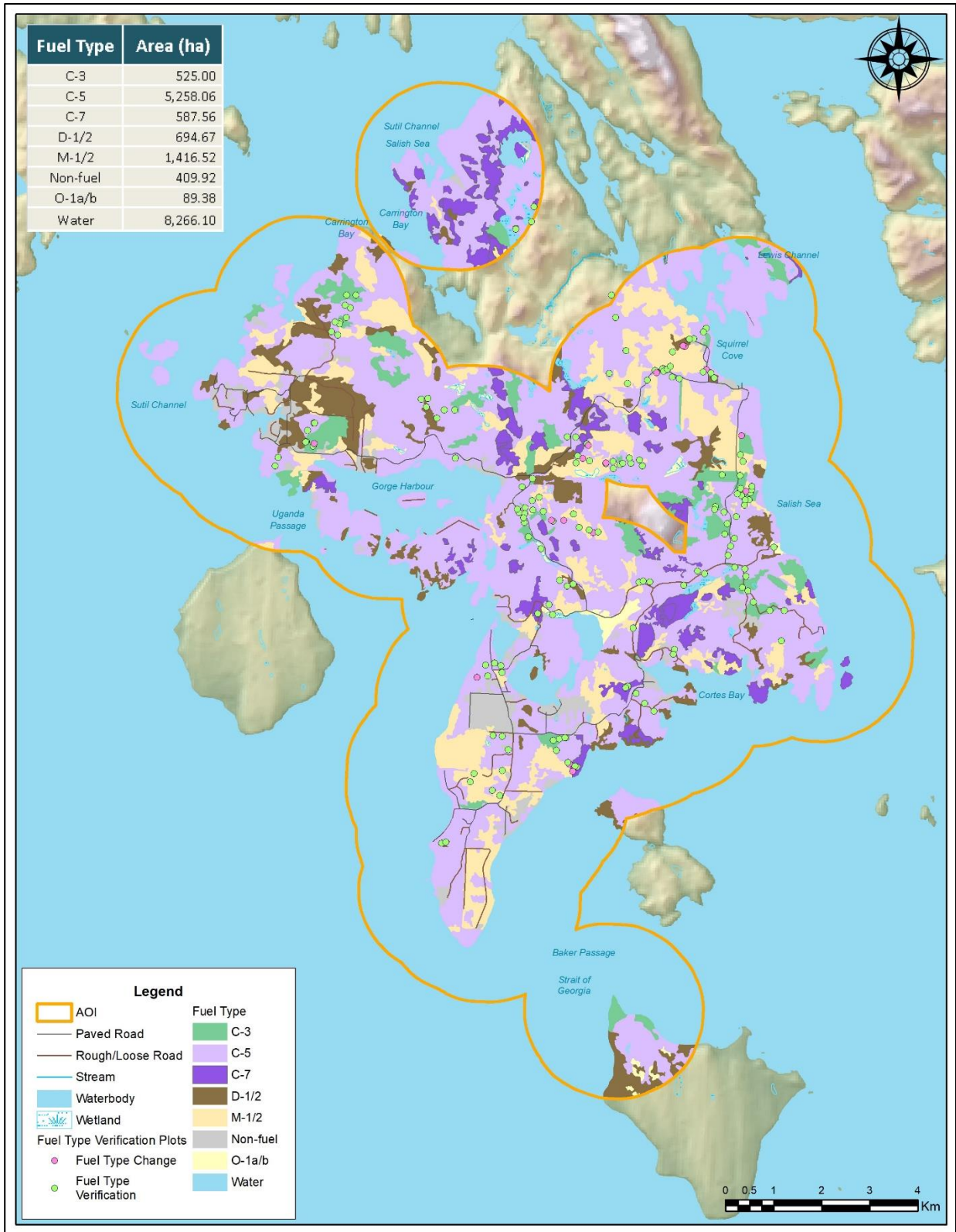
During field visits, nine recurring patterns of fuel type errors were found in the provincial dataset. They were:

- C-7 fuel types being incorrectly identified by the PSTA as C-5,
- C-3 fuel types identified as D-1/2,
- C-3 fuel types identified as C-5,



- C-5 fuel types identified as C-3,
- C-5 fuel types identified as M-1/2,
- M-1/2 fuel types identified C-5,
- M-1/2 fuel types identified as D-1/2,
- M-1/2 fuel types identified as S-3

All fuel type updates were approved by BCWS, using stand and fuel descriptions and photo documentation for the review process (see Appendix B for submitted fuel type change rationales).



Map 14. Updated Fuel Type



A-2 PROXIMITY OF FUEL TO THE COMMUNITY

Fire hazard classification in the WUI is partly dictated by the proximity of the fuel to developed areas within a community. More specifically, fuels closest to the community are considered to pose a higher hazard in comparison to fuels that are located at greater distances from values at risk. As a result, it is recommended that the implementation of fuel treatments prioritizes fuels closest to structures and / or developed areas, in order to reduce hazard level adjacent to the community. Continuity of fuel treatment is an important consideration, which can be ensured by reducing fuels from the edge of the community outward. Special consideration must be allocated to treatment locations to ensure continuity, as discontinuous fuel treatments in the WUI can allow wildfire to intensify, resulting in a heightened risk to values. In order to classify fuel threat levels and prioritize fuel treatments, fuels immediately adjacent to the community are rated higher than those located further from developed areas. Table 24 describes the classes associated with proximity of fuels to the interface.

Table 24. 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 2000	(501-2000 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.
	>2 000 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.

**Distances are based on spotting distances of high and moderate fuel type spotting potential and threshold to break crown fire potential (100m). These distances can be varied with appropriate rationale, to address areas with low or extreme fuel hazards.*



A-3 FIRE SPREAD PATTERNS

Wind speed, wind direction, and fine fuel moisture condition influence wildfire trajectory and rate of spread. The influence of topography on fire spread patterns is discussed in Appendix A-4. Wind plays a predominant role in fire behaviour and direction of fire spread and is summarized in the Initial Spread Index (ISI) Rose(s) from the local representative BCWS weather station. The Initial Spread Index (ISI) is a numeric rating of the expected rate of fire spread that combines the effects of wind speed and fine fuel moisture. ISI roses can help plan the location of fuel treatments on the landscape to protect values at risk based on the predominant wind direction and frequency of higher ISI values. Potential treatment areas were identified and prioritized with the predominant wind direction in mind; wildfire that occurs upwind of a value poses a more significant threat to that value than one which occurs downwind.

The local representative BCWS weather station for the AOI is Quinsam Base TWX. The Quinsam Base weather station is located in Campbell River, approximately 45 km west of the AOI at an elevation of 78 m. Hourly ISI roses depicting the frequency of ISI values by wind direction for the Quinsam Base weather stations are shown below in Figure 8. Figure 9 displays the daily average ISI values for Quinsam Base and for the TS Theodosia weather station, which represents wind speeds and directions in the east of the AOI. TS Theodosia weather station is located to the northeast of Theodosia Arm in the Desolation Sound at an elevation of 87 m.

During the fire season (April – October) predominant winds originate from the northwest. Winds generally come from the North, Northeast and Northwest during the day, while to a lesser degree, winds also occur from the south overnight. ISI values over 5 occur ~15% of the time, with the highest values occurring most frequently with winds from the north, northeast, northwest and south.

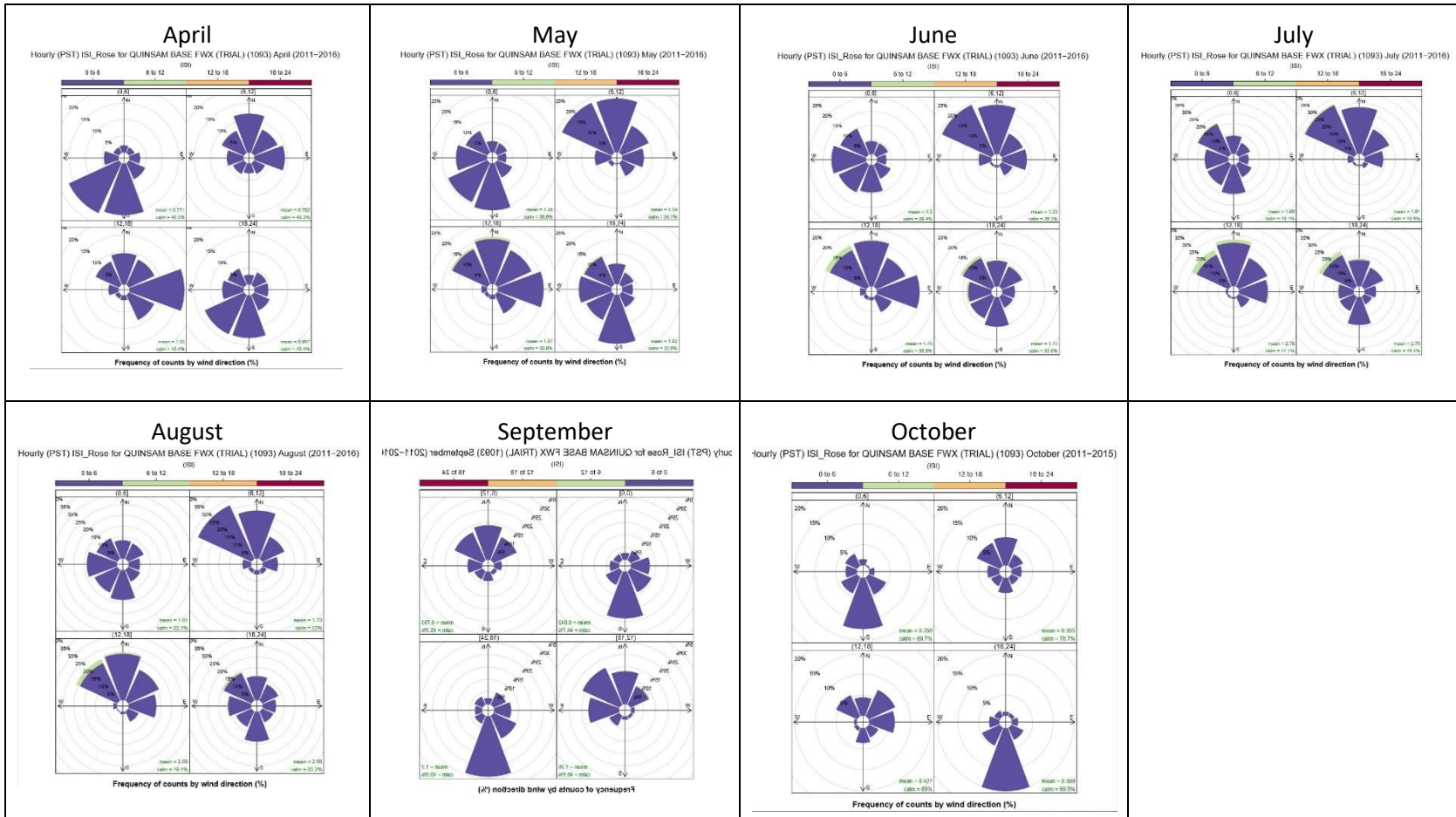


Figure 8. Initial Spread Index (ISI) roses depicting the average frequency of ISI values by wind direction for four 6-hour periods over the fire season April – October. Data taken from the Quinsam Base TWX (Trail) fire weather station.

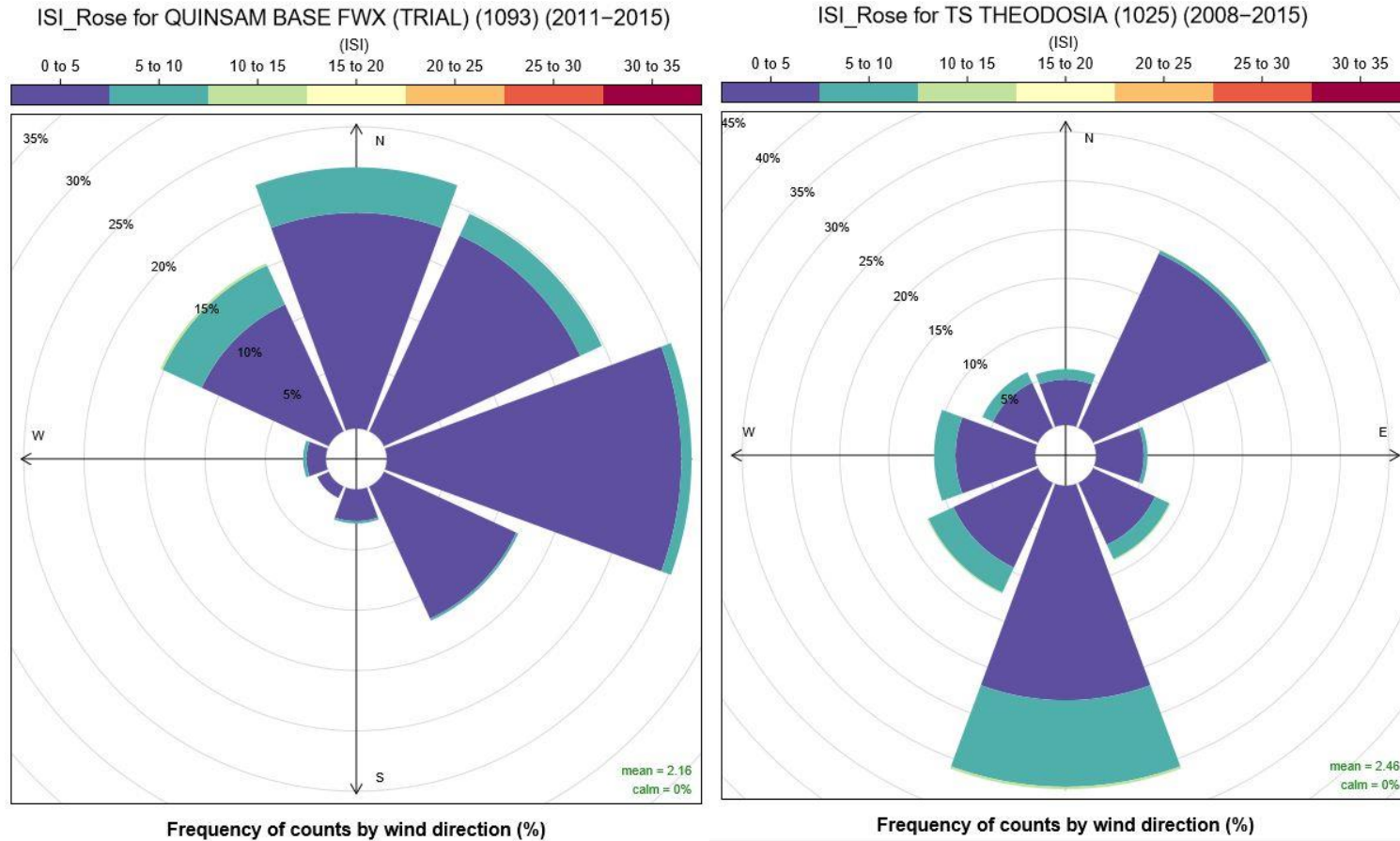


Figure 9. Initial Spread Index (ISI) roses depicting average daily wind speed and direction during the fire season (April – October) . Data taken from the Quinsam Base TWX fire weather station (left), 2011 – 2015 and TS Theodosia weather station (right), 2008 – 2015.



A-4 TOPOGRAPHY

Topography is an important environmental component that influences fire behaviour. Considerations include slope percentage (steepness) and slope position where slope percentage influences the fire’s trajectory and rate of spread and slope position relates to the ability of a fire to gain momentum uphill. Other factors of topography that influence fire behaviour include aspect, elevation and land configuration.

Slope Class and Position

Slope steepness affects solar radiation intensity, fuel moisture (influenced by radiation intensity) and influences flame length and rate of spread of surface fires. Table 26 summarizes the fire behaviour implications for slope percentage (the steeper the slope the faster the spread). In addition, slope position affects temperature and relative humidity. A value placed at the bottom of the slope is equivalent to a value on flat ground. A value on the upper 1/3 of the slope would be impacted by preheating and faster rates of spread. The majority of the AOI (82%) is on less than 20% slope and will likely not experience accelerated rates of spread due to slope class. Approximately 10% percent of the AOI is likely to experience an increased rate of spread, 8% high rate of spread and approximately 1% is likely to experience an extreme rate of spread. On the larger topographic scale, residential developments in the AOI would be considered bottom of the slope or valley bottom.

Table 25. Slope Percentage and Fire Behaviour Implications.

Slope	Percent of AOI	Fire Behaviour Implications
<20%	82%	Very little flame and fuel interaction caused by slope, normal rate of spread.
20-30%	10%	Flame tilt begins to preheat fuel, increase rate of spread.
30-45%	5%	Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.
40-60%	3%	Flame tilt preheats fuel and bathes flames into fuel, very high rate of spread.
>60%	1%	Flame tilt preheats fuel and bathes flames into fuel well upslope, extreme rate of spread.

Table 26. 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 increase 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.



Slope Position of Value	Fire Behaviour Implications
Upper 1/3 of slope	Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel.



APPENDIX B – WILDFIRE RISK ASSESSMENT – FBP FUEL TYPE CHANGE RATIONALE

Provided separately as PDF package.



APPENDIX C – WILDFIRE RISK ASSESSMENT WORKSHEETS AND PHOTOS

Provided separately as PDF package.



APPENDIX D – MAPS

Provided separately as PDF package.



APPENDIX E – WILDLAND URBAN INTERFACE DEFINED

The traditional and most simple definition for the wildland/urban interface (WUI) is “the place where the forest meets the community”. However, this definition can be misleading. Incorrectly, it implies that neighborhoods and structures well within the perimeter of a larger community are not at risk from wildfire. As well, it fails to recognize that developments adjacent to grassland and bush are also vulnerable.

A more accurate and helpful definition of the WUI is based on a set of conditions, rather than a geographical location: “the presence of structures in locations in which conditions result in the potential for ignition of structures from the flames, radiant heat or embers of a wildland fire.” This definition was developed by the National Fire Protection Association and is used by the US Firewise program. It recognizes that all types of wildland fuel/fire can lead to structural ignition (i.e. forest, grassland, brush) and also identifies the three potential sources of structural ignition.

Two situations are differentiated. Locations where there is a clean/abrupt transition from urban development to forest lands are usually specified as the “interface” whereas locations where structures are embedded or mingled within a matrix of dense wildland vegetation are known as the “intermix”. An example of interface and intermixed areas is illustrated in Figure 10.

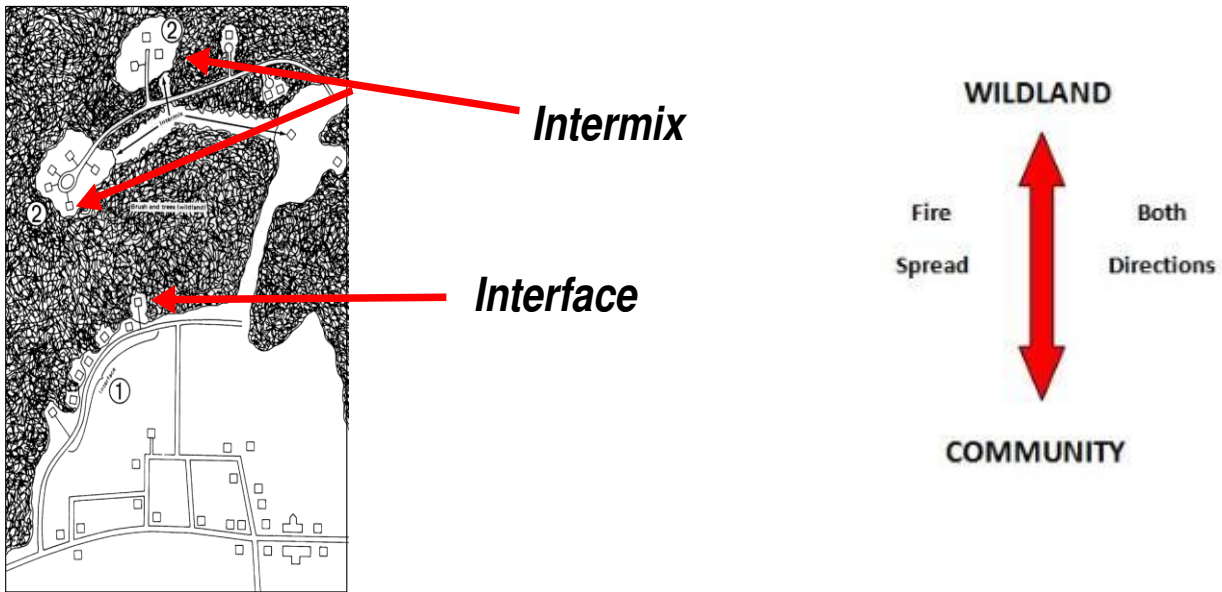


Figure 10. Illustration of intermix and interface situations.

Within the WUI, fire has the ability to spread from the forest into the community or from the community out into the forest. Although these two scenarios are quite different, they are of equal importance when considering interface fire risk. Regardless of which scenario occurs, there will be consequences for the community and this will have an impact on the way in which the community plans and prepares itself for interface fires.

Fires spreading into the WUI from the forest can impact homes in two distinct ways:



1. From sparks or burning embers carried by the wind, or convection that starts new fires beyond the zone of direct ignition (main advancing fire front), that alight on vulnerable construction materials or adjacent flammable landscaping (roofing, siding, decks, cedar hedges, bark mulch, etc.) (Figure 11).
2. From direct flame contact, convective heating, conductive heating or radiant heating along the edge of a burning fire front (burning forest), or through structure-to-structure contact. Fire can ignite a vulnerable structure when the structure is in close proximity (within 10 meters of the flame) to either the forest edge or a burning house (Figure 12).



Figure 11. Firebrand caused ignitions: burning embers are carried ahead of the fire front and alight on vulnerable building surfaces.

Figure 12. Radiant heat and flame contact allow fire to spread from vegetation to structure or from structure to structure.

Current research confirms that the majority of homes ignited during major WUI events trace back to embers as their cause (e.g., 50% – 80+ %). Firebrands can be transported long distances ahead of the wildfire, across any practicable fire guards, and accumulate on horizontal surfaces within the home ignition zone in densities that can reach 600+ /m². Combustible materials found within the home ignition zone combine to provide fire pathways allowing spot fires ignited by embers to spread and carry flames or smoldering fire into contact with structures.



APPENDIX F – WUI THREAT PLOT LOCATIONS

Table 25 displays a summary of all WUI threat plots completed during CWPP field work. The original WUI threat plot forms and photos will be submitted as a separate document. The following ratings are applied to applicable point ranges:

- Wildfire Behaviour Threat Score – Low (0-40); Moderate (41 – 95); High (96 – 149); Extreme (>149); and,
- WUI Threat Score – Low (0 – 13); Moderate (14 – 26); High (27 – 39); Extreme (>39).

Table 27. Summary of WUI Threat Assessment Worksheets.

WUI Plot #	Geographic Location	Wildfire Behaviour Threat Class	WUI Threat Class*
ANVIL-1	East of Anvil Lake	Moderate	N/A
ANVIL-2	East of Anvil Lake	High	Low/N/A
CARR-1	Carrington Bay CFGP	High	High
CARR-2	Carrington Forest	Moderate	N/A
CARR-3	Carrington Forest	Moderate	N/A
COWAN-1	Community Forest near Squirrel Cove; Cowan Road	Moderate	N/A
ELLI-1	CFGP near Ellington Way	Moderate	N/A
FERRY-1	Ferry terminal	Moderate	N/A
HALL-1	Whaletown Commons	High	Extreme
HANK-1	Hank's Beach Forest Conservation Park	Moderate	N/A
INTER-1	CFGP Gorge and Seaford intersection	Moderate	N/A
KLWL-1	Klahoose Woodlot	Moderate	N/A
KLWL-2	Klahoose Woodlot	Moderate	N/A
KLWL-3	Klahoose Woodlot	High	Moderate
KLWL-4	Klahoose Woodlot	Moderate	N/A
KWAS-1	K'was Park	Moderate	N/A
KWAS-2	K'was Park	Moderate	N/A
LARS-1	Larson Meadows	Moderate	N/A
LARS-2	Larson Meadows	Moderate	N/A
MANS-1	Mansons Landing Park	Moderate	N/A
OYST-1	Manzanita Road CFGP	Moderate	N/A
PIT-1	Gorge Harbour	Moderate	N/A
PIT-2	Gorge Harbour	Moderate	N/A
RECY-1	Recycling Centre	High	Extreme



WUI Plot #	Geographic Location	Wildfire Behaviour Threat Class	WUI Threat Class*
SCHOO-1	School	Moderate	N/A
SEAF-1	Seafood Road CFGP	Moderate	N/A
SEAF-2	Seafood Road CFGP	Moderate	N/A
SISK-1	Siskin Forest Park	High	Extreme
SISK-2	Siskin Forest Park	High	Extreme
SKID-1	North AOI	Moderate	N/A
SMELT-1	Smelt Bay Provincial Park	Moderate	N/A
SMELT-2	Smelt Bay Provincial Park	Moderate	N/A
SPNT-1	End of Southpoint Road	Moderate	N/A
SQ-2	Squirrel Cove	High	Extreme
TIBE-1	Tiber Bay	Moderate	N/A
TIBS-1	Tiber Bay South	Moderate	N/A
WHALE-1	Whaletown	Moderate	N/A
YARD-1	Mainroads Highway Yard	High	Extreme
YARD-2	Roadside near Highway Works Yard	Moderate	N/A

*Note that WUI threat scores are only collected for untreated polygons that rate high or extreme for Wildfire Behaviour Threat score.



APPENDIX G – FUEL TYPING METHODOLOGY AND LIMITATIONS

The initial starting point for fuel typing for the AOI was the 2019 provincial fuel typing layer provided by BCWS as part of the *2018 Provincial Strategic Threat Analysis (PSTA)* data package. This fuel type layer is based on the FBP fuel typing system. PSTA data is limited by the accuracy and availability of information within the Vegetation Resource Inventory (VRI) provincial data; confidence in provincial fuel type data is very low on private land. The PSTA threat class for all private land within the AOI was not available. Fuel types within the AOI have been updated using orthoimagery of the area with representative fuel type calls confirmed by field fuel type verification. Polygons not field-verified were assigned fuel types based upon similarities visible in orthophotography to areas field verified. Where polygons were available from the provincial fuel typing layer, they were utilized and updated as necessary for recent harvesting, development, etc.

It should be noted that fuel typing is intended to represent a fire behaviour pattern; a locally observed fuel type may have no exact analog within the FBP system. The FBP system was almost entirely developed for boreal and sub-boreal forest types, which do not occur within the AOI. As a result, the local fuel typing is a best approximation of the Canadian Forest Fire Danger Rating System (CFFDRS) classification, based on the fire behaviour potential of the fuel type during periods of high and extreme fire danger within the local MFLNRORD region. Additionally, provincial fuel typing depends heavily on VRI data, which is gathered and maintained in order to inform timber management objectives, not fire behaviour prediction. For this reason, VRI data often does not include important attributes which impact fuel type and hazard, but which are not integral to timber management objectives. Examples include: surface fuels and understory vegetation.

In some cases, fuel type polygons may not adequately describe the variation in the fuels present within a given polygon due to errors within the PSTA and VRI data, necessitating adjustments required to the PSTA data. In some areas, aerial imagery is not of sufficiently high resolution to make a fuel type call. Where fuel types could not be updated from imagery with a high level of confidence, the original PSTA fuel type polygon and call were retained.

For information on the provincial fuel typing process used for PSTA data as well as aiding in fuel type updates made in this document, please refer to Perrakis, Eade, and Hicks, 2018.⁷³

⁷³ Perrakis, D.B., Eade G., and Hicks, D. 2018. Natural Resources Canada. Canadian Forest Service. *British Columbia Wildfire Fuel Typing and Fuel Type Layer Description 2018 Version*



APPENDIX H – WUI THREAT ASSESSMENT METHODOLOGY

As part of the CWPP process, spatial data submissions are required to meet the defined standards in the Program and Application Guide. As part of the program, proponents completing a CWPP or CWPP update are provided with the Provincial Strategic Threat Analysis (PSTA) dataset. This dataset includes:

- Current Fire Points
- Current Fire Polygons
- Fuel Type
- Historical Fire Points
- Historical Fire Polygons
- Mountain pine beetle polygons (sometimes not included)
- PSTA Head Fire Intensity
- PSTA Historical Fire Density
- PSTA Spotting Impact
- PSTA Threat Rating
- Structure Density
- Structures (sometimes not included)
- Wildland Urban Interface Buffer Area

The required components for the spatial data submission are detailed in the Program and Application Guide Spatial Appendix – these include:

- AOI
- Fire Threat
- Fuel Type
- Proposed Treatment
- Threat Plot

The provided PSTA data does not necessarily transfer directly into the geodatabase for submission, and several PSTA feature classes require extensive updating or correction. In addition, the Fire Threat determined in the PSTA is fundamentally different than the Fire Threat feature class that must be submitted in the spatial data package. The Fire Threat in the PSTA is based on provincial scale inputs - fire density; spotting impact; and head fire intensity, while the spatial submission Fire Threat is based on the components of the Wildland Urban Interface Threat Assessment Worksheet. For the scope of this project, completion of WUI Threat Assessment plots on the entire AOI is not possible, and therefore an analytical model has been built to assume Fire Threat based on spatially explicit variables that correspond to the WUI Threat Assessment worksheet.

Field Data Collection

The primary goals of field data collection are to confirm or correct the provincial fuel type, complete WUI Threat Assessment Plots, and assess other features of interest to the development of the CWPP update. This is accomplished by traversing as much of the AOI as possible (within time, budget and access constraints). Threat Assessment plots are completed on the 2012 version form, and as per the Wildland Urban Interface Threat Assessment Guide.

For clarity, the final threat ratings for the AOI were determined through the completion of the following methodological steps:



1. Update fuel-typing using orthophotography provided by the client and field verification.
2. Update structural data using critical infrastructure information provided by the client, field visits to confirm structure additions or deletions, and orthophotography
3. Complete field work to ground-truth fuel typing and threat ratings (completed 39 WUI threat plots on a variety of fuel types, aspects, and slopes and an additional 400+ field stops with qualitative notes, fuel type verification, and/or photographs)
4. Threat assessment analysis using field data collected and rating results of WUI threat plots – see next section.

Spatial Analysis

Not all attributes on the WUI Threat Assessment form can be determined using a GIS analysis on a landscape/polygon level. To emulate as closely as possible the threat categorization that would be determined using the Threat Assessment form, the variables in Table 28 were used as the basis for building the analytical model. The features chosen are those that are spatially explicit, available from existing and reliable spatial data or field data, and able to be confidently extrapolated to large polygons.

Table 28. Description of variables used in spatial analysis for WUI wildfire risk assessment.

WUI Threat Sheet Attribute	Used in Analysis?	Comment
FUEL SUBCOMPONENT		
Duff depth and Moisture Regime	No	Many of these attributes assumed by using 'fuel type' as a component of the Fire Threat analysis. Most of these components are not easily extrapolated to a landscape or polygon scale, or the data available to estimate over large areas (VRI) is unreliable.
Surface Fuel continuity	No	
Vegetation Fuel Composition	No	
Fine Woody Debris Continuity	No	
Large Woody Debris Continuity	No	
Live and Dead Coniferous Crown Closure	No	
Live and Dead Conifer Crown Base height	No	
Live and Dead suppressed and Understory Conifers	No	
Forest health	No	
Continuous forest/slash cover within 2 km	No	
WEATHER SUBCOMPONENT		
BEC zone	Yes	
Historical weather fire occurrence	Yes	
TOPOGRAPHY SUBCOMPONENT		
Aspect	Yes	
Slope	Yes	Elevation model was used to determine slope.
Terrain	No	
Landscape/ topographic limitations to wildfire spread	No	
STRUCTURAL SUBCOMPONENT		
Position of structure/ community on slope	No	
Type of development	No	
Position of assessment area relative to values	Yes	Distance to structure is used in analysis; position on slope relative



WUI Threat Sheet Attribute	Used in Analysis?	Comment
		to values at risk is too difficult to analyze spatially.

The field data is used to correct the fuel type polygon attributes provided in the PSTA. The corrected fuel type layer is then used as part of the initial spatial analysis process. The other components are developed using spatial data (BEC zone, fire history zone) or spatial analysis (aspect, slope). A scoring system was developed to categorize resultant polygons as having relatively low, moderate, high or extreme Fire Threat, or Low, Moderate, High or Extreme WUI Threat.

These attributes are combined to produce polygons with a final Fire Behaviour Threat Score. To determine the Wildland Urban Interface Score, only the distance to structures is used. Buffer distances are established as per the WUI Threat Assessment worksheet (<200, 200-500 and >500) for polygons that have a 'high' or 'extreme' Fire Behaviour Threat score. Polygons with structures within 200m are rated as 'extreme', within 500m are rated as 'high', within 2km are 'moderate', and distances over that are rated 'low'.

There are obvious limitations in this method, most notably that not all components of the threat assessment worksheet are scalable to a GIS model, generalizing the Fire Behaviour Threat score. The WUI Threat Score is greatly simplified, as determining the position of structures on a slope, the type of development and the relative position are difficult in an automated GIS process. This method uses the best available information to produce the initial threat assessment across the AOI in a format which is required by the UBCM SWPI program.

Upon completion of the initial spatial threat assessment, individual polygon refinement was completed. In this process, the WUI threat plots completed on the ground were used in the following ways:

- fuel scores were reviewed and applied to the fuel type in which the threat plot was completed;
- conservative fuel scores were then applied to the polygons by fuel type to check the initial assessment;
- high Wildfire Behaviour Threat Class polygons were reviewed in google earth to confirm their position on slope relative to values at risk.

In this way, we were able to consider fuel attributes outside the fuel typing layer, as well as assessment area position on slope relative to structures, which are included in the WUI threat plot worksheet.

Limitations

The threat class ratings are based initially upon (geographic information systems) GIS analysis that best represents the WUI wildfire risk assessment worksheet and are updated with ground-truthing WUI threat plots. WUI threat plots were completed in a variety of fuel types, slopes, and aspects in order to be able to confidently refine the GIS analysis. It should be noted that there are subcomponents in the worksheet which are not able to be analyzed using spatial analysis; these are factors that do not exist in the GIS environment.

The threat assessment is based largely on fuel typing, therefore the limitations with fuel typing accuracy (as detailed in Appendix A-1 and Appendix G) impacts the threat assessment, as well.



APPENDIX I – SUMMARY OF 2011 RECOMMENDATIONS

The following recommendations for wildfire risk reduction were made in the 2011 CWPP completed for Cortes Island. These recommendations were directed at “individual residents, the Strathcona Regional District, provincial government, CIFFA, utility companies, and First Nations reserves” and as such are not all applicable to SRD staff. However, some recommendations have been completed fully or in part. Actions taken by the SRD to implement applicable recommendations are summarized below.

Recommendation 1: Develop a regional approach to enhancing education and communication with collaboration from the Cortes Island Volunteer Fire Department and other SRD municipalities with MFLNRO. Public education programs could be enhanced by integrating a unit of FireSmart and wildfire safety into the elementary school curriculum and creating a FireSmart sticker program where Fire Department members attend residences and certify them as meeting FireSmart guidelines.

Status unknown.

Recommendation 2: The Fire Department and SRD should develop a communication plan to outline the purpose, methods and desired results of communication and education in the community. Educational information and communication tools should be stakeholder specific. A spokesperson who can effectively establish communication ties with target audiences and provide educational information should be identified.

Status unknown.

Recommendation 3: The Fire Department and SRD should explore working with local developers to construct a FireSmart show home or public building with FireSmart landscaping as an educational tool on the principles of FireSmart.

Not completed.

Recommendation 4: The Fire Department and SRD should continue to use the Tideline and Cortes Community Radio, along with other local media outlets such as pamphlets, to communicate information on fire danger and FireSmart principles during high and extreme fire danger. The standard for website information about fire should outline community fire risks and fire danger by including information on fire bylaws, campfire bans and wildfire hazard ratings. Local websites should include links to relevant sites such as Wildfire Management Branch and FireSmart.

Completed/On-going.

Recommendation 5: Signage consisting of current fire danger, campfire bans and general fire safety related warnings should continue to be posted along main routes and on BC Ferries.

Completed/On-going.

Recommendation 6: The Fire Department should work with the SRD, BC Parks and the local First Nations to educate the local business community, particularly businesses that depend on forest use on FireSmart preparation and planning.



Status Unknown.

Recommendation 7: The SRD should consider incorporating building setbacks into a bylaw with a minimum of 10m when buildings border the forest interface.

Not completed.

Recommendation 8: The SRD and Fire Department should conduct a FireSmart hazard assessment of the community to educate residents fire hazards and mitigation for their personal residence.

Not completed.

Recommendation 9: Homeowners should be encouraged to put sprinklers on their roofs.

Status unknown.

Recommendation 10: The SRD should investigate the policy tools available (i.e. voluntary fire risk reduction for landowners, bylaws for building materials and subdivision establishment, covenants for vegetation, fire protection tax etc.) for reducing wildfire risk within the community and create and review/revise existing bylaws to be consistent with the development of a FireSmart community.

Not completed.

Recommendation 11: The SRD should consider requiring the use of roofing within new subdivisions that are fire retardant with Class A and Class B ratings. The SRD should consider obtaining legal advice regarding the implementation of building requirements that are more restrictive than the BC Building Code.

Completed.

Recommendation 12: The SRD should consider working with the Building Policy Branch to create a policy structure that would enable Cortes Island to better address WUI protection considerations for buildings.

Not completed.

Recommendation 13: Subdivision design plans should be reviewed by the Fire Department to ensure that suitable access routes exist, the water accessibility is adequate where applicable and that interface fire related issues are addressed.

Status unknown.

Recommendation 14: The SRD in coordination with the RCMP, BC Ambulance and Fire Department should work towards implementing clear and legible addresses to each house to aid in evacuation during a wildfire event.

Not completed. See recommendation 32.

Recommendation 15: FireSmart all propane storage depots, residential propane storage sites and generator sites.



Status unknown.

Recommendation 16: The SRD and Fire Department should cooperate with local groups to spearhead and cleanup old propane tanks on the island.

Status unknown.

Recommendation 17: A formal communication structure should be established with the MFLNRO to ensure that information regarding fires in the region is communicated to the Fire Department in a timely manner.

Completed.

Recommendation 18: A Community Evacuation Plan should be developed. Appropriate evacuation routes should be mapped considering DDR. Major evacuation routes should be signed and communicated to the public. The plan should identify loop roads and ensure access routes have sufficient width for two-way traffic. Alternative emergency responder access should be considered.

Completed/On-going updates.

Recommendation 19: The Fire Department should develop strategies to quickly identify and clear car accidents that impede traffic during evacuation efforts and incorporate such strategies within the evacuation plan.

Completed/On-going updates.

Recommendation 20: Access constraints should be addressed and homeowners in areas with poor emergency response access should be made aware of these constraints that may prevent the Fire Department from attending a wildland fire that could threaten their property.

Partially completed. Access constraints have been identified, however no roads construction has been implemented.

Recommendation 21: Marshalling points should be identified, signed and communicated to the public. Pre-planning for evacuation of these points should be completed to identify and correct deficiencies and provide safe, efficient egress (i.e. parking locations, traffic control measures etc.) for the community. Limitations of the number of boats available vs. the anticipated population for each evacuation center should be identified and contingency plans should be identified.

Completed.

Recommendation 22: Marshalling point and evacuation plans for isolated communities should be established.

Completed.

Recommendation 23: BC Ferries and provincial government should conduct a review of their infrastructure to assess vulnerability (i.e. risk of ignition to creosote soaked timbers) during a wildfire event and suitable mitigation measures should be implemented.



Status unknown.

Recommendation 24: Evacuation planning should be a coordinated process with the Fire Department, MFLNRO, local RCMP, BC Ambulance, the SRD, BC Ferries, Quadra Island and PEP involved.

Completed/On-going updates.

Recommendation 25: The SRD and the Fire Department should work towards improving access in areas of the community that are considered isolated and that have inadequately developed access for evacuation and fire control.

Not completed.

Recommendation 26: New subdivisions should have multiple access points that are suitable for evacuation and the movement of emergency response equipment. The number of access points and their capacity should be determined during subdivision design and should be based upon threshold densities of houses and vehicles within the subdivision.

Status unknown.

Recommendation 27: Coordination with local land owners, the MFLNRO and the Fire Department should ensure that during a wildfire event, keys for all gates are accessible to multiple suppression crews.

Status unknown.

Recommendation 28: Consideration should be given to requiring roadways to be placed adjacent to forests lands throughout new subdivisions. If forested lands surround the subdivision, ring roads should be part of the subdivision design.

Status unknown.

Recommendation 29: Contingency plans should be developed in the event that smoke causes evacuation of the community's incident command centers. The Fire Department should cooperate with provincial and regional governments to identify alternate command locations and a mobile facility in the event that the community is evacuated.

Status unknown.

Recommendation 30: The Fire Department and SRD should consider conducting a review of critical water infrastructure to identify area where water infrastructure requires improvement. Mapping of water infrastructure should be shared with adjacent municipalities which have mutual aid agreements with the MFLNRO to aid wildland suppression crews during a wildfire event.

Not completed.

Recommendation 31: The following training should be maintained:

- The S100 course training should be continued on an annual basis
- A review of the S215 course instruction should be given to Officers annually



- The S215 course instruction should be given to Fire Chiefs and Deputies and;
- Incident Command System training should be given to Fire Chiefs and Deputies

Partially completed. Annual SPP-WFF1 (previously S-100).

Recommendation 32: The Fire Department should meet with the MFLNRO prior to the fire season to review the incident command system structure in the event of a major wildland fire. The review should include designated radio channels and operating procedures.

Status unknown.

Recommendation 33: The community should consider reviewing its existing inventory of interface firefighting equipment to ensure that items are adequate to resource the interface area.

Completed. See Recommendation 40.

Recommendation 34: The Fire Department should consider working with the SRD to coordinate update their wildland fighting equipment that includes more pumps and sprinkler kits.

Completed See Recommendation 40.

Recommendation 35: Cortes should review working with Quadra Island, Sayward the SRD to create a sub-regional mobile cache of wildland firefighting equipment.

Status unknown.

Recommendation 36: Cortes should continue to encourage residents to join the volunteer fire department.

Completed/On-going.

Recommendation 37: Mutual aid agreements should be reviewed/established with MFLNRO and neighbours municipalities to ensure that adequate resources and support are available in the event of a wildfire.

Completed.

Recommendation 38: The Fire Department and SRD should work with private property owners to emphasize the importance of FireSmart principles while investigating ways to support residents in reducing fuels, raising awareness of ignition hazards and fitting homes to be FireSmart certified.

Partially completed/On-Going.

Recommendation 39: The Fire Department and SRD should explore fuel management programs in coordination with BC and SRD Parks to thin Priority Fuels 1 & 2.

Not completed.

Recommendation 40: Cortes Island should consider lobbying BC Hydro and Ministry of Transport and Infrastructure to identify and document hazardous fuel types on ROWs with subsequent treatment of these lands.



Not completed.

APPENDIX J- CORTES ISLAND WILDFIRE SURVEY COMMUNITY FEEDBACK

Table 29. 2020 Strathcona Regional District Evacuation Plan Update online survey participants categorized by Evacuation Zone.

Evacuation Zone	Response Numbers
Zone A	28
Zone B	11
Zone C	12
Zone D	4
Zone E	16
Zone F	20
Zone G	1
Zone H	3
TOTAL	95

Table 30. 2020 Strathcona Regional District Evacuation Plan Update online survey responses.

What are your primary concerns regarding wildfires on Cortes Island?		
Concern	Number of Responses	Percentage (%)
Evacuation	19	20.43%
Rapid Spread	13	13.98%
Free Woodchipping services	11	11.83%
Damage homes	10	10.75%
Limited Resources	10	10.75%
Damage to Property	7	7.53%
Human Life	7	7.53%
Warning System	5	5.38%
Damage to wildlife/forests	5	5.38%
Tourists Starting fires	5	5.38%
Dryness	5	5.38%
Prevention	4	4.30%
Limited Fire Department	4	4.30%



Ferry Availability	3	3.23%
People who do not understand risk	2	2.15%
Education and Awareness	2	2.15%
Access to water suppression	2	2.15%
Response Time	2	2.15%
None	1	1.08%
Carrington Rave	1	1.08%
No Fire Breaks	1	1.08%
Adequate Response Plan	1	1.08%
Controlled Burning	1	1.08%
Maintenance to fallen trees/bushes	1	1.08%
Water Drafting Stations	1	1.08%
Remote Areas/ Harder to access	1	1.08%
Smokers	1	1.08%
Beach Fires in Summer	1	1.08%
Embers from different fires	1	1.08%
Residents following Firesmart Recommendations	1	1.08%
Fire that moves to residential housing	1	1.08%
Climate change	1	1.08%
Lack of signage on fire risk	1	1.08%
Weather Concerns	1	1.08%
Regular updates monitoring areas in fire season	1	1.08%
Total number of concerns	133	
Total number of responses	93	
Regarding wildfire risk, what areas on Cortes Island particularly concern you and why is that?		
Area of Concern	Number of Responses	Percentage (%)
Whole Island	10	12.50%
Carrington	7	8.75%
Tree & undergrowth kept to a minimum	5	6.25%
Smelt Bay Fire concern	5	6.25%
Smelt Bay	4	5.00%
Visitors	4	5.00%
Mansions Landing/ Large population	4	5.00%
Northern Area (Difficult to access/Sparsely inhabited)	4	5.00%
Easily spread areas	4	5.00%
Vital infrastructure	3	3.75%
Smelt Bay Evacuation	2	2.50%
Lack of Fire breaks	2	2.50%
Hanks Beach	2	2.50%



Heavily habited tracked areas such as trails	2	2.50%
Northern & Tibre Bay- Outside Jurisdiction of Fire Fighters	2	2.50%
Squirrel Cove- Less habitation/ more trees	2	2.50%
Human Life	2	2.50%
No Area	2	2.50%
Backyard burning	1	1.25%
Pile Management	1	1.25%
Those who live close to the forests	1	1.25%
Maintenance of grass by roads	1	1.25%
Southern tip/ Carrington Bay-Lack of Evacuation Routes	1	1.25%
Education	1	1.25%
Whaletown- Block access to ferry	1	1.25%
Sandy Beaches	1	1.25%
Residential areas due to damage to property	1	1.25%
Green Mountain	1	1.25%
Evacuation Routes through forest areas	1	1.25%
Fallen Trees blocking ferry evacuation	1	1.25%
Upland areas- would need loud warning system	1	1.25%
Roads to be upgraded for Fire Fighting equipment	1	1.25%
Chainsaw and ATV use in hot dry conditions	1	1.25%
Evacuation	1	1.25%
Residents leaving flammables on property	1	1.25%
No municipal water system for Fire fighters to access water if needed	1	1.25%
Need water tanks in neighborhoods	1	1.25%
Climate Change	1	1.25%
Lack of Assistance from Fire Department for downed lines in Tibre Bay- could result in a fire	1	1.25%
Beachfires	1	1.25%
Dryness	1	1.25%
No rules for clearance between buildings & bush	1	1.25%
Areas that are not regularly managed by people	1	1.25%
Shortage of Firefighters	1	1.25%
Populated Areas	1	1.25%
Urban Areas	1	1.25%
North Island- Access for Fire Fighters	1	1.25%
Total Number of Concerns for specific areas	95	
Total Number of Responses	80	



What additional steps would you like to see taken to minimize the risk of wildfire on Cortes Island		
Additional Steps	Number of Responses	Percentage (%)
Removing Debris outside homes and buildings	8	9.30%
Education	8	9.30%
Fire Ban	5	5.81%
Signage in Dangerous Areas	4	4.65%
Water Reservoir	4	4.65%
Equipment for residents to use	3	3.49%
Clear Roads	3	3.49%
Forest Management	3	3.49%
Signage for no fires	2	2.33%
Communicate with residents	2	2.33%
Incentive to Firesmart	2	2.33%
Firefight Equipment	2	2.33%
Program/ financial help with clearing of trees	2	2.33%
More supervision at high risk areas	2	2.33%
Hotline to report offenders/fires	2	2.33%
Implement community managed wood chipping 2x year	2	2.33%
implement neighbourhood fire support	2	2.33%
No use of chainsaws in summer months	2	2.33%
More controlled burning / funding	2	2.33%
Funding for Fire Department	2	2.33%
Trim Trees	2	2.33%
Outdoor Sprinkler for homes	2	2.33%
Fund Residential improvements	1	1.16%
Strict Limitations for beach fires	1	1.16%
WUI Protocols implemented	1	1.16%
Smoking ban between October-May	1	1.16%
Widen Roads/ Bikes and pedestrians	1	1.16%
Evacuation (If ferry access is blocked)	1	1.16%
Signage for fireban when in effect	1	1.16%
Prevention for proper disposal of cigarettes	1	1.16%
Info given at ferries regarding risk and prevention	1	1.16%
Fund Fire Breaks	1	1.16%
Residents be supplied with info guide on safe fire practices	1	1.16%
In areas of no reception- install horn for evacuation	1	1.16%



No opinion	1	1.16%
Remove Ladder fuels	1	1.16%
Ban backyard burning	1	1.16%
Providing removal/ assist of deadfall and pickup	1	1.16%
Fire Drills/Hoses	1	1.16%
Extend cell service towers	1	1.16%
Proper inspections to ensure structure defensibility	1	1.16%
No open fires	1	1.16%
Detailed instruction for evacuation on ferry	1	1.16%
Advice for those evacuating by kayak	1	1.16%
Building public amenities should be assessed for risk	1	1.16%
Get RCMP detachment on island	1	1.16%
Harsher Penalties	1	1.16%
More water based firefighting boats	1	1.16%
Consultation for land-owners	1	1.16%
Establish firebreak lanes	1	1.16%
Post info for tourists on media/ Ferry/ stores	1	1.16%
Carrington Rave Prohibited	1	1.16%
Gates on Carrington Bay Road	1	1.16%
Slash and clearing fires in the winter/rain	1	1.16%
Crews to clean up to lessen amount of fire fuel	1	1.16%
Better automated fire monitoring system	1	1.16%
Make survey of existing useable water storage	1	1.16%
Government action/Global on climate change	1	1.16%
Inspection to ensure property owners store material properly	1	1.16%
Fire department to cover all areas	1	1.16%
Need tangible climate emergency plan	1	1.16%
Access from Jocelyn Road/ Carrington Bay road to Whaletown Road	1	1.16%
Increased fire practice	1	1.16%
BC Hydro to have someone full time on the island	1	1.16%
Total Number of Additional Steps that should be taken	108	
Total Number of responses	86	
What is your understanding of the FireSmart principles? Have you taken any actions around your home with the explicit purpose of reducing wildfire?		



Understanding of FireSmart Principles	# of people	% Overall
Pruning	29	58.00%
Metal Roof	28	56.00%
No woodpiles/ relocate	18	36.00%
Basic Understanding	11	22.00%
Clearing Debris	11	22.00%
Cleaning Roof	11	22.00%
Cut down trees/ Trim	10	20.00%
Nothing	6	12.00%
Clear Shed of Combustibles	4	8.00%
Water Storage	4	6.00%
Sprinkler System	3	6.00%
Cutting grass around home	3	6.00%
Not a land owner	2	4.00%
Chipping	2	4.00%
Keep gutters clean	2	4.00%
Widened Driveway	1	2.00%
House is managed based on FS recommendations	1	2.00%
Cut down trees/ Trim	1	2.00%
Installed fire hydrants	1	2.00%
Building a pond to supply water for firefighting purpose	1	2.00%
Metal siding	1	2.00%
Go once a year to clean up	1	2.00%
Reduce Fire Load	1	2.00%
Purchase gas pressure water pumps and hoses	1	2.00%
Wood chipping	1	2.00%
Watering	1	2.00%
Concrete decking	1	2.00%
Fire Hoses	1	2.00%
Hose hookup	1	2.00%
House in open area	1	2.00%
Safe and Supervised burning	1	2.00%
Fire extension	1	2.00%
Burn wood in wet seasons	1	2.00%
Removing vegetation	1	2.00%
Reviewing how to disconnect propane tanks	1	2.00%
Reduce undergrowth and low branches	1	2.00%
Purchased gutter clip	1	2.00%
Reclearing of roads	1	2.00%
Neighbourhood Emergency Services Group	1	2.00%



Should continue chipper program	1	2.00%
Total number of responses for understanding FS	169	
Total Number of responses	50	
Do you have any additional comments or concerns about wildfires on Cortes Island?		
Additional comments and concerns	# of People	% Overall
Education and enforcement	5	10.20%
None	3	6.12%
Risk of fires that come with climate change	3	6.12%
Rapid Spread	2	4.08%
Communication between residents	2	4.08%
Evacuation	2	4.08%
Ensure Firefighting resources are able to get to the island	2	4.08%
Support for community forest wildfire mitigation funding	1	2.04%
Scarce resources	1	2.04%
Informative signage	1	2.04%
Residents to be observant and report suspicious things	1	2.04%
Very concerned	1	2.04%
Ban Raves	1	2.04%
Providing accessible equipment	1	2.04%
Communicate to homeowners about FireSmart	1	2.04%
Ensure houses have readable house numbers	1	2.04%
Speed of outside help for local volunteer firefighting department	1	2.04%
Fire suppression in neighborhoods & having access to equipment and being trained to use it	1	2.04%
Concerned about chosen reception centre- no generator/ running water if power outage	1	2.04%
Prevention	1	2.04%
Unsure	1	2.04%
Ensure absentee homeowners keep property firesafe	1	2.04%
Develop own reservoir and pumping system independent of BC Hydro	1	2.04%
Keep an inventory of boats available for evacuation	1	2.04%
Sirens instead of phone warning system	1	2.04%



Imposing restrictions on access Carrington Bay	1	2.04%
Humidity	1	2.04%
Risk of fires that come with climate change	1	2.04%
Ensuring visitors are made aware of the vulnerability of the island	1	2.04%
Tourists who are careless	1	2.04%
Water storage tanks to be used by the fire department	1	2.04%
Organize local volunteer initiatives	1	2.04%
Online fire info bulletin	1	2.04%
Total number of additional comments & concerns	45	
Total number of responses	49	