Community Wildfire Resiliency Plan

Quadra Island

February 25, 2022

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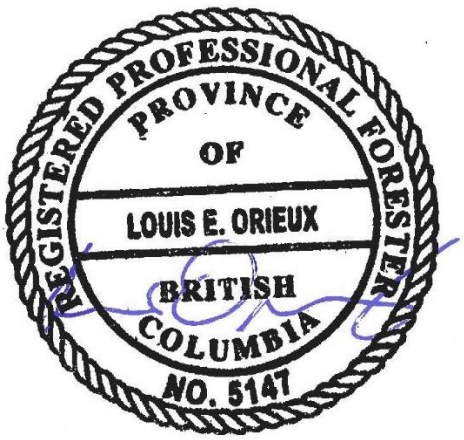
I certify that the work described herein fulfills the standards expected of a member of the Association of British Columbia Forest Professionals and that I did personally supervise the work.	
Registered Professional Forester Signature and Seal	
	

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EXECUTIVE SUMMARY

The Community Wildfire Resiliency Plan (CWRP) process (evolving from the Community Wildfire Protection Plan - CWPP) was created in British Columbia 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), CWRPs aim to develop strategic recommendations based on the seven FireSmart principles (Education, Legislation and Planning, Development Considerations, Interagency Cooperation, Emergency Planning, and Vegetation Management) to assist communities in improving safety and reducing the risk of damage to property and critical infrastructure from wildfires.

This CWRP is an update to Quadra Island's (Quadra) 2011CWPP and provides Quadra with an updated action plan that can be used to guide the improvement and/or development of emergency plans, emergency response, evacuation plans, communication and education programs, bylaw and policy development in areas of fire risk, and the management of potentially hazardous forest stands in the Wildland Urban Interface (WUI).

Fieldwork allowed for verified and updated fuel types and wildfire threat assessments to be combined with an office-based analysis to update the local wildfire threat for Quadra's WUI. UBCM CRI grant funding does not allow for assessments on private land, which constitutes 55% of Quadra's WUI. Classes of the wildfire threat class analysis are as follows:

- Very Low: Waterbodies with no forest or grassland fuels, posing no wildfire threat;
- Low: Developed and undeveloped land that will not support significant wildfire spread;
- Moderate: Developed and undeveloped land that will support surface fires that are unthreatening to homes and structures;
- High: Landscapes or stands that provide continuous forested fuels that will support candling, intermittent crown or continuous crown fires. These landscapes are often steeper slopes, rough or broken terrain and/or south or west aspects. High polygons may include high indices of dead and downed conifers; and
- Extreme: Continuous forested land that will support intermittent or continuous crown fires.

The result of the analysis shows that for the remaining 45% of assessable area within the WUI, approximately 64% is low or very low treat classes and 35% is moderate threat class or higher (with high and extreme threat classes both constituting less than 1% each).

Most homes in Quadra's WUI are part of intermix 'satellite' communities – the homes and structures of small, individual communities are largely situated within the vegetated/forested landscape. With 77% of historical fire ignitions being directly from humans or associated human activity, the most likely threat of wildfire ignition and spread within these communities is from a structure or industrial fire spreading via vegetation to other homes and structures and then into the surrounding forested landscape. The key to reducing WUI fire structure loss is to reduce structure ignitability. Thus, FireSmart activities on and surrounding homes and critical infrastructure (with a focus on a values-out approach, *i.e.,* starting with

activities on the structure itself and then the surrounding area immediately adjacent and continuing outwards) is the number one recommendation in this plan. Using the 2022 UBCM CRI FireSmart Community Funding and Supports program application guide as a gauge on how FireSmart Quadra Island is as a community, of the 39 applicable mitigation activities, 46% have already been achieved (or are planned to be within one year), 13% partially achieved, and 41% not achieved. Continued mitigation should be focused on development considerations (construction practices and regulations), FireSmart assessments and vegetation management on homes, neighbourhoods, and critical infrastructure, and continued resident education. Public outreach on the range of available activities and the prioritization of activities should help residents to feel empowered to complete simple risk reduction activities on their property.

A total of 43 recommendation and action items are presented in Table 1 within this Executive Summary and are more thoroughly discussed in their appropriate sections within the document. Because the WUI overlaps multiple land titles and license holders, Strathcona Regional District's (SRD) role may be limited to an advocate or influencer in some instances, while other action items can be implemented directly. Ultimately, the recommendation and action items within this plan should be considered a toolbox of options to help reduce the wildfire threat to Quadra's WUI.

Table 1: Quadra Island's CWRP Action Plan

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Education (Section 5.1)							
Objective: To provide information to citizens empowering them to adopt and conduct FireSmart practices to mitigate the negative impacts of wildfire to their homes/businesses, properties, and neighbourhoods.							
1	High	This CWRP report and associated maps should be made publicly available by SRD through its website, Quadra FD's website, and on social media. In addition, this CWRP should be shared with local industry partners who may be interested in collaborating on FireSmart and wildfire risk reduction activities.	Include all members of the Community FireSmart Resiliency Committee, as well as other relevant industries and businesses in the WUI ((*i.e.,* woodlots, Mosaic Forest Management, BC Parks, and local First Nations).	SRD	1 year from document completion	Available for download or viewing on SRD's and Quadra FD's webpages	SRD (~5 hours to update one website)
2	High	SRD and Quadra FD should continue to promote Fire Smart education through FireSmart workshops (*i.e.,* Quadra's 'Safety Day'), open houses, presentations, and information mailouts. Supply FireSmart resources during these engagement campaigns and promote the FireSmart Begins at Home mobile app as a method of conducting home assessments. Promote overall home fire safety by providing information on fire extinguishers, fireplace maintenance, chimney maintenance, etc.	Educate homeowners of FireSmart principles and encourage residents to FireSmart their homes. Aim to conduct the engagement and promotion campaign before and during the fire season. The SRD should consider FireSmart workshops for each of the priority neighbourhoods outside of the Quadra Island Fire Improvement District. Consider providing fire extinguisher maintenance and re-certification at these workshops.	SRD (Quadra FD, Local FireSmart Representatives, Fire Extinguisher Professional)	Yearly (pre-fire season)	50% of residents from top 3 FireSmart priority neighbourhoods attend	UBCM CRI funding is available (~40 hours for planning and 1 day for each workshop)
3	High	SRD and Quadra FD should both develop a FireSmart/Wildfire Preparedness page on their websites with links to FireSmart BC information, local updates, etc.	Websites are effective platforms to distribute information. SRD should consider creating a fire weather decal on its front page displaying the current fire weather (that could double as a button to its FireSmart page).	SRD/Quadra FD (Consultant)	1 year	Webpage updated	UBCM CRI funding is available (~$3000 contracted service. ~40 hours for set-up. Additional hours for

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							updates as required)
4	High	SRD should apply for funding to complete Home Ignition Zone Assessments (HIZ) or Home Partners Program (HPP)Wildfire Mitigation Assessments on residential properties. Inform residents (through mail-outs, social media, etc.) of the program and provide online and mail-in sign-up options for a set of potential assessment dates.	HIZ assessments can be completed by a Local FireSmart Representative and assess the home and property's risk from wildfire. HPP Wildfire Mitigation Assessments[1] area more detailed and comprehensive assessment completed by fire professionals (*ex.* firefighter) that have completed FireSmart Wildfire Mitigation Specialist training. The assessment process accurately evaluates a home and property for wildfire exposure, while engaging the homeowner in their unique risk and ways to reduce it.	SRD (LFR or HPP Mitigation Specialists – may be a consultant)	3 years	5 homes in each priority neighbourhood (Table 15) have been assessed	UBCM CRI funding is available for both HIZ and HPP assessments. (~$250/structure)
5	High	In conjunction with recommendation #4, SRD should offer a local rebate program to residential property/homeowners that have completed eligible FireSmart assessments and activities. (Rebates are limited to 50% of the total cost of eligible activities, up to $500/property)	Rebate programs can be difficult to incentive owners to participate in. Currently underway in the Squamish-Lillooet Regional District[2], inform residents (through mail-outs, social media, etc.) that those who have had a HIZ or HPP assessment completed automatically qualify for the rebate program. Provide online and mail-in registration options.	SRD (Consultant)	5 years	Rebate program implemented on Quadra Island	UBCM CRI funding is available (cost/time dependent on number of registered properties)
6	High	SRD should apply for funding to complete Neighbourhood Wildfire Assessments for each of the priority neighbourhoods listed	Neighbourhood Wildfire Assessments provide a written evaluation of the overall neighbourhood wildfire hazard	SRD	5 years	Assessments completed for neighbourhoods	UBCM CRI funding is available

[1]More information on HPP assessments can be found here: https://www.firesmartcanada.ca/programs-and-education/firesmart-home-partners-program/
[2]Contact the SLRD for more information on how they have implemented this program. Additional information located here: https://www.slrd.bc.ca/emergency-program/preparedness/firesmart-program

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		in Table 15 (the Quathiaski Cove general community area should be broken down into smaller, more distinct neighbourhoods).	and should be completed by a certified Local FireSmart Representative to be recognized by FireSmart Canada. This could be contracted out in conjunction with recommendation #4.	(Local FireSmart Representative, Consultant)		outside the Quadra Fire Improvement District.	(~$400-1000/neighbourhood depending on location and size)
7	High	Links to the Campbell River FireSmart Guide to Landscaping should be created on SRD's and Quadra FD's webpages. SRD should continue to include it, or reference to it, in annual FireSmart education mail-outs.	Increase FireSmart vegetation management knowledge Quadra's residents. Consider a social media 'blast' relating to it.	SRD (Quadra FD)	1 year	Posted on SRD's and Quadra FD's FireSmart webpages.	UBCM CRI funding is available (~ 20 hours in-house)
8	Moderate	SRD should support and facilitate priority neighbourhoods to self-organize to attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status. Once completed, support the development of FireSmart Neighbourhood Plans.	Neighbourhood Wildfire Assessments are a steppingstone towards FSCNRP status. Leverage the leadership of a Local FireSmart Representative.	Quadra (Local FireSmart Representatives)	5 years	Completed for priority neighbourhoods 1,2, and 3.	UBCM CRI funding is available ($5000/ neighbourhood; 40 hours/ initiative)
9	Moderate	SRD should encourage School District 72 to adopt and deploy existing wildfire education programs. Other options/value-added activities include consulting with the Association of BC Forest Professionals (ABCFP) and BCWS (North Island Mid Coast Fire Zone) as well as the Quadra FD and regional FireSmart representatives to facilitate and recruit volunteer teachers and experts to help with curriculum development to be delivered in the schools (field trips, guest speakers, etc.).	Emergency preparedness curriculum is available provincially, which includes preparedness for a variety of natural hazards, including wildfire (Master of Disaster, FireSmart BC Education box).	SRD	Yearly (pre-fire season)	One FireSmart education day per school year	UBCM CRI funding available (FireSmart BC Education box - $800 Junior K-Grade 12. Field trips, guest speakers, etc. ~$2500 per school)
Legislation and Planning (Section 5.2)							
Objective: To provide the means to implement wildfire risk reduction actions through by-laws and legislation by outlining local government responsibilities regarding wildfire.							
10	High	Complete or schedule periodic updates of the CWRP. The frequency of updates is highly dependent upon major changes	A current (i.e., no more than 5 years old) CWRP isa requirement for further funding under the UBCM CRI Program.	SRD (Consultant)	5 years from adopting this	Quadra always has an up-to-date	UBCM CRI funding is available

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		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 CWRP update should be initiated every 5 years.			CWRP document	CWRP and action plan	(~$25,000 for full document / $10,000 for update)
11	High	Should residents show sufficient interest in this matter, SRD should explore ways to extend/apply fire bans and other associated wildfire risk bans enacted in the South Quadra Fire Improvement District to north Quadra.	To eliminate confusion on what regulations apply where, and to reduce wildfire risk across the WUI.	SRD (Consultant/Lawyers)	5 years	Legislation updated/created	UBCM CRI funding is available ($3000 contracted service)
12	Low	Quadra Islands OCP speaks to developing a Quadra Island Parks Plan. If/when this plan is developed, or any future land management plans/ legislation are developed/amended, ensure that FireSmart principles are adopted into them.	SRD has a responsibility to manage for wildfire hazards and risks in District-owned or adopted parks, trails, and greenbelts. Imbedding FireSmart principles, such as FireSmart vegetation/landscaping or trail-side vegetation maintenance in legislation can reduce overall wildfire risk in the WUI.	SRD (Consultant)	n/a	FireSmart imbedded into all future land management legislation.	UBCM CRI funding is available (cost/time dependent on scope of work)
Development Considerations (Section 5.3)							
Objective: To embed FireSmart practices and considerations into all development within Quadra.							
13	High	Develop a wildfire hazard DPA and update Quadra's Official Community Plan (OCP) when completed. To meet objectives, consider including the following elements: • minimum setbacks from forested edges based on FireSmart, • fuel management based upon qualified professional recommendations, • landscaping to FireSmart guidelines,	To embed FireSmart values into all aspects of community development and planning, especially to those communities within the WUI. Variations of a Wildfire DPA, with differing levels of FireSmart adherence required, are being	SRD (Consultant)	5 years	Interface wildfire DPA created and adopted	UBCM CRI funding is available (~$20,000 contracted service and 40 hours in-house)

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		• building materials and design based on NFPA 1144 and FireSmart standards, • underground servicing, • prompt removal of combustible construction materials or thinning/fuel management waste, and a minimum of two access/evacuation routes for all neighbourhoods.	developed/employed by municipalities and regional districts across BC.[3]				
14	High	Explore opportunities to enhance water access/drafting sites across the WUI for Quadra FD, wildland firefighters, and organized communities outside of the Quadra Island Fire Improvement District. Opportunities include building permanent cisterns/reservoirs adjacent to/within communities that can be filled during the winter, or are on the edge/near known accessible drafting sites and are gravity fed and covered to reduce evaporation during fire season.	This will likely involve multiple jurisdictions and entities including SRD, Quadra FD, BCWS, FLNRORD and multiple professional assessments (engineering, riparian, biology).	SRD (BCWS, Quadra FD, FLNRORD, Consultant)	5years (for siting and planning)	Locations for cisterns / reservoirs identified in priority neighbourhoods.	SRD (unknown)
15	High	Quadra's functional infrastructure (*i.e.,* Firehalls, Emergency Reception Centres, Emergency Housing Locations, sewer lift/pump stations, etc.) should have backup gas- or diesel-powered generators. SRD/Quadra FD/Private owners should invest in secondary power sources to continue these services in the case of a prolonged or extensive power outage as a	Ensure that generators have sufficient fuel supply for extensive power outages (3 + days) so that they can function as required in the event of an emergency.	SRD (Quadra FD, Private Owners)	5 years	All functional CI have backup power sources	SRD Quadra FD (~$30,000 per site - depending on requirements)

[3] Example municipalities and regional districts include District of West Vancouver and the Regional District Okanagan-Similkameen.

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		result of a wildfire. Upgrade or realign resources, as prioritized.					
16	High	Engage a qualified professional (such as a Local FireSmart Representative) to complete formal FireSmart assessments of all critical infrastructure. Plan and implement action items in the sequence of importance. Additionally, SRD should request that Telus Communications Inc and Rogers Communications conduct FireSmart assessments on all communication infrastructure and implement mitigation work as required.	Critical infrastructure, such as fire halls and emergency shelters, are identified in Table 7. Make sure to update the list of critical infrastructure when Quadra's emergency planning and response documents have been completed.	SRD (Local FireSmart Representative or Consultant)	3 years	Assessments completed and action items being planned for	UBCM CRI funding is available (~$1000 per location – contracted service)
17	High	Use fire-resistant construction materials, building design and landscaping for all critical infrastructure when completing upgrades or establishing new infrastructure.	Vegetation setbacks around critical infrastructure should be compliant with FireSmart principles (*e.g.,* no combustible material within 10 m of structures).	SRD	Ongoing	New and upgraded critical infrastructure are FireSmart	SRD ($ variable: CI specific)
18	High	Apply a landscaping standard to Quadra zoning and development permit documents (*i.e.,* bylaw 1213 Quadra Island Zoning Bylaw) that lists flammable, non-compliant vegetation and landscaping materials, non-flammable drought and pest resistant alternatives, and tips on landscape design to reduce maintenance, watering requirements; to avoid wildlife attractants, and to reduce wildfire hazards.	Consider including the landscaping standard as part of the wildfire hazard DPA, as well as making it publicly available for residents and homeowners outside of the DPA.The Campbell River FireSmart Guide to Landscaping can be used.	SRD	5 years	Landscaping standard created (or adopted) and built into the interface wildfire DPA	UBCM CRI funding is available ($0 if using FireSmart Canada guidelines; ~20 hours in-house)
19	High	Conduct a full review and updating of the Quadra OCP, including Schedule B, to imbed FireSmart principles within the stated objectives and policies and to guide future land use and development decisions. Examples include updating:	The OCP sections recommended for updating should not be considered the complete list of sections that should be reviewed and updated, but rather a guide to how FireSmart principles can be viewed and actioned in it.	SRD (Consultant)	5 years	Required OCP sections updated	UBCM CRI funding is available (~20 in-house hours and ~$10,000

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		• 2.2a Objectives – Settlement Patterns to include wildfire as a natural hazard to be considered and planned for. • 2.2j Objectives – Forests / Silviculture and 3.7 Community Planning Policies – Forests/Silviculture to include management practices of forest areas within the WUI that decrease wildfire risk (through proper cut-block placement, clean-up of combustible fuels within harvested areas (slash – scattered and pile), and reforestation techniques/planting). • 2.2m Objectives – Parks & Recreation, 3.10 Community Planning Policies – Parks and Recreation, and Schedule B2.3.7.1/2 to consider the planning, adoption, and maintenance of parks through a wildfire lens. • 3.1 Community Planning Policies – Settlement Patterns (xii) to include FireSmart vegetative setbacks. 3.3.2 Community Planning Policies – Road Transportation to include the removal of road-side vegetation for wildfire risk reduction.	See the Fraser Valley Regional District Electoral Area D OCP Update, the Cariboo Regional District Electoral Area G OCP, and other regional district electoral areas as examples.				including $1,500 for administration (SRD) and $8,500 for consultant costs (100 hrs @ $85/hr).
20	Moderate	Existing single access/egress neighbourhoods should be reassessed for potential secondary access/evacuation routes. There could be opportunities for an easement or agreement-on-use on the edge of an individual's private property, routes via woodlots and TFL 47, or a combination (to be used only in emergency evacuation situations).	It is recognized that landscape geography and private property can make this difficult. Start by contacting forest land managers and discuss using resource roads as emergency evacuation routes.	SRD	5 years	Where determined possible, secondary egress routes are being planned for development	SRD (Cost/time dependent on level of discussions and planning)
Interagency Cooperation (Section 5.4)							
Objective: To broaden from a department or agency single jurisdiction-based approach to a risk driven, multi-agency and multi-scalable approach.							

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21	High	Engage with forest licensees within the WUI (woodlots and TFL47) to: 1) Identify parts of the license area that are in the WUI and what goals would be for this zone regarding harvesting, post-harvest debris disposal, and reforestation prescriptions so that both harvesting operations and the future forest stand maintain or enhance wildfire resiliency. 2) Gauge interest in facilitating a forest licensee – BCWS specific wildfire education and training day/workshop.	1) Reduce interface wildfire risk throughout managed forest lands that are closest to structures in the WUI. Consider involving BCWS North Island Mid-Coast Zone and FLNRORD personnel in discussions and planning. Slash management is a priority for wildfire risk reduction. 2) Promote wildfire management and wildfire mitigation tools/tactics to those managing the wildland forest land base. Consider adding the S-100 course/training to those who attend.	1/2) SRD (FLNRORD, Stakeholders, BCWS, Consultant)	5 years	1) License managers know where their tenure area overlaps with the WUI 2) Licensee – BCWS specific workshop/training day completed.	1) SRD (time/cost dependent) 2) UBCM CRI funding is available – education (~40 hours for planning and 1 day for each workshop)
22	High	Plan Quadra CFRC scheduled meetings, especially before and during the fire season.	Forward relevant information to forest land managers within the WUI, including BC Parks.	SRD (Stakeholders)	Ongoing	1 meeting each year prior to fire season	SRD (~$300/yr)
23	High	Continue to have relevant SRD members attend annual FireSmart BC conferences, hosted by the BC FireSmart Committee.	Participation will continue to foster a strong relationship between SRD and FireSmart BC/Canada. Notify the Quadra FD Fire Chief of the conference and encourage attendance.	SRD (Quadra FD)	Ongoing – yearly	SRD rep. and Quadra FD Fire Chief attend yearly	UBCM CRI funding is available (cost/time dependent on conference location)
24	Moderate	Encourage BC Parks to communicate fire risk (*i.e.,* add fire danger ratings at main trailheads) and enforce provincial fire bans when patrolling in Main Lake Provincial Park.	Educate island visitors of wildfire risk and current fire bans during wildfire seasons.	SRD (BC Parks)	5 years	Consultation with BC Parks completed	SRD (~2 hours)
25	Moderate	Continue to promote right-of-way best management practices (BMPs) for regular brushing and clearing of woody debris and shrubs in coordination with FortisBC and	Tree failures adjacent to power lines (transmission and distribution) are common occurrences and represent significant risks to ignition within the WUI. Encroachment of understory	Quadra (BC Hydro, FortisBC)	5 years	BMPs in use for the region	UBCM CRI funding is available

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		BC Hydro to help reduce fire risk, utility pole damage, and subsequent outages.	vegetation and overhanging trees were noted by consultants in various locations.				(~30 hours in-house)
Cross-Training (Section 5.5)							
Objective: To support the development of comprehensive and effective wildfire risk reduction planning and activities, as well as a safe and effective response.							
26	High	Complete and participate in regular testing of, and updates to, the Evacuation Plan for Quadra. Include yearly (pre-fire season is best) wildfire emergency simulation exercises. Identify hazards, barriers to access (i.e., locked gates, tight or no turnarounds), and other response issues and develop measures to address them.	Include SRD emergency response staff, BCWS, BC Ferries, QIEP, and mutual aid partner fire departments.	SRD (see comments)	Yearly (pre-fire season)	Table-top response exercises conducted at least once every two years	UBCM CRI funding is available (12 planning hours; 60 person-hours per exercise)
27	High	Ensure all Quadra FD fire personnel attain SPP-WFF1 certification at a minimum.[4] 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). Quadra FD 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 Quadra FD personnel are qualified to respond to wildfire emergencies and use wildfire suppression equipment. 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).	Quadra FD	Ongoing/yearly	FD members training continually updated	UBCM CRI funding is available (~$600/16 hrs per person)
28	High	SRD should facilitate: 1)additional Local FireSmart Representative (LFR) Training for Quadra residents, district, and Quadra FD staff. Quadra FD should facilitate:	Increase SRD's and Quadra FD's capabilities to provide FireSmart programs and resources to the community. Consider engaging the community leaders within the QIEP to identify	SRD/Quadra FD (QIEP)	2 years	1+ additional LFR in SRD staff 1+ additional LFR and Mitigation Specialist in Quadra FD	UBCM CRI funding is available (~$2000/16 hrs per person)

[4] The SPP-WFF 1 (Wildland Firefighter Level 1) course will replace the S-100 Basic Fire Suppression and Safety and S-185 Fire Entrapment Avoidance courses for structure firefighters (only) and exceeds the NFPA 1051 Level 1 standard.

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		2) additional FireSmart Home Partners Mitigation Specialist Training opportunities for Quadra FD staff.	potential LFR candidates from each neighbourhood.				
29	Moderate	SRD should leverage Local FireSmart Representatives (LFR) to: 1) conduct outreach into priority FireSmart Neighbourhoods to identify potential community champions, and 2) schedule and conduct FireSmart Community Champion Training.	Increase Quadra's FireSmart priority neighbourhoods' capabilities to assume FireSmart planning and mitigation activities themselves.	SRD (LFRs)	1) 2-3 years 2) 2-4 years	Community champion identified for each high-risk FireSmart neighbourhood.	1) SRD: ~80 hours 2) UBCM CRI funding is available
30	Moderate	Quadra FD should attain Superior Tanker Shuttle Service accreditation.	This accreditation sets a standard for firefighting departments which have to shuttle water. A secondary benefit is to property owners as they are eligible for reduced insurance rates.	Quadra FD	5 years	Accreditation attained	Quadra FD
Emergency Planning (Section 5.6)							
Objective: To create specific wildfire response pre-incident plans so those responding to a wildfire emergency know who is available to help with what and when, and to improve Quadra's ability to respond to (during and after) a wildfire emergency.							
31	High	Quadra FD should continue engaging BCWS to conduct annual reviews ensuring PPE and wildland equipment resources are complete, in working order, and the crews are well-versed in their set-up and use. Identify equipment deficiencies and plans to fill them.	Maintain an annual structural and interface training and equipment review program and maintain a strong relationship between Quadra FD and BCWS.	Quadra FD	Yearly (pre-fire season)	Wildland firefighting equipment resources are complete	Quadra FD (~20 hours in-house)
32	High	For communities outside of Quadra FD's fire response area, SRD should: 1) Facilitate equipment review and community member training opportunities with BCWS. 2) Explore further equipment funding and training opportunities to grow each	Invite persons from other communities (as listed in Table 15to participate. Utilize the QIEP in identifying communities and persons to coordinate with on Quadra.	SRD (BCWS, Quadra FD)	5 years and ongoing	At least one equipment check and training opportunity with BCWS planned and conducted	UBCM CRI funding available (~20 hours planning and one day each for training and equipment checks)

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		communities' ability to fight structural and wildland fires.					
33	High	Quadra FD should complete planned digitization of important fire and emergency response information, such as water drafting sites and driveway lengths.	To ensure prompt and effective response to fire emergencies within Quadra FD's fire response area. Quadra FD should reach out to the SRD to see if the District's GIS department can provide this service.	Quadra FD	2 years	Required information is digitized and available electronically	Quadra FD
34	High	SRD should include evacuation harbors and wharfs, as well as tactical staging areas, identified in Quadra's updated emergency response documents as critical infrastructure.	To ensure these locations are included for FireSmart assessment and mitigation activities so that, through a wildfire lens, they are as safe and functional as possible.	SRD	When documents completed	List of critical infrastructure is updated.	SRD (~8 hours in-house)
35	High	SRD should apply for UBCM CRI funding to hire a FireSmart coordinator (full-time basis).	To manage the planning and implementation of recommendations and action items in this report.	SRD	2 years	FireSmart coordinator hired	UBCM CRI funding is available ($59,000 contract pay)
36	Moderate	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.	Consider adding a section for "what we need for prompt response on your property"[5] that details key information/items/locations first responders and emergency responders require when responding to incidents.	SRD (Quadra FD)	5 years	Pamphlets created and available to the public	SRD (Cost to develop: 40 hours total and $5.00/ pamphlet)
37	Moderate	Update Quadra's HRVA and/or emergency management plans with information and data from this CWRP. Develop wildfire-specific incident plans and associated maps. Incorporate items listed in the Pre-	Wildfire incident plans and maps will support emergency response in the event of a wildfire and/or evacuation event. These plans help target emergency planning and effort in	SRD (Consultant, BCWS)	5 years	Wildfire incident plans and associated maps were created and made available	SRD (Cost to EOC/EPC; 12 planning hours

[5]Recently conducted on Thetis Island.

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
		Incident Planning subsection above. Local Fire Threat and stakeholders'/tenure holder's contact information should be incorporated within the map. The map should be included in the Quadra Island Evacuation Plan and shared with fire suppression personnel, BCWS, and industrial operators (Woodlots, TFL 47) to support emergency response in the event of a wildfire. The map should be reviewed as needed to incorporate additions and/or changes.	meaningful and effective ways, such as knowing where fire guards can/can't be built, as well as minimizing the need for using machinery to build cat guards in sensitive areas.				and ~$6,000 contracted service)
Vegetation Management (Section 5.7)							
Objective: To reduce the potential wildfire intensity and ember exposure to people, infrastructure, structures, and other values through manipulation of both the natural and cultivated vegetation that is within or adjacent to a community.							
38	High	Continue implementing the yearly community/neighbourhood chipping program. Education of FireSmart yard and landscaping principles, including chipping specifications should be incorporated into the program.	To reduce wildfire hazards on private property within the WUI and promote FireSmart vegetation management knowledge and education.	SRD	Yearly	Continued high amount of participation by Quadra residents	UBCM CRI funding is available (Costs/time in line with previous year)
39	High	Proceed with detailed assessment, prescription development, and treatment of fuel treatment units identified and prioritized in this CWRP.	To reduce wildfire hazards in the WUI's highest priority Structure, Community, and Landscape Zones.	SRD (Consultant)	5 years	Prescriptions for high priority units developed. Treatment completed on one TU.	UBCM CRI funding is available (~$500/ha prescription; ~$8000/ha treatment)
40	High	As part of fuel treatment implementation on TU Comm-1A, SRD should develop interpretive signage to demonstrate pre- and post-fuel treatment forest stands.	Increase public awareness and support of fuel management practices.	SRD	5 years	Signs placed in one high-public use area, post-treatment	UBCM CRI funding is available (~$500/sign)

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
41	High	When operational fuel treatments are conducted, treatment monitoring 10 years out should be completed by a qualified professional. This can be completed with a CWRP update or as a stand-alone exercise.	Assess the efficacy of the treatment and schedule maintenance activities. It is cheaper to perform maintenance early when regeneration is small.	SRD (Consultant)	10 years	All completed fuel treatments are reassessed within 10 years, and ongoing, post-treatment	UBCM CRI funding is available (~100/ha for assessment)
42	High	Lobby We Wai Kai First Nation for prescription development and implementation of fuel treatment units proposed in the We Wai Kai 2021 CWRP.	To reduce wildfire hazards in the Quadra's Landscape Zone.	RDOS (We Wai Kai First Nation)	5 years	Prescriptions for high priority units developed. Treatment completed on one TU	UBCM CRI funding is available (~$500 per hectare)

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FREQUENTLY USED ACRONYMS

AOI	Area of Interest
BC	British Columbia
BCWS	British Columbia Wildfire Service
BEC	Biogeoclimatic Ecosystem Classification
CDC	Conservation Data Centre
CFFDRS	Canadian Forest Fire Danger Rating System
CFS	Community Funding and Support
CI	Critical Infrastructure
CIIZ	Critical Infrastructure Ignition Zone (also see Structure Ignition Zone)
CRI	Community Resiliency Investment
CWPP	Community Wildfire Protection Plan
CWRP	Community Wildfire Resiliency Plan
DPA	Development Permit Area
EMBC	Emergency Management British Columbia
FD	Fire Department
FBP	Fire Behavior Prediction System
FESBC	Forest Enhancement Society of British Columbia
FSCCRP	FireSmart Canada Community Recognition Program
HIZ	Home Ignition Zone
HRVA	Hazard Risk and Vulnerability Analysis
LRMP	Land and Resource Management Plan
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
MOTI	Ministry of Transportation and Infrastructure
NDT	Natural Disturbance Type
OCP	Official Community Plan
PSTA	Provincial Strategic Threat Assessment
QIEP	Quadra Island Emergency Program
SRD	Strathcona Regional District
SWPI	Strategic Wildfire Prevention Initiative
UBCM	Union of British Columbia Municipalities
VAR	Values at Risk
WRR	Wildfire Risk Reduction
WUI	Wildland Urban Interface

SECTION 1: INTRODUCTION

In April 2021, B.A. Blackwell and Associates Ltd. was retained to assist the Strathcona Regional District (SRD) in developing an updated Community Wildfire Resiliency Plan for Quadra Island (Quadra), hereinafter referred to as the CWRP. This CWRP revisits areas assessed in Quadra's 2011 Community Wildfire Protection Plan (CWPP), but with a focus on integrating the updated Provincial Strategic Threat Analysis (PSTA), updated BC Wildfire Service (BCWS) fuel type mapping, and an improved wildfire threat analysis methodology, all with a focus on the seven FireSmart principles.

Recent wildfire disasters like those experienced in Slave Lake, Alberta (2011), Washington State (2014, 2015), Fort McMurray, Alberta (2016), BC (2017, 2018, 2021), and California (2017, 2018, 2020) all display the vulnerability of communities and the potential toll of wildfires on families, neighbourhoods, 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 concerning fire risk in the wildland-urban interface (WUI).[6] CWRPs are an invaluable opportunity to proactively manage wildfire risk and increase community resilience to wildfire.

1.1 PLAN PURPOSE AND GOALS

The purpose of this CWRP is to identify and update the wildfire risk specific to Quadra and the surrounding eligible WUI, to describe the potential consequences of wildfire to Quadra's communities, and to examine options and strategies to reduce the wildfire risks. This CWRP provides a reassessment of the level of wildfire risk to Quadra and gives stakeholders a current and accurate understanding of the wildfire threats to human life, property, and critical infrastructure. The goal of this CWRP is for it to be used as an action plan to:

1) Increase the effectiveness of fire suppression and emergency response,
2) Reduce potential impacts and losses to lives, property, and critical infrastructure from wildfire, and
3) Reduce wildfire behaviour threats within the community.

To help guide and accomplish the above strategies, this CWRP will provide SRD and the Quadra Island Fire Department's (Quadra FD) fire service protection area with:

1) an updated assessment of wildfire risk to the community,
2) an updated assessment of values at risk and potential consequences in the event of a wildfire,
3) update mapping of fuel types and recommended areas for fuel treatments and forest modifications,
4) an updated assessment of emergency response capacity and community FireSmart status, and

[6] 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).

5) 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.

CWRPs are funded in BC by the Union of BC Municipalities (UBCM) under the Community Resiliency Investment (CRI) FireSmart Community Funding and Supports Program (FCFS). As per funding requirements, this CWRP is completed according to the 2021 CRI template.

1.2 CWRP DEVELOPMENT SUMMARY

The CWRP development process consisted of five general phases:

1) Consultation involving key SRD representatives, structural and wildfire specialists, and stakeholders. This included:
    a. SRD staff:
        i. Protective Services Coordinator (Shaun Koopman)
        ii. Parks & Facilities Technician (Jacob Blanchard)
        iii. Coordinator, Engineering Services (Jesse Humphreys)
        iv. Manager, Engineering Services (Wolfgang Parada).
    b. Quadra Island Fire Department Fire Chief (Sharon Clandening).
    c. BCWS North Island Mid Coast Fire Zone (Kate McLean, Todd Flanagan, Dan Harris).
    d. BC Parks Area Supervisor (Derek Moore).
    e. Leadership personnel of the Quadra Island Emergency Program (QIEP).
2) Information sharing with First Nations (see Appendix G: List of First Nations and Associated Governments Consulted) and other stakeholders (woodlots, TFL 47 – TimberWest Forest Corporation (Mosaic Forest Management is the Timberlands Manager), QIEP).
3) Review of relevant plans and legislation regarding emergency response and wildfire (Section 2).
4) Identification of the values at risk and assessment of the local wildfire threat (Sections 3 and 4).
5) Developing an action plan with a focus on the seven FireSmart principles (Section 5): Education, Legislation and Planning, Development Considerations, Interagency Cooperation, Cross-training, Emergency Planning, and Vegetation Management.

SECTION 2: RELATIONSHIP TO OTHER PLANS AND LEGISLATION

Wildfires can affect all aspects of a community. As a result, there are many plans that relate to this CWRP. The intent of this section is to review all laws, policies, plans, and guidelines and identify sections within that are relevant to wildfire emergency planning and response.

2.1 LOCAL AUTHORITY EMERGENCY PLAN

Quadra's emergency preparedness and response is managed by the SRD in collaboration with the Quadra Island Emergency Program (QIEP) and is guided by higher-level emergency management legislation such as the provincial Emergency Program Act.[7] 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. Quadra's evacuation planning and management documents are currently being updated and are discussed in Section 3.2.1.

2.2 LINKAGES TO OTHER CWPPS/CWRPS

Quadra Island 2011Community Wildfire Protection Plan (CWPP)

Quadra's 2011 CWPP was reviewed, and the recommendations were discussed with the CFRC. Recommendations that were partially or wholly addressed or completed include:

- **Recommendation 2:** *Quadra Island Volunteer Fire Department and the SRD should consider developing a communication plan to outline the purpose, methods and desired results of communication and education in the community.*
- **Recommendation 4:** *No stand-alone website exists for the Quadra Island Volunteer Fire Department. The creation of one or another media format should be reviewed to convey information to the community and visitors.*
- **Recommendation 5:** *Quadra Visitor Centre should continue to be used to communicate FireSmart, fire danger and fire restrictions to tourists visiting the area.*
- **Recommendation 6:** *Quadra Island has 1 Fire Danger sign. Additional Fire Danger signs should be located at both ferry terminals on the Island or other strategic locations.*
- **Recommendation 7:** *BC Ferries' sailings to Quadra should be encouraged to post signs showing the current fire danger and campfire bans as well carrying pamphlets with FireSmart and related information.*
- **Recommendation 11:** *The SRD in coordination with the RCMP, BC EHS, and Quadra Island Fire Department should work towards each house having a clear and legible addresses displayed to help evacuation efforts during a wildfire event.*
- **Recommendation 13:** *Homeowners should be encouraged to put sprinklers on their roofs.*

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

- **Recommendation 19:** *A community evacuation plan should be developed. Appropriate evacuation routes should be mapped, considering Disaster Response Routes (DRR). Major evacuation routes should be signed and communicated to the public.*
- **Recommendation 22:** *Marshalling point and evacuation plans for isolated communities should be established prior to a wildfire event should road egress be unsafe or become blocked.*
- **Recommendation 30:** *The loss of communications infrastructure such as telephone lines and the microwave tower is possible. Alternate communication methods such as ham radio should be explored with the SRD for the incident command center.*
- **Recommendation 32:** *The following training should be considered: 1) The S100 course training should be continued on an annual basis; 2) A review of the S215 course instruction should be given on a yearly basis; 3) The S215 course instruction should be given to Fire Chiefs and Deputies; and, 4) Incident Command System training should be given to Fire Chiefs and Deputies.*
- **Recommendation 38:** *Formal mutual aid agreements should be established with MFML to ensure that adequate resources and manpower support are available in the event of a wildfire.*
- **Recommendation 39***: The Fire Department should review cistern and standpipe locations and identify areas where additional cisterns or standpipes should be established.*
- **Recommendation 40:** *Most hazardous fuel types on Quadra are located on private property. The SRD and Quadra representatives should work with private property owners to ensure that they understand the importance and principles of FireSmart. The SRD should investigate ways to support residents reducing fuels, making homes FireSmart and raising awareness of ignition hazards.*

2.3 QUADRA ISLAND OFFICIAL COMMUNITY PLAN 2007

An Official Community Plan (OCP) documents objectives and policies of the local government and provides it with a long-range framework to guide future land use and development decisions. Table 2below summarizes the objectives and policies within the Quadra Island OCP 2007that are directly relevant to community wildfire resilience. The current OCP includes amending bylaws up to SRD 316 #13, 2018.

Table 2: Summary of Quadra's Official Community Plan emergency and wildfire-related objectives and policies and their relationship to this CWRP

Section, Sub-section, Goal	Description and Relationship to CWRP
2.2a Objectives - Settlement Patterns	(iv) To promote settlement patterns that minimize risks associated with natural hazards and that consider the surrounding environment. • *Including wildfire as a natural hazard allows for it to be considered and planned for.*
2.2b Objectives – Health & Public Safety	(i) To encourage public health and safety as major considerations in all development proposals. • *Development planned 'through a wildfire lens' can increase public health and safety concerning wildfire.*
2.2c Objectives - Transportation Planning	(i) To encourage road design and construction standards that meet the safety and transportation needs of the community. (iii) To establish 'rural road' standards for the Island.

Section, Sub-section, Goal	Description and Relationship to CWRP
	• *Road design and construction standards as well as effective road maintenance are integral for emergency response, egress, and evacuations.*
2.2f Objectives - Water Resources & Management	(i) To protect watersheds and groundwater recharge areas from degradation. (iii) To determine the extent and quality of water resources through inventories, water quality testing, and monitoring. • *Water infrastructure and availability is integral to fire fighting and stopping a wildfire in the WUI from either entering the wildland from homes and properties, or vice versa.*
2.2g Objectives - Climate Change	(i) (d) To protect the health and productivity of the local soils and waterways. • *Local water availability is integral to timely and effective firefighting.* • *Moisture retention in forest fuels and duff lowers wildfire risk.*
2.2j Objectives - Forests/ Silviculture	(ii) To promote appropriate forest development and encourage wise management and maintenance of timber lands as a means of achieving sustainable development. • *Forest development, management, and maintenance practices can affect wildfire risk reduction in the WUI.* (iii) To endorse the economic use of forestlands through the promotion of viable, community-oriented woodlots, and value-added products. • *Woodlots promote resident-led landscape and forest management, letting community members guide forest management practices in the WUI.*
2.2m Objectives - Parks & Recreation	(ii) To encourage the immediate protection of specific areas on the Island through park or park reserve status. (iii) To promote the achievement of an integrated trail and park system on the Island, and to develop a park system which minimizes recreational/residential and agricultural conflict and prioritizes environmental protection in park design, management, and use. (v) To encourage the provision of 'neighbourhood' parks in the more populated areas of the Island. (vi) To provide for the retention of greenbelts on the Island. • *Local government has a responsibility to manage wildfire hazards and risks associated with government-owned or adopted parks, trails, and greenbelts. The BC Wildfire Act gives local governments authority to prevent and control fires, but liability rests with whomever causes the fire.*
3.1 Community Planning Policies – Settlement Patterns	(xii) Setbacks and heights of buildings and structures shall be regulated to ensure a scale of construction that is appropriate for the Island as well as to minimize the potential for development to adversely impact on adjacent properties, agricultural areas, the foreshore, wetlands, streams, lakes, and other sensitive areas. • *Appropriate setbacks based on FireSmart building principles of structures from vegetation and steep slopes reduces wildfire risk to that structure, and from the structure to the vegetation.*
3.3.1 Community Planning Policies – Water Transportation	(a)(ii) Consult with the Island community respecting future planning and scheduling for ferry service to the Island. • *BC Ferries infrastructure is used for emergency access/egress by Quadra Island residents and off-island agencies.*
3.3.2 Community Planning Policies – Road Transportation	(d)The Ministry of Transportation and Infrastructure shall be encouraged: (i) to maintain a high standard of maintenance on all major roads. • *Effective road maintenance is integral for emergency response, egress, and evacuations.*

Section, Sub-section, Goal	Description and Relationship to CWRP
	(iii) to remove roadside vegetation only where required for safety and maintenance and noxious weed and invasive plant control reasons utilizing manual roadside vegetation control methods. • *Vegetation management along both heavily used travel routes and emergency evacuation routes lowers wildfire risk and increases safety along travel routes.*
3.3.3 Community Planning Policies – Air Transportation	(a) Community emergency personnel shall be encouraged to identify appropriate emergency helicopter landing sites for the north end of the Island. • *Identifying and mapping emergency helicopter landing sites increases emergency response and evacuation efficacy.*
3.4.1 Community Planning Policies – Environmentally Sensitive Areas	(a) Ministry of Environment, Ministry of Forests Lands and Natural Resource Operations, Fisheries and Oceans Canada, and the community shall be requested to work cooperatively in the identification of hazardous lands and environmentally sensitive areas, including site-specific habitat considerations such as eagle nest trees. • *Identification of hazardous fuel types within the landscape (especially the WUI) can lead to risk reduction measures being implemented, lowering wildfire risk.*
3.5 Community Planning Policies – Commercial Activity	(l) Development permits shall be utilized to provide greater regulation over the form and character of commercial development. • *An Interface Wildfire Development Permit Area can be used to infuse FireSmart principles into both individual structure and subdivision design, structures, vegetation, and green spaces (i.e., neighbourhood park).*
3.7 Community Planning Policies – Forests / Silviculture	(c) The following general policies apply to all forested lands regardless of designation: (i) The importance of the Island's forest cover in the provision of green space, recreational opportunities, timber and forest products, buffers, wildlife habitat, protection of groundwater resources, and biodiversity shall be considered in all development proposals and these values shall be respected. • *Forest development, management, and maintenance practices can affect wildfire risk reduction in the WUI.* • *Moisture retention in forest fuels and duff lowers wildfire risk.* (v) Ministry of Forests, Lands and Natural Resource Operations, and private forest companies shall be encouraged to maintain active consultation with Island residents. • *Open and direct communication, such as with access closures due to wildfire risk, fosters greater understanding of wildfire risks and trust between land managers and the public.* (ix) Stewardship of forested areas to protect environmental values, in particular, groundwater resources and wildlife habitat areas shall be strongly encouraged. • *Forest development, management, and maintenance practices can affect Local water availability, which is integral to timely and effective firefighting.*
3.10 Community Planning Policies – Parks and Recreation	(b) A Quadra Island parks plan shall be developed to more fully recognize the existing and proposed park and recreational opportunities on the Island. (g) The regional district shall consult with private landholders, the community, and appropriate government agencies respecting the protection of environmentally sensitive areas, retention of greenbelts, and the provision of land for parks, trails, and community recreational facilities. Protection of these areas shall be accomplished through legislated mechanisms such as, but not limited to, density

Section, Sub-section, Goal	Description and Relationship to CWRP
	transfer within the plan area, density bonusing, development permit designations, use of restrictive covenants, and easements. • *Local government has a responsibility to manage wildfire hazards and risks associated with government-owned or adopted parks, trails, and greenbelts. The BC Wildfire Act gives local governments authority to prevent and control fires, but liability rests with whomever causes the fire.* • *Parks, trails, greenbelts, etc. that are planned for and managed through a wildfire lens can reduce wildfire risk.*
Part 4 – Development Permit & Development Approval Information Areas	4.1 The following application requirements are in addition to the requirements specified elsewhere in the OCP: (1) Development approvals shall be issued in accordance with the following guidelines. Where it appears one of more of the following guidelines is not applicable to an application, the guideline(s) may be waived by the board: … • *An Interface Wildfire Development Permit Area can be used to infuse FireSmart principles into both individual structure and subdivision design, structures, vegetation, and green spaces (i.e., neighbourhood park).*
Schedule B – Quathiaski Cove Village Plan	2.3.7.1 Green Networks and Forested Bluffs & 2.3.7.2 Parks, Open Space, Trails and Greenways • *Local government has a responsibility to manage wildfire hazards and risks associated with government-owned or adopted parks, trails, and greenbelts. The BC Wildfire Act gives local governments authority to prevent and control fires, but liability rests with whomever causes the fire.* • *Parks, trails, greenbelts, etc. that are planned for and managed through a wildfire lens can reduce wildfire risk.*
Schedule B – Quathiaski Cove Village Plan Part 5 – Development Permit Guidelines (General)	The Regional District will be guided by the policies of the Quathiaski Cove Village Plan and the Official Community Plan in its review of all applications received for amendment to the Quathiaski Cove Village Plan and/or rezoning of lands within the Quathiaski Cove Village Containment Boundary. • *Recognition of and planning for interface[8] and intermix[9] WUI areas can identify and reduce wildfire risk.*
Schedule B – Quathiaski Cove Village Plan Part 5 – Development Permit Guidelines	(b) Applicants are required to provide a detailed description as to how the proposal adheres to the policies, objectives and guidelines of the Village plan, as well as providing information related, but not limited, to the following: - intended land uses, densities, and the form and character of the development, including Green building design and build considerations, - environmental site planning considerations (i.e. stormwater management, riparian protection, native vegetation retention/buffers), … • *An Interface Wildfire Development Permit Area can be used to infuse FireSmart principles into both individual structure and subdivision design, structures, vegetation, and green spaces (i.e., neighbourhood park).*

[8]A zone of transition between wildland vegetation and developed land where the built environment meets with the natural environment.

[9] Areas where developed land (the built environment) and wildland vegetation (natural environment) intermingle.

2.4 LOCAL BYLAWS

Table 3 below contains local policies which are directly relevant to community wildfire resilience.

Table 3: Summary of local wildfire and emergency-related bylaws and their relationship to the CWRP

Bylaw	Description and clauses relevant to the CWRP
2733 Strathcona Emergency Program Service Establishment Bylaw	Establishes a service to provide emergency preparedness plans and operations, including electoral area C (Quadra Island within). • *Regulates all aspects of the "Strathcona Emergency Program" to be reviewed every 5 years.*
117 South Quadra Island Fire Protection District Open Burning Bylaw	A bylaw to establishing the rights and actions the Fire Department has for fire protection and safety in the South Quadra Island Fire Protection District: 1. *The Fire Chief may prohibit any or all open-air fires when in his/her opinion, atmosphere conditions or local circumstances may make such fires a hazard or nuisance.* *2. If at any time the Fire Chief deems it advisable, the Fire Chief may order one or more of the high-risk activities in Schedule B to be prohibited for a specified period unless authorized by a Special Permit issued by the Fire Chief.* *3. The Fire Chief or any person under his/her authority may:* *(a) enter at all reasonable times on any property that is subject to the requirements or regulations of this bylaw, to ascertain whether the regulations in this bylaw or directions made under this bylaw are in compliance;* *(b) make Orders directing the owners or occupiers of property to bring Open Burning in to compliance with this bylaw;* *(c) prevent material not properly prepared (i.e., dried) from being added to Open Burning;* *(d) call on the Ministry of Environment's Conservation Officers if a Person is Open Burning of waste in contravention of the Environmental Management Act;* *(e) order the Person who is Open Burning to immediately put the fire out; and extinguish Open Burning.* *5.The Fire Chief may withhold or cancel any Special Open Burning Permit issued where, in his/her opinion, Open Burning may create a hazard or Nuisance to Persons or property. Includes tools/equipment on site, setbacks, etc. for category 1,2,3 and campfires open burns.* *16. Every person who starts or allows Open Burning is responsible for such fire. If, in the opinion of the Fire Chief, the fire presents a hazard, has escaped, or threatens to escape from the person's control, or is prohibited under the terms of this bylaw, the Fire Department may be summoned to control or extinguish the fire. The property owner is liable for all costs and expenses incurred by the Fire Department or the District to control or extinguish the fire.*
2027 Park Rules and Regulations Bylaw	Gives authority to the SRD to make rules and regulations governing the use, management, improvement, operation, control and use of Regional District Parks. Appendix A - Section 7. Fires • *This section outlines fire regulations within parklands throughout the SRD, including prohibiting the ignition of fire outside of fire circles/rectangles*

Bylaw	Description and clauses relevant to the CWRP
	without the permission of the Regional District, limiting fire sizes to 1m x 1m, extinguishing fires by 11:00pm and the requirement of a 10L water pail at each fire.
158 Building Regulation Bylaw	Bylaw 158 specifies that all residential construction must abide by the BC Building Code. • *Includes material standards in part 9.26.2.1.*
1213 Quadra Island Zoning Bylaw	Provides Zoning Designations and speaks to • Subdivision Requirements: *minimum lot sizes and frontages, exemptions*; and • Land Use Requirements*: home occupation and industries, size shape siting of buildings/structures, siting buildings adjacent to lakes, watercourses and roads, siting exemptions, health requirements, and off-street parking.*
64 Minimum Standards for Subdivision of Land	Provides minimum standards for subdivision of land speaking to: • *Water, sewage disposal, roads, lot area requirements and exemptions, minimum frontage.*

2.5 OTHER LOCAL PLANS

Table 4 below contains other local plans and policies which are directly relevant to the CWRP.

Table 4: Summary of other Local Plans and Policies relating to the CWRP

Plan type	Description and Relationship to CWRP
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 within the CWRP are aimed to increase public understanding of wildfire hazards and FireSmart principles, while increasing Quadra Island's wildfire resiliency.*

2.6 LINKAGES TO HIGHER LEVEL PLANS AND LEGISLATION

Table 5 below lists higher-level plans and legislation relevant to wildfire planning and risk mitigation. Fuel management prescriptions and burn plans must address these plans as they relate to on-the-ground restrictions and regulations.

Table 5: Higher Level Plans and Relevant Legislation and their relationship to the CWRP

Plan/Legislation	Description and Relationship to CWRP
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. • *Establishes land use objectives for Special Management Zones and Resource Management Zones, which guides Crown land license holders planning and development documents, and subsequently CWRP recommendations pertaining to Crown land.*

Plan/Legislation	Description and Relationship to CWRP
FRPA – Government Action Regulations (GARs)	Visual Quality Objective (VQO) polygons guide forest management activities on a landscape in a manner so that timber harvesting does not compromise the designated objective. • *Multiple VQO polygons are within the WUI that should be accounted and planned for if overlapping fuel treatment prescriptions.*
Woodlot Management Plans	The primary purpose of a Woodlot Management Plan is to propose an allowable annual cut (AAC) for the woodlot license taking into account inventory information and resource management considerations. • *Seven woodlots' schedule B (Crown land portion) license area are within the WUI.*
Tree Farm License Management Plan (TFLMP)	TFLMPs provide a general description of the TFL, a list of publicly available planning documents that guide the TFLs operations, and a timber supply analysis for the TFL which guides the Chief Forester of BC in determining the annual allowable cut (AAC) for it. Strategies to address government objectives that are reflected in higher-level plans are given. • *TFL47 (licensed to TimberWest Forest Corporation; Mosaic Forest Management is the Timberlands Manager) overlaps with the WUI.*
BC Provincial Open Burning Smoke Control Regulation (OBSCR)	The OBSCR came into effect in September 2019 and governs open burning relating to land clearing, forestry operations and silviculture, wildlife habitat enhancement, and community wildfire risk reduction. • *All areas within the WUI from Heriot Bay south are within a High Smoke Sensitivity Zone. The remaining area within the WUI north of Heriot Bay are within a Medium Smoke Sensitivity Zone.*
Main Lake Park Purpose Statement and Zoning Plan (PSZP)	The PSZP identifies the following purposes of the park: • *The primary role of Main Lake Park is to protect a biologically diverse freshwater island lake system.* • *The secondary role is to provide a destination for canoe/small boat recreation on the Gulf Islands.* • *The tertiary role is to represent the natural environment.*
Rebecca Spit Marine Park	The PSZP identifies the following purposes of the park: • *The primary role of Rebecca Spit Park is to protect a recreational opportunity on Quadra Island.* • *The secondary role is to protect the natural environment in which people come to recreate.* • *The tertiary role of the park is to protect significant cultural values. Rebecca Spit was once a fortified First Nation's village and a midden site and as such, protects an under-represented portion of the cultural heritage of British Columbia.*

SECTION 3: COMMUNITY DESCRIPTION

Quadra Island, located at the north end of the Salish Sea just east of Campbell River, is the central community of the Discovery Islands. Within Electoral Area C of the Strathcona Regional District, the island is characterized by a mix of isolated rural properties, small residential neighbourhoods, parkland, and forest tenure (which includes both woodlots and a tree farm license). The population is clustered primarily in the South Quadra Island Fire Improvement District featuring communities at Quathiaski Cove, Heriet Bay, and Cape Mudge. Communities outside of the improvement district include Copper Bluffs, Bold Point, Open Bay, Village Bay Lake, and Granite Bay.

Quadra Island has been inhabited by the Coast Salish and Kwakwaka'wakw Aboriginal Peoples since time immemorial.[10] We Wai Kai (Cape Mudge), Klahoose, Xwemalhkwu (Homalco), Wei Wau Kum (Campbell River) First Nations, and Tla'amin Nation are among the First Nation governments whose traditional territory includes Quadra Island. We Wai Kai has land parcels on Quadra Island that overlap the projects eligible assessment area, which includes the Cape Mudge reservation community. We Wai Kai's Cape Mudge reservation land is excluded from this document as a separate CWRP document (We Wai Kai First Nation 2021 CWRP) has been prepared that makes recommendations specific to We Wai Kai reservation land, emergency planning, governance, and community concerns.

Services to residents of Quadra are provided both privately and by the Strathcona Regional District. SRD provides land use planning, emergency management, building and development permits, bylaw enforcement, and administration. Water and sewer for most residents are provided by private wells and septic systems, while sewer is provided to the Quathiaski Cove community by the SRD. Solid waste collection is not a service provided by the SRD to Quadra – residents must arrange pickup with private contractors. Quadra is accessed via a BC Ferries route to/from Campbell River, another to/from Cortes Island, or by private means.

Quadra is comprised of low-lying forested hills with variable topography, including rocky outcrops, karst geologic features, freshwater lakes (the Main Lake chain of interconnected lakes forms the second largest freshwater lake system on the west coast of Canada)[11], and small valleys throughout the landscape. The island lies in the rain shadow of Vancouver Island; summers are warm and dry and winters are mild and wet.

The economy of Quadra was historically driven by fishing, mining, and logging, the latter of which has endured as one of the main economies. Logging began in the late 1800's, and the Lucky Jim mine opened in 1903 (gold and copper ore).[12] A fish-canning plant operated throughout the early 1900's until it burned

[10]Quadrisland.ca
[11] Main Lake Provincial Park Purpose Statement and Zoning Plan. Accessed via: https://bcparks.ca/planning/mgmtplns/mainlake/mainlk_ps.pdf
[12]Gulf Island History Guide – Quadra Island History. Accessed via: https://www.gulfislandsguide.com/history/quadra-island-history/

down in 1941.[12] A passenger ferry in 1949 was followed by a car ferry in 1960, facilitating accelerated population growth for the island community.[12]

The most recent (2019) population statistics for Electoral Area C, of which Quadra is the largest community, show a population of 2,431 (a decrease by 6.5% from 2011).[13] The median age of the population is 56.3 years old (considerably higher than the provincial median age), of which approximately 29% are categorized as seniors.[13] Overall, Electoral Area C's population has stayed relatively constant over the last decade.[13] Important to note and consider, however, is that Quadra's population varies significantly based on the season, weather, and time of day due to visitors, commuters, and part-time residents; the population increases during the summer due to the influx of seasonal second-property cabin owners as well as the 100,000 tourist visits during the summer (of which approximately 50% stay in lodging on the island).[13]

Fire protection services are provided by the Quadra Island Fire Department (Quadra FD) to those within the South Quadra Island Fire Improvement District (shown on Map 1). Properties outside this must rely upon their own suppression equipment and capabilities, however Quadra FD is contracted by BCWS for rescues outside of its fire protection zone. BC Wildfire Service (BCWS) will respond to all fires on Crown Land, (and to those on private land that are in imminent threat of entering on to Crown Land) with the closest BCWS fire base being the Quinsam Fire Base, located in Campbell River. Quadra is within the BC Wildfire Service (BCWS) North-Island Mid Coast Fire Zone which is part of the greater Coastal Regional Fire Centre.

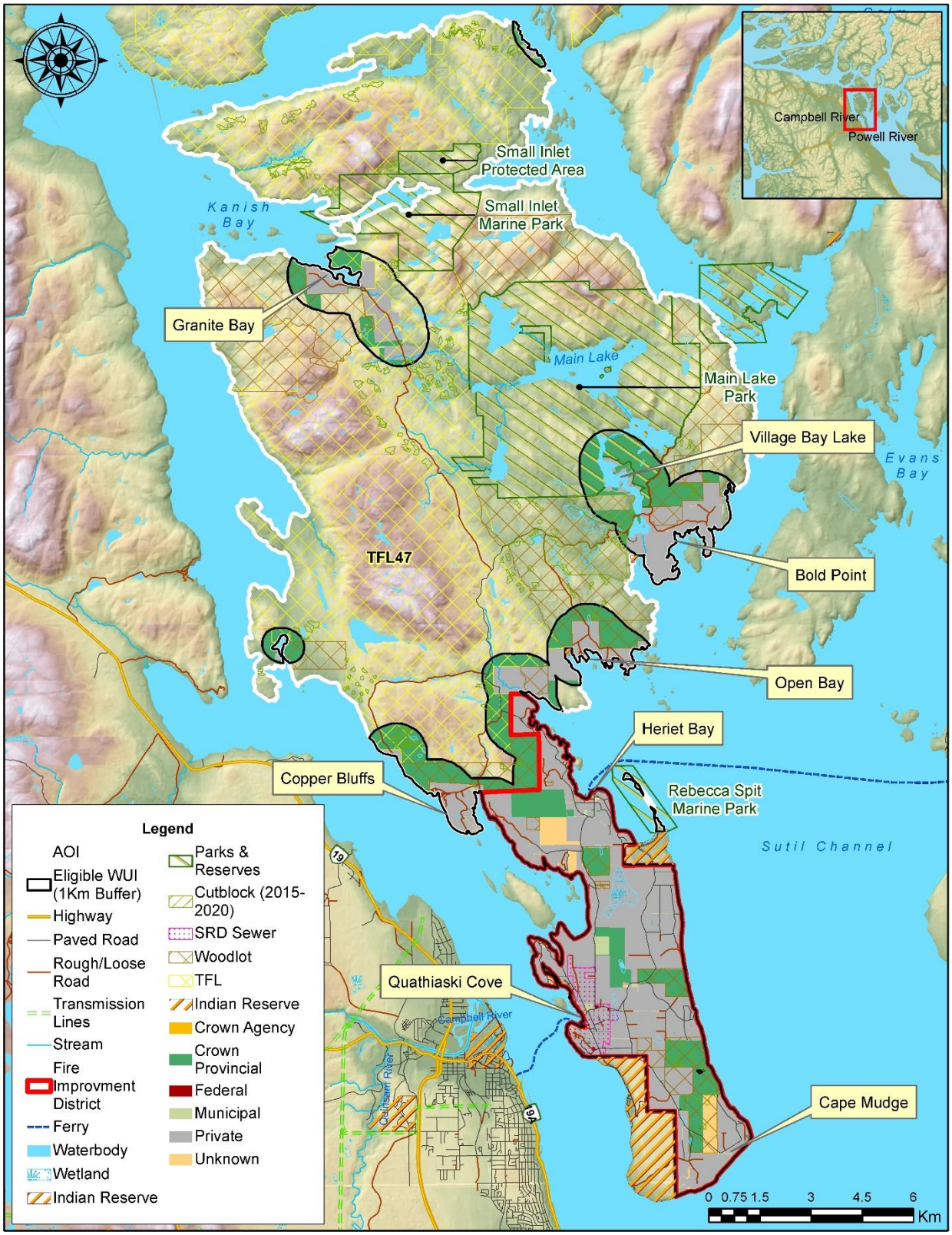
The main concerns relating to Quadra's wildfire preparedness that were expressed by the CFRC were:

1) No formal firefighting response for communities outside the South Quadra Fire Protection District.
2) The often-unaligned fire bans/restrictions between the South Quadra Fire Protection District and the rest of the island.
3) Difficulty for mutual aid/emergency response to access the island.
4) Single route access and egress neighbourhoods.
5) Long, narrow driveways limiting firefighting equipment access.

3.1 AREA OF INTERESTAND WILDLAND-URBAN INTERFACE

The Area of Interest (AOI) for the CWRP is Quadra Island. The associated eligible WUI represents a one-kilometer buffer around a structure density of 6+ structures/km^2 within the AOI and defines the focus of this CWRP – Quadra's WUI encompasses a total of 6,999 hectares. A breakdown of the area by ownership type is listed in Table 6. The AOI, WUI, and land ownership types are shown on Map 1.

[13]Social Determinants of Health Fact Sheet: Quadra Island. Accessed via: https://srd.ca/wp-content/uploads/2019/06/Quadra-Community-Profile.pdf



Map 1: Quadra CWRP Area of Interest, Wildland-Urban Interface, and Fire Improvement District

Most of the land in Quadra's WUI is split between Crown Provincial (42% of the WUI) and Private (55% of the WUI). Most of the Crown land is managed under managed forest licenses (woodlots and TFL) or provincial parks.

Table 6: Land Ownership within the Wildland-Urban Interface

Land Ownership[14]	Area (ha)	Percent
Crown Agency	2	0.0
Crown Provincial	2,923	41.8
Federal	2	0.0
Municipal	37	0.5
Private	3,851	55.0
Unknown	185	2.6
Total	**6,999 ha**	**100%**

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

3.2 VALUES AT RISK

Protection of critical infrastructure and values at risk 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 and sewer services, social services, evacuation reception centres, and communications infrastructure. Critical infrastructure is shown on Map 2, and Table 7 details the inventory of critical infrastructure identified in the WUI.

3.2.1 EMERGENCY RESPONSE, PUBLIC SERVICES, AND COMMUNICATIONS

Quadra's evacuation planning and management documents are currently being updated. The current evacuation plan highlights nine evacuation zones with evacuation routes assigned to each. In the event of an evacuation order, SRD is responsible for offering support services, including reception centres and emergency housing. The Quadra Island Evacuation Plan is to be used in conjunction with the Regional Master Emergency Plan, which provides additional overreaching procedures to be used in any emergency, such as: BC Emergency Management System (BCEMS) overview, roles and responsibilities, EOC activation and management, and guidelines for declaring a State of Local Emergency (SOLE).[15]

The Quadra Island Emergency Program (QIEP) is a group of over 100 trained local volunteers helping Quadra prepare for, and respond to, an emergency or disaster. It houses three prongs of emergency organization, planning, and response for Quadra Island: amateur (ham) radio operators operating on a repeater system, Emergency Support Services (ESS), and the Neighbourhood Emergency Preparedness Program (NEPP). Both Telus Communications Inc. and Rogers Communications operate and maintain one cellular communication transceiver within the WUI, providing most of the southern two-thirds of the island with cell phone coverage.

3.2.2 ELECTRICAL POWER

A large fire has the potential to impact electrical service by disrupting the network power distribution through both direct and indirect processes. For example, heat from flames or fallen trees associated with a fire event may cause power outages. Electrical power is provided to Quadra by BC Hydro via underwater cables from the Campbell River substation and on-island by a network of overhead wooden pole distribution lines. This system is well-mapped, and in the event of a wildfire, BC Hydro will work with local and provincial emergency responders and employ their emergency response protocols.[16]Neighbourhoods with small, street-side wooden poles that connect to homes are particularly vulnerable to fire. Utility right-

[15] Quadra Island Evacuation Plan (Draft)
[16]https://www.bchydro.com/safety-outages/emergency-preparation.html

of-way best management practices such as regular brushing and clearing of woody debris and shrubs are employed by BC Hydro to help reduce fire risk, utility pole damage, and subsequent outages.

Secondary power sources are important to reduce critical infrastructure vulnerability in the event of an emergency that cuts power for days, or even weeks. 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 long outages. The CFRC identified that secondary power sources are in place for some, but not all, of the critical infrastructure within the WUI.

3.2.3 WATER AND SEWAGE

All homes and businesses on Quadra are responsible for their own water needs. Water is sourced from either registered points-of-diversion (streams/lakes) or private wells. Sewage for most of the island's residents is handled privately with septic systems, while sewer to those residents and businesses in the Quathiaski Cove community is provided by the SRD through the Quathiaski Cove Sanitary Sewerage System.

3.2.4 HAZARDOUS VALUES

Hazardous values are defined as values that pose a safety hazard to emergency responders and include large propane facilities, landfills/refuse sites, storage facilities containing explosives, etc. Anywhere combustible materials, explosive chemicals, or gas/oil is stored can be considered a hazardous value. Protecting hazardous values from fires is important to preventing interface fire disasters.

There is no natural gas supply to Quadra, as well as no on-island refuse disposal site. TimberWest Forest Corporation owns a dryland log sort (managed by Mosaic Forest Management) at the south end of Upper Gowland Harbour Road (on private property) which can be considered a hazardous value due to a large amount of fuel that can be ignited in a wildfire event.

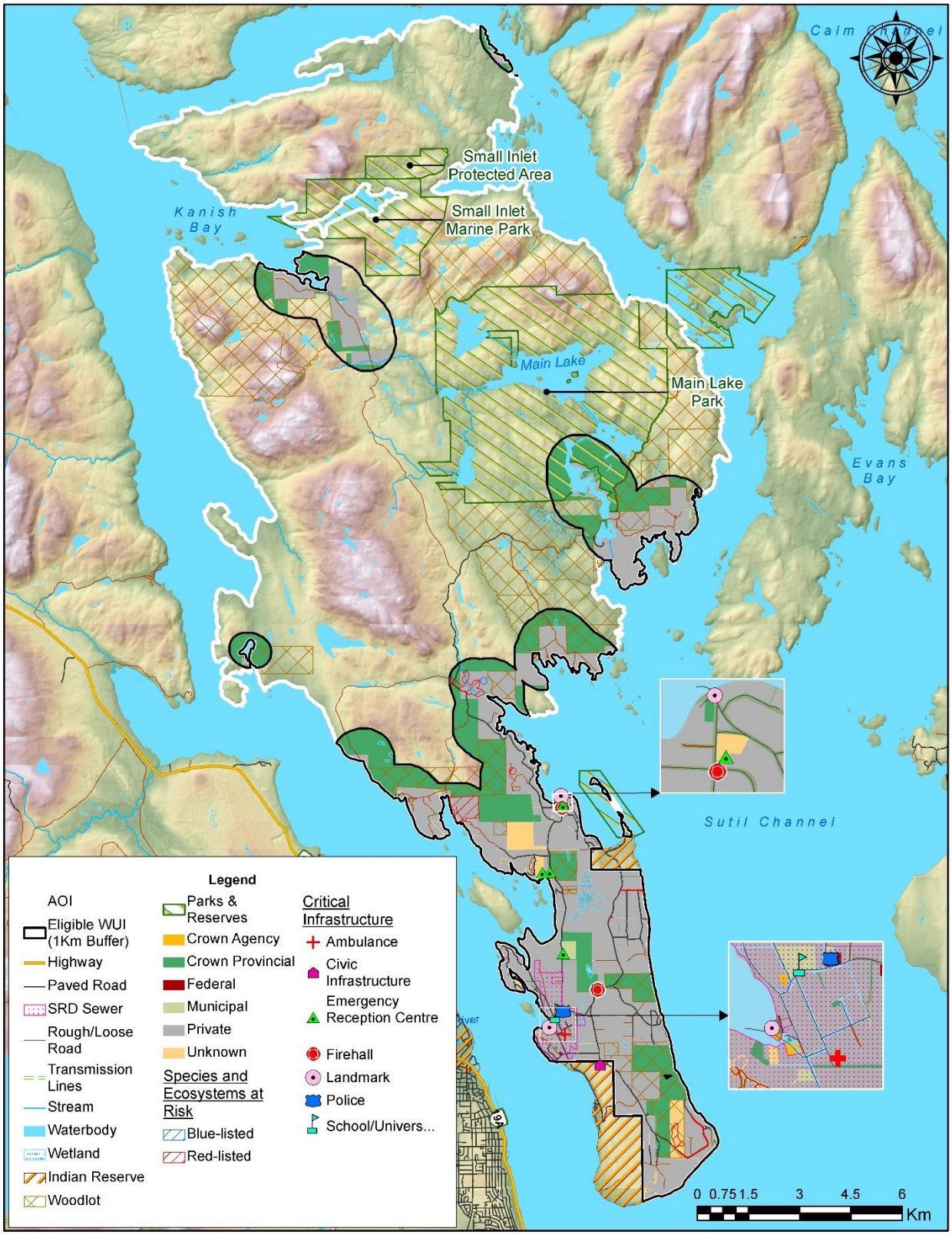
The management and treatment of fuels in proximity to hazardous infrastructure is critical in reducing the risks associated with both structural fire and wildfire. Specifically, best management practices recommended for the management of hazardous values include:

1) Incorporating FireSmart planning and setback requirements for all infrastructure in this category;
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; and
3) Installing sprinkler systems to keep wood accumulations/stacks (branches, logs, lumber, firewood, etc.) damp, especially during the fire season (this is specifically applicable to wood fibre industrial sites).

Table 7: Critical Infrastructure within the Wildland-Urban Interface

Critical Infrastructure Type	Critical Infrastructure Name	Address/Intersection/Location
Emergency Response, Public Services, Electrical, Gas, and Communications		
Emergency Reception Centre Emergency Housing Location	Quadra Island Bible Church	1281 W Rd, Quathiaski Cove
	Camp Homewood	1291 W Rd, Heriot Bay
	Quadra Island Community Centre	970 W Rd, Quathiaski Cove
	Royal Canadian Legion Branch 154	1503 W Rd, Quathiaski Cove
	Quadra Elementary School	Heriot Bay Rd, Heriot Bay
	Heriot Bay Inn	673 Hotel Rd, Heriot Bay
Fire Department	Fire Hall #1	844 Heriot Bay Rd, Quathiaski Cove
	Fire Hall #2	1515 W Rd, Heriot Bay
Health	BC Ambulance Station 170	844 Heriot Bay Rd, Heriot Bay
	Quadra Island Medical Clinic	654 Harper Rd #3A, Quathiaski Cove
Police	RCMP	738 W Rd, Quathiaski Cove
School	Quadra Elementary School	678 Heriot Bay Rd, Heriot Bay
Transportation (Landmark)	BC Ferries Quathiaski Cove	Quathiaski Rd terminus
	BC Ferries Heriot Bay	W Rd, Heriot Bay terminus
Communications (Civic Infrastructure)	Telus and Rogers Transceiver Tower	573 Cape Mudge Rd, Quathiaski Cove
	Ham Radio Repeaters	Heriot Ridge
		Mt Menzies
		Quadra Repeater
Water and Sewage		
Sewage – Quathiaski Cove	Quathiaski Cove Sanitary Sewerage System (including backup generator)	Quathiaski Cove (see Maps 1 and 2)
Hazardous Materials		
Industrial	Dry Land Log Sort (TimberWest Forest Corporation; managed by Mosaic Forest Management)	South end of Upper Gowland Harbour Rd

When the Quadra Island Evacuation Plan is finalized, Table 7 should be updated to reflect updated critical infrastructure, emergency reception and housing centres, harbor and wharf evacuation locations, and tactical staging areas.



Map 2: Critical Infrastructure and Species/Ecosystems at Risk within the Wildland-Urban Interface

3.2.5 CULTURAL VALUES

There are many documented historic and archeological sites within the WUI and a high potential for additional sites to be found given the long history of use by the Coast Salish and Kwakwaka'wakw Aboriginal Peoples. Known archeological sites are protected under the Heritage Conservation Act, which applies on both private and public lands. In addition, there are resource and cultural values presently held that should be known and managed for.

First Nations with overlapping interests should be involved well before any fuel management projects are initiated to allow for meaningful review and input. Archeological assessments may be required to ensure that known or unknown cultural resources are not inadvertently damaged or destroyed, and that First Nations' strategies for land management in their traditional territory are complied with.

3.2.6 HIGH ENVIRONMENTAL VALUES

Table 8 below lists the ecosystem or species at risk occurrences that have been identified through the B.C. Conservation Data Center (CDC) or have been specifically observed and recorded within the WUI boundary. 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. Blue and Red listed occurrences are shown above on Map 2.

Table 8: Publicly available occurrences of Red and Blue-listed species recorded in the WUI

Scientific Name	Common Name	Category	BC List	Habitat Type
Claytonia washingtoniana	Washington Springbeauty	Vascular Plant	Red	Terrestrial: Forest Needleleaf, Mature Forest
Thuja plicata/ Rubus spectabilis	Western Redcedar/ Salmonberry	Ecological Community	Red	Western Redcedar / Salmonberry
Cercyonis pegala incanabilis	Common Woodnymph, Incana Subspecies	Invertebrate Animal	Red	Common Woodnymph, Incana Subspecies
Ardea Herodias fannini	Great Blue Heron, Fannini Subspecies	Vertebrate Animal	Blue	Great Blue Heron, Fannini Subspecies
Picea sitchensis/ Rubus spectabilis	Sitka Spruce/ Salmonberry	Ecological Community	Red	Sitka Spruce / Salmonberry

SECTION 4: WILDFIRE RISK ASSESSMENT

This section summarizes the factors that contribute to local wildfire risk in Quadra's WUI. Using verified and updated fuel types (Appendix A: Local Wildfire Risk Process) combined with field wildfire threat assessments and office-based analysis (Appendix A: Local Wildfire Risk Process), local wildfire risk for the WUI was updated. There are two main components of this local risk assessment: the *wildfire behaviour threat class* (fuels, weather, and topography sub-components) and the *WUI risk class* (structural sub-component). The local wildfire risk assessment helps to identify the parts of the AOI that are most vulnerable to wildfire.

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

Wildfire Risk = Consequence X Probability

Where:

Wildfire risk is the potential losses incurred to human life and values at risk within a community in the event of a wildfire.

Consequences are the repercussions associated with fire occurrence in an area. Higher consequences are associated with densely populated areas, areas of high biodiversity, etc.

Probability is the threat of wildfire occurring in an area and is expressed by the ability of wildfire to ignite and then consume fuel on the landscape – its *wildfire threat*. Wildfire threat is driven by three major components of the wildfire environment:

1) Fuel – loading, size and shape, arrangement (horizontal and vertical), compactness, chemical properties, and fuel moisture.
2) Weather – temperature, relative humidity, wind speed, and direction and precipitation.
3) Topography – slope and terrain (increase/decrease rate of spread), and aspect (fuel dryness)

These components are generally referred to as the 'fire behaviour triangle' (the ways in which they individually influence the wildfire environment of the WUI will be detailed below). Fuel is the only component of the fire triangle that can be managed.

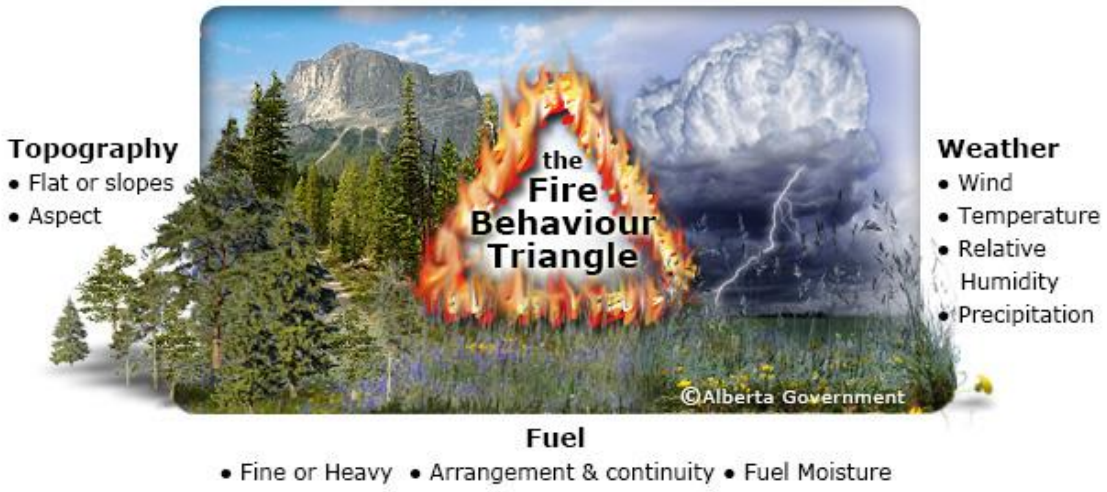


Figure 1. Graphic display of the fire behavior triangle, and a subset of characteristics of each component[17]

4.1 WILDFIRE ENVIRONMENT

The ecological context of wildfire and the role of fire in the local ecosystem under both current and historical conditions is an important basis for understanding the current and future wildfire threat to a community.

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. Quadra's WUI is entirely within the CWHxm subzone, comprising of two variants – eastern and western. Historically, because of major yet infrequent fires that occurred in this disturbance type, the landscape would have consisted of extensive areas of even-aged stands with snags and veteran trees that had survived previous fires.[18]However, extensive logging over the last 100 years within the WUI and surrounding area has left mostly even-aged forest stands.

Fuel

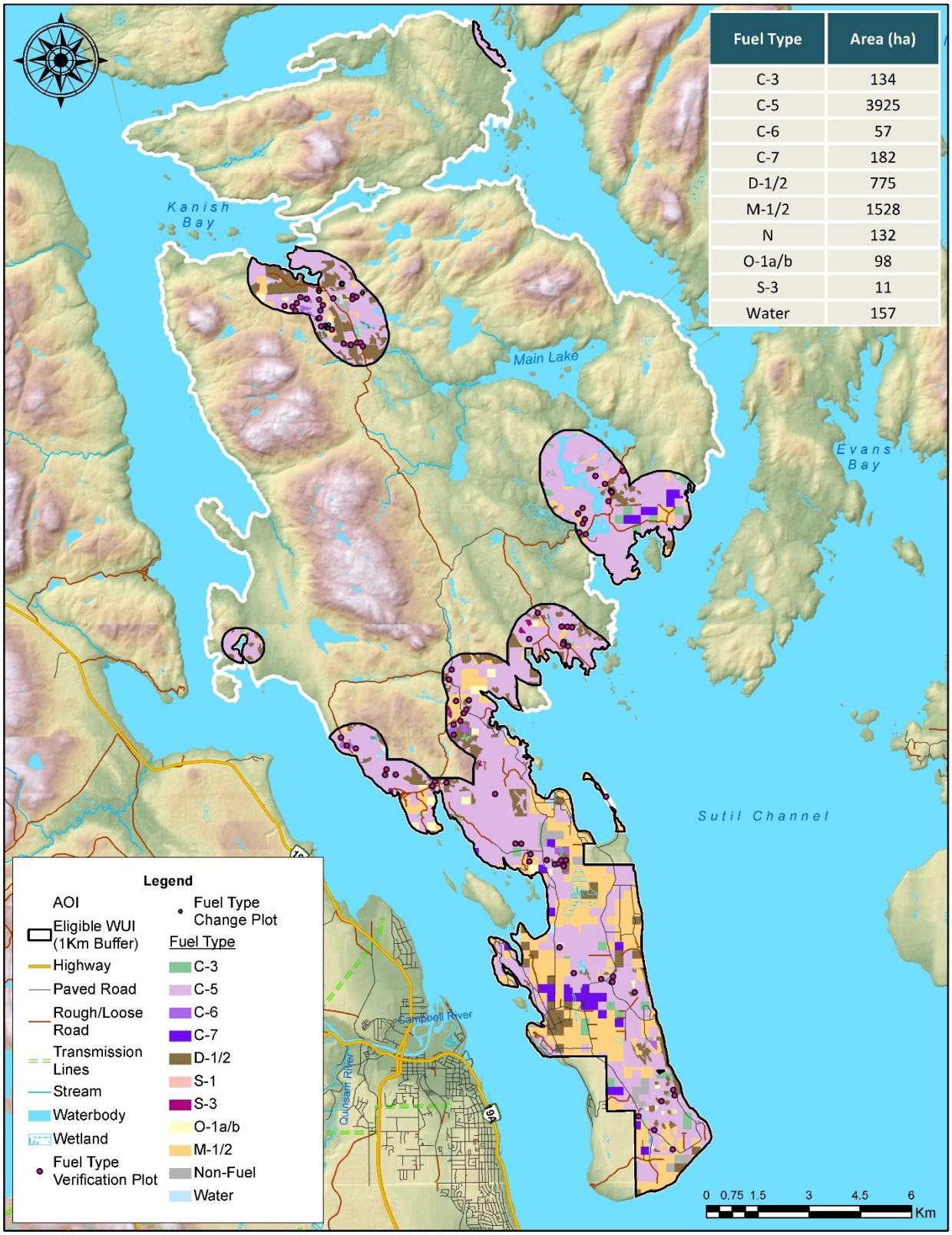
The Canadian Forest Fire Behaviour Prediction (FBP) System outlines sixteen fuel types based on characteristic fire behaviour under defined conditions.[19] Fuel types (confirmed or updated by fieldwork verification) for Quadra's WUI are detailed below in Table 9 and shown on Map 3. The fuel types present that may be considered hazardous in terms of fire behaviour and fire brand spotting potential in the WUI are C-3 and C-6, particularly if there are large amounts of woody fuel accumulations or denser understory

[17] Province of Alberta
[18] Province of British Columbia, 1995. Biodiversity Guidebook.
[19]Forestry Canada Fire Danger Group. 1992. Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3.

ingrowth, and S-3. C-5 fuel types have a moderate potential for active crown fire when wind-driven. 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 the level of curing. Detailed fuel type descriptions and their associated wildfire risk can be found in Appendix A-1: Fire Risk Threat Assessment Methodology.

Table 9: Updated fuel types (by area and percent) within Quadra's Wildland-Urban Interface

Fuel Type	Fuel Type Description within WUI	Area (ha) of WUI	Percent (%) of WUI
C-3	Fully stocked, late-young conifer forest with crowns separated from the ground. Often the result of clear-cut logging.	134	1.9
C-5	Well-stocked mature forest, crowns separated from ground. Moderate understory herbs and shrubs. Little grass or surface fuel accumulation. Typically, undisturbed, or selectively harvested forests.	3,925	56.1
C-6	Pure, fully stocked conifer plantations with closed crowns and no understory or shrub layer. Typically, 15-25 years old.	57	1.0
C-7	Open, sparsely populated conifer stands with grass and low-lying shrubs underneath. Often on dry, rocky ridges and outcrops. Tree crowns usually close to or at the ground.	182	2.6
D-1/2	Deciduous stands/forest.	775	11.1
M-1/2	Moderately well-stocked mixed stand of conifers and deciduous species, low to moderate dead, down woody fuels. Typically, areas harvested 10-20 years ago or mature wet/floodplain forests.	1,528	21.8
O1-a/b	Matted and standing grass communities; sparse or scattered shrubs; trees and down woody debris; areas harvested <7 years ago *with good slash management*.	98	1.4
S-3	Areas recently logged with slash where the cedar component is retaining all its foliage in a cured condition on the branches, but the hemlock and Douglas-fir components have dropped up to 50% of their foliage. Slash fuels tend to be continuous and uncompacted.	11	0.1
N (non-fuel)	Areas with no available fuel, such as gravel dumps, beaches, etc.	132	1.9
W (water)	Waterbodies.	157	2.3



Map 3: Fuel types present in Quadra's WUI (updated)

Weather

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 Canadian Forest Fire Danger Rating System (CFFDRS) Danger Class ratings of 4 (High) and 5 (Extreme). Danger class days were summarized to indicate the fire weather in Quadra's WUI. Considering that fire danger varies from year to year, historical weather data can provide information on the number and distribution of days when the WUI is typically subject to high fire danger conditions, which is useful information in assessing fire risk.

Figure 2 below displays the average frequency of danger class days summarized from the Quinsam Base BCWS weather station, located 5.8 km west of Quathiaski Cove on the west side of Campbell River. This data is most applicable for inferring danger class days to areas of south Quadra Island. Figure 3 below displays the average frequency of danger class days summarized from the Maurelle BCWS weather station, located 12.8 km east of Granite Bay on Maurelle Island. This data is most applicable for inferring danger class days to northern areas of Quadra Island. Both stations provide an 11-year fire weather data collection interval for Quadra's WUI between the months of April and October. When looking at just the 'High Fire Danger' days for the peak fire season months of June-September (Table 10), both weather stations show very similar data:

Table 10: High Fire Danger Days in the Wildland-Urban Interface (June-September)

Weather Station	Number of 'High Fire Danger' Days	% 'High Fire Danger' Days
Maurelle BCWS Fire Weather Station	42	34%
Quinsam BCWS Fire Weather Station	44	36%

Overall, July and August are by far the two months with the highest fire danger, having 12 and 18 'High Fire Danger' days respectively.

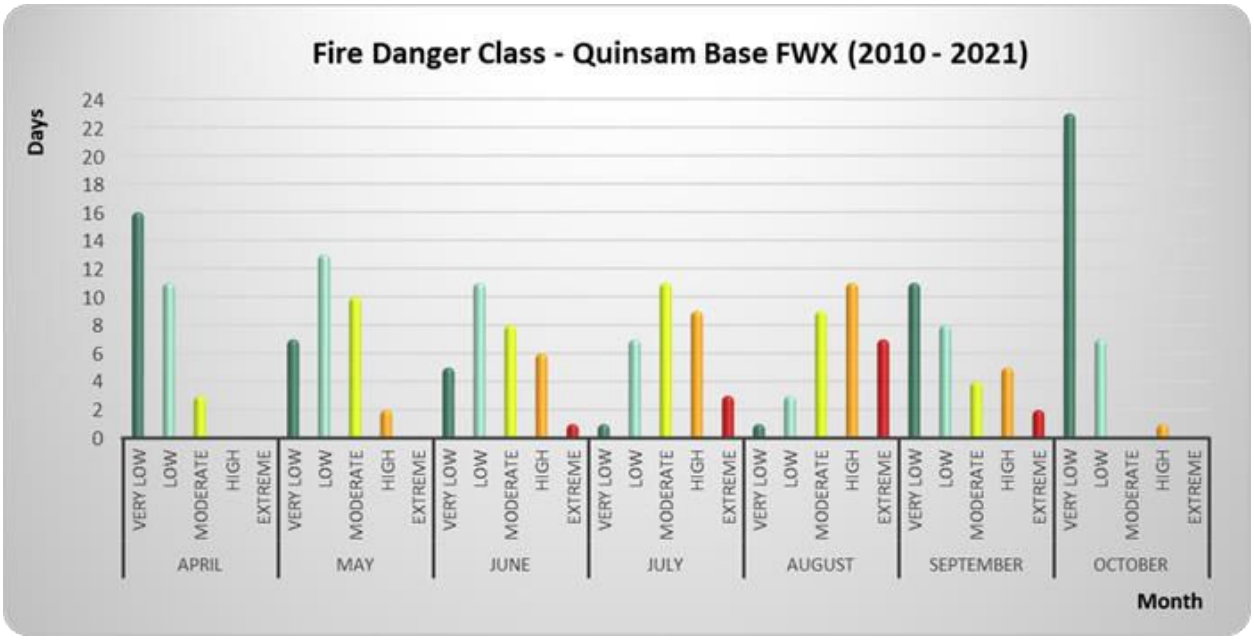


Figure 2: Average number of danger class days for the Quinsam Base fire weather station. Summary of fire weather data for the years 2010-2021.

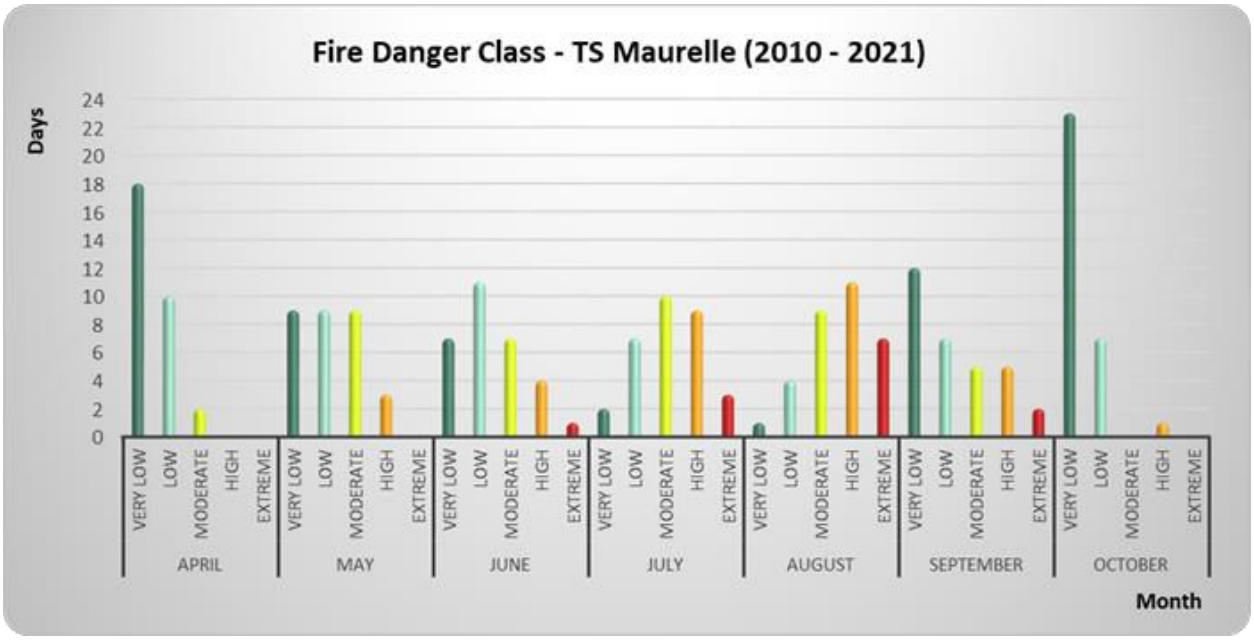


Figure 3: Average number of danger class days for the Maurelle fire weather station. Summary of fire weather data for the years 2010-2021.

Climate change is projected to contribute to changes in the fire regime, forest attributes, and fuel hazard across BC. Climate scientists expect that the warming global climate will trend towards wildfires that are increasingly larger, more intense, and more difficult to control. Furthermore, these fires will likely threaten WUI communities more often due to increased potential for intense fire behaviour, fire season

length, and fire severity.[20] As outlined in the *Climate Summary for the West Coast,*[21] the following climate predictions for the West Coast of BC are made, including Quadra:

- Year-round moderate increases in temperature (an increase in mean temperature of 1.4^{o} 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.[22]
- An additional 22 frost-free days and +327 growing degree days by the 2050s.

Wind speed and direction are also critical components of fire behavior. Information on local wind conditions is found in Appendix A-3: Fire Spread Patterns. Summarized in an Initial Spread Index (ISI) Rose(s) from representative BCWS weather stations, 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. A wildfire that occurs upwind of a value poses a more significant threat to that value than one which occurs downwind. For this analysis, the Maurelle BCWS fire weather station will likely provide more accurate ISI data as it is located also on an island adjacent to the WUI, whereas the Quinsam Base BCWS fire weather station is inland on Vancouver Island. During the fire season (April – October), the Maurelle BCWS fire station indicates predominant winds originate from the south (with some north influence), becoming south dominant in July and August (peak 'High Fire Danger' weather months). Thus, fires south of structures and values pose the largest threat on Quadra Island.

Topography

Slope steepness 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 configuration of features on the landscape that can restrict (i.e., water bodies, rock outcrops) or drive (i.e., valleys, exposed ridges) the movement of a wildfire.

Table 11shows the percent of the WUI by slope percent class and those classes fire behaviour implications. The majority of Quadra's WUI (74%) is on less than 20% slope and will likely not experience accelerated

[20] BC Provincial Government. 2020. Preliminary Strategic Climate Risk Assessment. Retrieved from: https://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/risk-assessment

[21] Pacific Climate Impacts Consortium. Climate Summary- West Coast. 2013. https://pacificclimate.org/sites/default/files/publications/Climate_Summary-West_Coast.pdf

[22] 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

rates of spread. 14% of the WUI is likely to experience an increased rate of spread, 7% a high rate of spread, and only 5% is likely to experience a very high or extreme rate of spread.

Table 11. Slope Percentage and Fire Behaviour Implications.

Slope	Percent of WUI	Fire Behaviour Implications
<20%	74%	Very little flame and fuel interaction caused by slope, normal rate of spread.
21-30%	14%	Flame tilt begins to preheat fuel, increase rate of spread.
31-40%	7%	Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.
41-60%	4%	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.

When slope percentage is considered in context with a value's slope position (summarized below in Table 12), that value's risk to increased fire behaviour can change dramatically. For instance, a value located in the upper 1/3 of a steep slope (>40%) will be exposed to fires downslope travelling very quickly uphill towards it and be impacted by preheating and thus faster rates of fire spread. Homes and critical infrastructure in the WUI vary in slope position, from bottom slope (at the shoreline) to mid-and-upper slopes for the furthest up homes and structures. Managing fuel downslope of homes and structures would typically reduce wildfire risk to those values more so than managing fuel upslope of them.

Table 12. 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 increasing 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 terrain break features affecting preheating and flames rolling over into the fuel ahead of the fire.
Upper 1/3 of slope	Impacted by extreme rates of spread. At risk to large, continuous fire run. Preheating and flames rolling over into the fuel.

4.2 WILDFIRE HISTORY

Historic Fire Regime

BEC zones have been used to classify BC into five Natural Disturbance Types (NDTs). The NDT classification is based on the frequency and severity of pre-European disturbance events (including, but limited to, wildfires) and indicates historical fire regimes.[23]

[23] Province of British Columbia, 1995. Biodiversity Guidebook.

Quadra's WUI is entirely classified as NDT 2 – ecosystems with infrequent stand-initiating events. Wildfires in these ecosystems were often of moderate size (20 to 1000 ha), with unburned areas resulting from sheltering terrain features, higher site moisture, or chance. Many larger fires occurred after periods of extended drought, but the landscape was dominated by extensive areas of mature forest surrounding patches of younger forest.[24] The mean fire return interval for disturbances in the NDT2 historically was about every 200 years.[24] 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.[25]

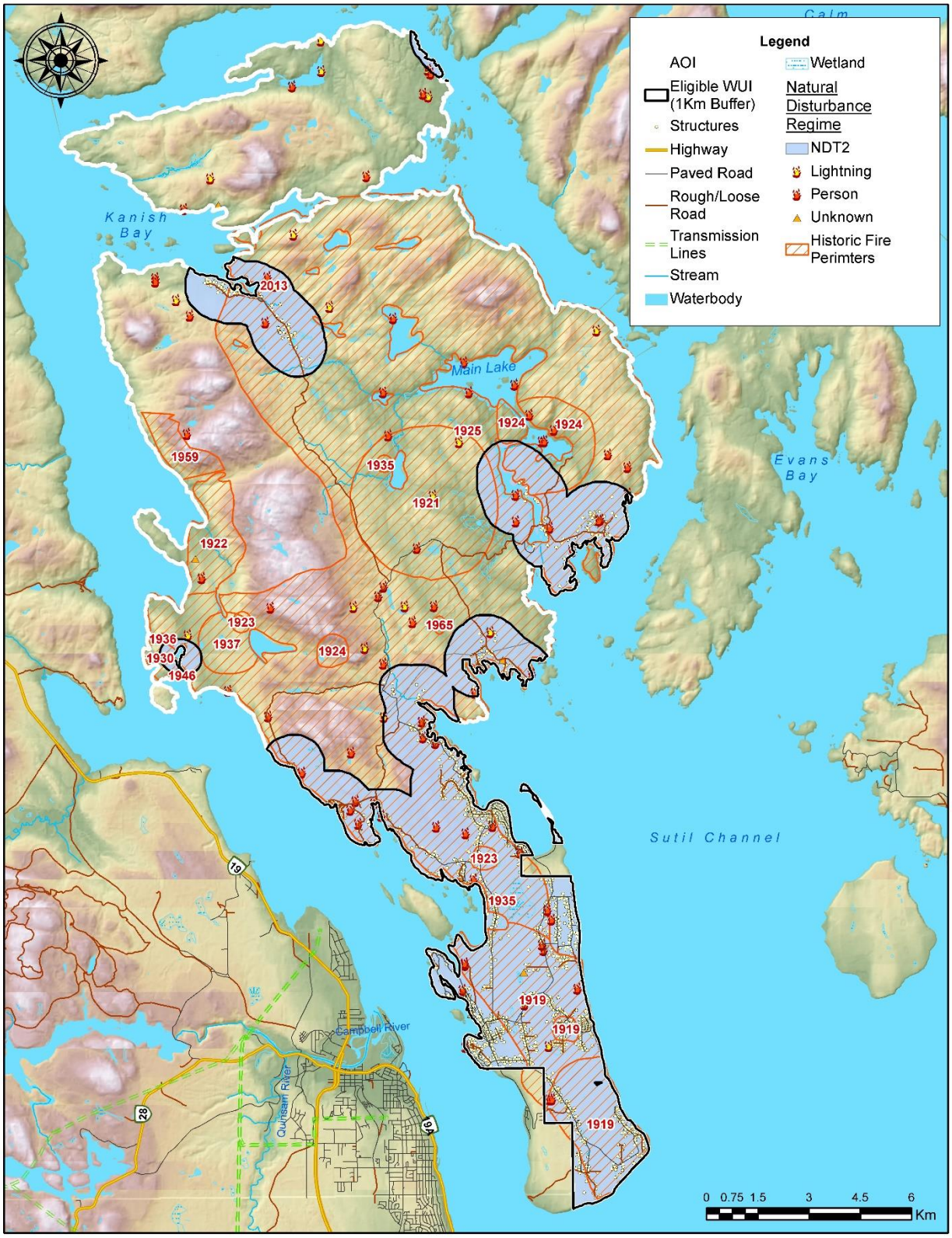
Historical Wildfire Occurrences

Historical fire ignition and perimeter data for the WUI are depicted below in Map 4. Fire ignition data is available from 1950-2020 and fire perimeter data is available from 1917-2020 for the Quadra Island.

Based on the BCWS historical wildfire polygon dataset, wildfires in (or partially overlapping) the WUI are rare – since 1946 there has been one recorded fire polygon that occurred in 2013 in Granite Bay, was 0.7 hectares in size, and caused by lightning. However, of the 13 fires occurring prior to 1946, three were over 1,000 hectares, one of which was 15,908 hectares (burning approximately 80% of Quadra). This shows that, although rare, large fires can occur under the right conditions (echoed by the above NDT 2 characteristic statement, "Many larger fires occurred after periods of extended drought").

Based on the BCWS historical fire ignition dataset, most ignitions with the WUI were human-caused – out of 48 total ignitions ranging from 1958 to present, 77% (37) were from human or human activity and 15% (seven) were from lightning (four were recorded as cause "unknown"). When analyzing the last 30 years of data for recent ignition trends, from 1990 to present there were 27 ignitions of which 21 were from human or human activity (78%). This shows that human-caused fire ignitions are the most likely risk to igniting a wildfire in Quadra's WUI.

[24] Pogue, L. A., and L. Daniels. 2017. Three Centuries of Fire at Vaseux Lake. MASC Executive Summary for the BC Community Forests Association.
[25] 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: Historical fire ignitions and occurrences within the Wildland-Urban Interface

4.3 LOCAL WILDFIRE THREAT ASSESSMENT

The local wildfire threat assessment process includes several key steps as outlined in Appendix A: Local Wildfire Risk Processand summarized as follows:

- *Fuel type attribute assessment* – ground-truthing/verification and updating as required to develop a local fuel type map (Appendix A-1: Fire Risk Threat Assessment Methodology, Map 3).
- *Consideration of the proximity of fuel to the community* – recognizing that fuel closest to the community usually represents the highest hazard (Appendix A-2: Proximity of Fuel to the Community).
- *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: Fire Spread Patterns).
- *Consideration of topography concerning values*–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 (4.1–Topography).
- *Stratification of the WUI* – according to relative wildfire threat based on the above considerations, other local factors, and field assessment of priority wildfire risk areas.

Wildfire Threat Assessments were completed over several field days in July of 2021 in conjunction with verification of fuel types (see Appendix B: Wildfire Risk Assessment – Worksheets and Photos) to support the development of priority treatment areas. 20 WUI threat plots were completed along with 95 other field stops (e.g., qualitative notes, fuel type verification, and/or photograph documentation) were made across the WUI (see Appendix D: WUI Threat Plot Locations and Map 5: Local Wildfire Threat Map) in areas that had road or trail access to build the most accurate assessment of local fire risk possible.

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 before 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

It is important to note that the Local Wildfire Threat Assessment analyses only apply to the Crown and municipal land base within the WUI as assessment of private property is not supported by UBCM

CRI grant funding. Thus, approximately 45% of the land base is excluded. However, the analyses do provide relevant information regarding wildfire threat that should be considered for FireSmart and emergency management planning and preparedness.

4.3.1 WILDFIRE THREAT CLASS ANALYSIS

Classes of the wildfire threat class analysis are as follows:

- Very Low: Waterbodies with no forest or grassland fuels, posing no wildfire threat;
- Low: Developed and undeveloped land that will not support significant wildfire spread;
- Moderate: Developed and undeveloped land that will support surface fires that are unthreatening to homes and structures;
- High: Landscapes or stands that provide continuous forested fuels that will support candling, intermittent crown or continuous crown fires. These landscapes are often steeper slopes, rough or broken terrain and/or south or west aspects. High polygons may include high indices of dead and downed conifers; and
- Extreme: Continuous forested land that will support intermittent or continuous crown fires.

The results of the wildfire threat class analysis are shown on Map 5 and in Table 13 below. The updated analysis shows that 29% of the WUI is either water, very low threat, or low threat. The remaining ~16% of the WUI is moderate threat or higher, with high and extreme threat classes both constituting less than 1% each. 55% of the WUI is classified as private land and as such has not been allocated fire threat data. Table 13 also shows the differences between the 2020 PSTA data and the updated PSTA data resulting from the methodology.

Table 13: Fire threat summary for the Wildland-Urban Interface

Wildfire Threat Class	2020 PSTA Data	2020 CWRP Data Update
	% of WUI	% of WUI
Extreme	1%	**<1%**
High	1%	**<1%**
Moderate	32%	**16%**
Low	4%	**27%**
Very Low/ No Threat (Water)	3%	**2%**
No Data (Private Land and Private Managed Forest Land)	56%	**55%**

When applied to just the assessable area within the WUI, approximately 64% is low or very low treat classes and 35% is moderate threat class or higher (with high and extreme threat classes both constituting less than 1% each).

4.3.2 WUI RISK CLASS ANALYSIS

WUI Risk Classes are quantified when the Wildfire Threat (the above; Table 13) is assessed as high or extreme, causing the potential of unacceptable wildfire risk when near communities and developments. The total combined WUI Risk equals the area of High and Extreme Fire Threat Ratings. WUI Risk Classes are described below:

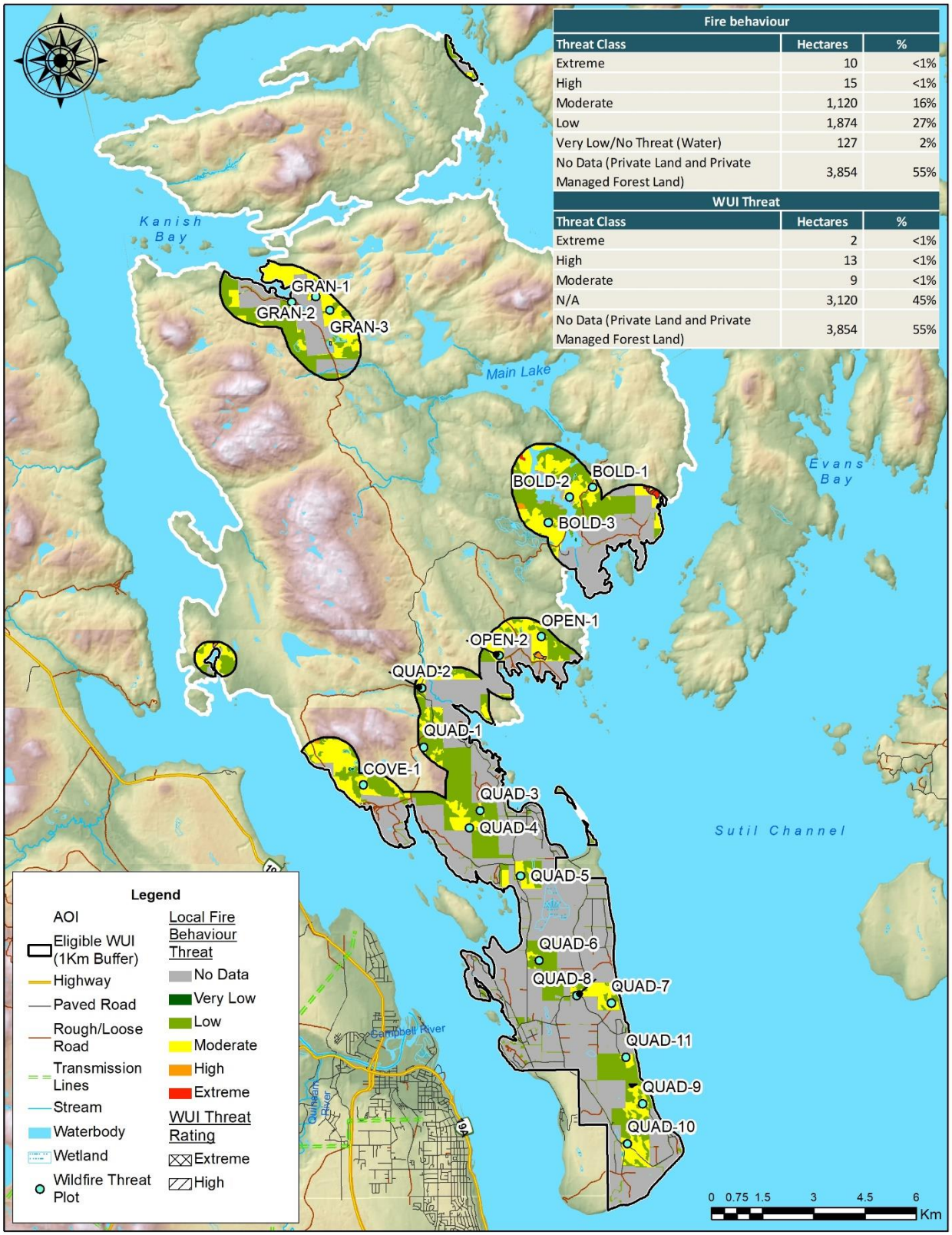
- **Low**: The high or extreme threat is sufficiently distant from developments, having no direct impact on the community and is located over 2Km from structures;
- **Moderate**: The high or extreme threat is sufficiently distant from developments, having no direct impact on the community and is located 500m to 2Km distance from structures;
- **High**: The high or extreme threat has the potential to directly impact a community or development and is located 200m to 500m from structures; and
- **Extreme**: The high or extreme threat has the potential to directly impact a community or development and is located within 200m from structures.

Table 14 below (and displayed on Map 5) summarizes the WUI risk class ratings within Quadra's WUI. Only 24 hectares total have a WUI risk class rating of Moderate or higher: two hectares have an extreme risk class rating, 13 hectares have a high risk class rating, and nine hectares have a moderate risk class rating.

Table 14: Wildland-Urban Interface threat class ratings

WUI Threat		
Risk Class	**Area (ha)**	**% of WUI**
Extreme	2	<1%
High	13	<1%
Moderate	9	<1%
N/A	3,120	45%
No Data (Private Land and Private Managed Forest Land)	3,854	55%
Extreme	2	<1%

For detailed field data collection and spatial analysis methodology for the local threat assessment and classification, see Appendix F: Fire Risk Threat Assessment Methodology.



Map 5: Local Wildfire Threat Map

4.4 HAZARD, RISK, AND VULNERABILITY ASSESSMENT

The Hazard, Risk and Vulnerability Analysis (HRVA) that local governments undertake as part of the legislative requirements to develop a local Emergency Management Plan may provide additional locally derived information that can augment the PSTA, particularly regarding critical infrastructure.[26] Updated critical infrastructure locations ('values at risk') were used to prioritize field data collection for the Local Wildfire Threat Analysis conducted above in Section 4.3. Additionally, critical infrastructure assessments, changes to values at risk within the WUI, and changes to wildfire risk and consequences within the WUI are addressed in their respective FireSmart sections below.

[26]CRI FCFS 2021 SCRP Supplemental Instruction Guide

SECTION 5: FIRESMART PRINCIPLES

FireSmart™ is the leading program in the country aimed at empowering the public and increasing neighbourhood resilience through wildfire mitigation measures. It has been formally adopted by almost all Canadian provinces and territories, including British Columbia in 2000. The FireSmart program covers a wide breadth of preventative measures, which are founded in the seven FireSmart disciplines: Education, Legislation and Planning, Development Considerations, Interagency Cooperation, Cross-Training, and Vegetation Management. These seven disciplines and the guiding principles behind FireSmart can be applied across spatial scales and are not restricted to any type of land ownership, forest type, or property type.

Most homes in Quadra's WUI are part of intermix 'satellite' communities – the homes and structures of small, individual communities are largely situated within the vegetated/forested landscape. With the wildfire risk analysis (Section 4) showing that the most likely ignition cause of a wildfire to be from human actions, a focus on FireSmart education, FireSmart building materials, and Home and Critical Infrastructure Ignition Zone vegetation management would be the most important actions for SRD to focus on to not only ensure structures and homes on Quadra survive a wildfire event, but that they also do not ignite one.

FireSmart compliance on private properties is generally moderate when considering building materials, landscaping, and maintaining a 10 m defensible space (where possible). Many homes lack setbacks from vegetated edges, use wood construction for decking, fences, and siding, have planted cedar and other volatile hedges, and store combustible items (firewood, propane cylinders, vehicles) adjacent to the home and out-buildings. However, most structures within the WUI have Class A (high resistance to fire) roofing materials, which is a critical component of preventing structure ignition. Overall, the primary concern is the lack of defensible space structure-to-structure and structure-to-forest (especially considering how much managed forest land – woodlots, TFLs, and private – is in the WUI). A secondary concern is the ubiquity of flammable building and landscaping materials. A tertiary concern is overall home fire safety.

FireSmart activities should focus first on the most at-risk communities/areas within the WUI. Based on general field observations, the local wildfire threat assessment, the current level of FireSmart, proximity to the WUI edge, restrictions to access/egress, adjacent fuel types and hazards, etc.), separate areas of focus within the WUI have been prioritized in Table 15 by those that would benefit the most from FireSmart planning and activities.

Table 15. Priority Areas within the Wildland-Urban Interface

Community and Priority Number	Rationale	Suggested Priority Actions
1. Village Bay Lake	Outside of the Quadra Island Fire Improvement District. Moderate fire threat polygons on District and Crown land surrounding private properties. Very low FireSmart compliance on structures and properties. Properties are boat or walking trail access only – an emergency access/egress constraint.	• FireSmart vegetation management in the Home (Structure) Ignition Zone. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart improvements. Rebate program for eligible FireSmart activities/improvements completed. • Community Neighbourhood Wildfire Assessments. • Prescription and treatment of proposed fuel treatment units adjacent to the community.
2.Granite Bay	Outside of the Quadra Island Fire Improvement District. Single access/egress community downwind of managed and unmanaged forest land. Moderate fire threat polygons adjacent, but downwind. Large lot, Intermix community.	• FireSmart vegetation management in the Home (Structure) Ignition Zone, including continuing the community yard waste/debris chipping program. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart improvements. Rebate program for eligible FireSmart activities/improvements completed. • Community Neighbourhood Wildfire Assessments. • Training with BCWS on community-owned firefighting equipment.
3.Bold Point	Outside of the Quadra Island Fire Improvement District. Single access/egress community located mostly on the shoreline with managed forest land downwind. Large lot, Intermix community.	• FireSmart vegetation management in the Home (Structure) Ignition Zone, including continuing the community yard waste/debris chipping program. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart improvements. Rebate program for eligible FireSmart activities/improvements completed. • Community Neighbourhood Wildfire Assessments.
4. Open Bay	Outside of the Quadra Island Fire Improvement District. Single access/egress community located mostly on the shoreline with managed forest land downwind. Large lot, Intermix community.	• FireSmart vegetation management in the Home (Structure) Ignition Zone, including continuing the community yard waste/debris chipping program. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart

Community and Priority Number	Rationale	Suggested Priority Actions
		improvements. Rebate program for eligible FireSmart activities/improvements completed. • Community Neighbourhood Wildfire Assessments. • Training with BCWS on community-owned firefighting equipment.
5. Copper Bluffs	Outside of the Quadra Island Fire Improvement District. Single access/egress community located mostly on rocky bluffs overlooking the shoreline with managed forest land adjacent. A mix of medium and large lots. Intermix community.	• FireSmart vegetation management in the Home (Structure) Ignition Zone, including continuing the community yard waste/debris chipping program. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart improvements. Rebate program for eligible FireSmart activities/improvements completed. • Community Neighbourhood Wildfire Assessments. • Training with BCWS on community-owned firefighting equipment.
6. Heriot Bay	Within the Quadra Island Fire Improvement District. Two roads for access/egress. A mix of small, medium, and large lots. Intermix community.	• FireSmart vegetation management in the Home (Structure) Ignition Zone, including continuing the community yard waste/debris chipping program. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart improvements. Rebate program for eligible FireSmart activities completed. • Community Neighbourhood Wildfire Assessments.
7. Quathiaski Cove (general community area)	Within the Quadra Island Fire Improvement District. Multiple roads for access/egress. A mix of small, medium, and large lots. Intermix community.	• FireSmart vegetation management in the Home (Structure) Ignition Zone, including continuing the community yard waste/debris chipping program. • Continued FireSmart education campaigns to owners. • FireSmart home assessments to guide owners on structure and vegetation FireSmart improvements. Rebate program for eligible FireSmart activities completed. • Community Neighbourhood Wildfire Assessments. • Prescription and treatment of proposed fuel treatment units within the community.
8. Cape Mudge	Within the Quadra Island Fire Improvement District. Due to fire	• FireSmart vegetation management in the Home (Structure) Ignition Zone.

Community and Priority Number	Rationale	Suggested Priority Actions
	season winds being predominantly from the south, there is little vegetated landscape south of structures to create a fire risk. A mix of small, medium, and large lots. Intermix community.	• Continued FireSmart education campaigns to owners. Rebate program for eligible FireSmart activities completed. • Community Neighbourhood Wildfire Assessments. • Prescription and treatment of proposed fuel treatment units adjacent to the community.

An evaluation of the current level of FireSmart implementation within Quadra's WUI is presented below in Table 16. All the activities listed are eligible for funding under the 2022 UBCM CRI FireSmart Community Funding and Supports program. Of the 39 applicable activities to Quadra's WUI, 46% have already been achieved (or are planned to be within one year), 13% partially achieved, and 41% not achieved. Items not achieved are addressed in their respective FireSmart sections below.

Table 16: FireSmart activities funded under the 2022 UBCM CRI program[27] and their level of implementation in Quadra's Wildland-Urban Interface

CRI Funding Category	FireSmart Activities	Current Status
1. Education	Update public signage, social media, websites and/or newsletters, and community education materials or displays related to a proposed activity in categories 2-9 (below).	*Achieved.* Quadra FD's website has a link to fire bans. Wildfire risk signs are posted at major entrances to the island. BC Ferries provides fire weather announcements during fire season.
	Organize and host public information meetings related to a proposed activity in categories 2-9 (below).	*Achieved.* See below.
	Promote and distribute FireSmart educational materials and resources.	*Achieved.* Yearly mass mailout of FireSmart information to Quadra residents.
	Encourage community participation in a Wildfire Community Preparedness Day.	*Achieved.* Yearly 'safety day' with wildfire a part of it.
	Support the organization of a Farm and Ranch Wildfire Preparedness workshop, Neighbourhood Champion workshop, community FireSmart day, FireSmart events and workshops, and/or wildfire season open houses.	*Achieved.* FireSmart events and workshops organized yearly by Quadra FD and Quadra ESS.

[27]CRI 2022 FireSmart Community Funding and Supports Program and Application Guide: https://www.ubcm.ca/sites/default/files/2021-09/LGPS_CRI-FCFS_2022ApplGuide_2021-09-03_0.pdf

CRI Funding Category	FireSmart Activities	Current Status
	Support neighbourhoods to apply for FireSmart Canada Neighbourhood Recognition Program.	*Partially achieved.* Some Quadra neighbourhoods working towards applying.
2. Legislation and Planning	Develop or amend a CWRP/CWPP (to the 2020 template).	*Achieved.* Quadra 2021 CWRP.
	Develop FireSmart policies for the design and maintenance of public lands, such as regional parks, or buildings.	*Not achieved.*
	Conduct FireSmart Assessments for publicly owned buildings to support future FireSmart projects for critical infrastructure (see category 7).	*Not achieved.* Completed on privately owned Camp Homewood and the Bible Church.
3. Development Considerations	Amend OCPs or bylaws to incorporate FireSmart principles.	*Not achieved.*
	Revise landscaping requirements in zoning and development permit documents to require fire resistant landscaping or include other FireSmart considerations.	*Not achieved.*
	Establish Development Permit Areas for Wildfire Hazard.	*Not achieved.*
	Include wildfire prevention and suppression considerations in the design of subdivisions.	*Not achieved.*
	Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management personnel, are included.	*Not achieved.*
4. Interagency Cooperation	Develop, coordinate, and/or participate in a Community FireSmart Resiliency Committee or multi-agency fire and/or fuel management planning table.	*Not achieved*. No active CFRC for Quadra.
	Provide Indigenous cultural safety and humility training to emergency management personnel.	*Achieved.* SRD staff have completed.
	Attend the annual FireSmart BC Conference, to be hosted by the BC FireSmart Committee.	*Achieved.* SRD staff have attended.
5. Emergency Planning	Develop and/or participate in cross-jurisdictional meetings and tabletop exercises focused on wildfire preparedness and suppression, including seasonal wildfire readiness meetings.	*Achieved.* 2018 evacuation drill and 2019 ESS local emergency drill.
	Assess community water delivery ability as required for suppression activities, limited to current water system evaluation and available flow analysis.	*Partially achieved.* Quathiaski Cove Water System Feasibility Study (2021).
	Assess structural protection capacity.	*Achieved.* Quadra FD with BCWS.

CRI Funding Category	FireSmart Activities	Current Status
	Use and/or promote EMBC Wildfire Preparedness Guide for community emergency preparedness events focused on wildfire.	*Achieved.*
6. Cross-Training	Provide or attend training for Local FireSmart Representatives (LFR).	*Achieved.* One member of Quadra FD completed training. SRD staff have completed training.
	Support LFRs to attend facilitator training.	*Not achieved.*
	Home Partners Program – Wildfire Mitigation Specialist training.	*Achieved.* One member of Quadra FD completed training.
	Support local government or First Nation staff that have completed Wildfire Mitigation Specialist training to qualify as facilitators.	*Not achieved.*
	Cross-train fire department members to include structural and interface wildfire training: - SPP-WFF1 Wildland Firefighter Level 1 - S-100 Basic fire suppression and safety - S-185 Fire entrapment avoidance and safety - S-231 Engine Boss - ICS-100	*Achieved.* Provided to all Quadra FD recruits.
	Cross-train emergency management personnel: - ICS-100 - WRR Basics Course	ICS-100: *achieved.* Quadra FD and SRD staff have completed training. WRR Basics Course: *not achieved.*
7. FireSmart Projects for Critical Infrastructure	Completion of recommended mitigation activities identified in a FireSmart Home Ignition Zone or Critical Infrastructure Ignition Zone Assessment.	*Partially achieved.* Funding received in 2021 for treatment at two assessed critical infrastructure locations.
	Completion of a FireSmart Home Ignition Zone or Critical Infrastructure Ignition Zone Assessment once mitigation work has been completed.	*Not achieved.*
8. FireSmart Activities for Residential Areas[28]	Conduct Home Ignition Zone Assessments for individual residential properties or homes.	*Partially achieved.* Some homeowners have had HIZ assessments completed.
	Offer local rebate programs to residential property or homeowners that complete eligible FireSmart activities.	*Not achieved.*

[28] To be eligible for funding, all FireSmart activities for residential areas must be located in the FireSmart Home Ignition Zone which includes the home and surrounding yard area - FireSmart Non-Combustible Zone and Priority Zones 1, 2 and 3 (only with residential property and/or homeowners' consent).

CRI Funding Category	FireSmart Activities	Current Status
	Undertake Neighbourhood Wildfire Hazard Assessments.	*Planned for summer 2022*
	Support the development of FireSmart Neighbourhood Plans for specific areas.	*Planned for summer 2022*
	Conduct Home Partners Program wildfire mitigation assessment for individual residential properties or homes.	*Not achieved.*
	Provide off-site vegetative debris disposal for residential property or homeowners who have undertaken their own vegetation management, including: - Provide a dumpster, chipper, or other collection method. - Waive tipping fees. - Provide curbside debris pick-up.	*Achieved.*
9. Fuel Management	Undertake planning and development for fuel management on publicly owned land (fuel management prescriptions, burn plans, demonstration projects).	*Not achieved.*
	Undertake new fuel management treatments on publicly owned land (including demonstration projects).	*Partially achieved.* Fuel management treatments completed at the Quadra Community Centre.
	Undertake fuel management maintenance activities on publicly owned land.	*Not achieved.*
	Undertake prescribed burns on publicly owned land or First Nations land when the primary objective is fuel management for community wildfire risk reduction.	*Not applicable to Quadra.*

5.1 EDUCATION

Public education and outreach play a critical role in helping a community prepare for and prevent a wildfire. Participating in wildfire risk reduction and resiliency activities also promotes a sense of empowerment and shared responsibility. This discipline often supports the successful implementation of the other FireSmart disciplines by building awareness and understanding within both residents and visitors.

SRD and Quadra FD employ a strong FireSmart education campaign both within the Quadra Fire Improvement District and outside it. Fire danger and fire bans are communicated through social media as well as with signs at entrances to the island, including at both ferry terminals as well as the public dock in Granite Bay. During times of high and extreme fire danger, BC Ferries issues notifications over the loudspeaker during each sailing. Members of the Quadra Island Emergency Program (QIEP) deploy a 'welcome wagon' to meet new residents and provide free smoke alarms and FireSmart materials. Yearly, the SRD conducts a mass mailout with FireSmart information and also organizes a wildfire event at the Quadra Community Centre with BCWS to debrief the past wildfire season, promote FireSmart education, and have a question-and-answer session. Both the SRD and Quadra FD have links to fire bans and fire restrictions on their webpages (Quadra FD also includes links to current fire weather conditions), but neither provide links or information for FireSmart. A 2017 SRD survey of Quadra residents showed that 33% were familiar with FireSmart; this number has likely grown in the following years from the above-mentioned efforts.

Funded under a FireSmart grant to the City of Campbell River, a Campbell River FireSmart Guide to Gardening document has been created to educate residents on proper FireSmart landscaping plants and techniques. The SRD has handed this out to all communities within the region, including Quadra.

Overall home fire safety should be considered an important education topic. Items to promote (added on to pamphlets, through social media, etc.) to residents include having fire extinguishers at home and keeping them maintained, and fireplace safety and chimney maintenance (*i.e.,* chimney inspections and cleaning from a chimneysweep).

To further FireSmart education, SRD and Quadra FD should continue to consider actions that get the FireSmart message out to as many residents and visitors as possible, including the island's youth. Table 17 below details recommended actions and activities to do so. Of note are FireSmart activities for residential areas – funding is available for FireSmart assessments to be completed on both individual homes/properties as well as collective neighbourhoods, taking the onus of FireSmart assessments and planning off individual property owners, providing them with actions they can prioritize and implement to reduce wildfire and ignition risks on their structures and properties.

Table 17: Education recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To provide information to Quadra Island citizens empowering them to adopt and conduct FireSmart practices to mitigate the negative impacts of wildfire to their homes/businesses, properties, and neighbourhoods.							
1	High	This CWRP report and associated maps should be made publicly available by SRD through its website, Quadra FD's website, and on social media. In addition, this CWRP should be shared with local industry partners who may be interested in collaborating on FireSmart and wildfire risk reduction activities.	Include all members of the Community FireSmart Resiliency Committee, as well as other relevant industries and businesses in the WUI ((*i.e.,* woodlots, Mosaic Forest Management, BC Parks, and local First Nations).	SRD	1 year from document completion	Available for download or viewing on SRD's and Quadra FD's webpages	SRD (~5 hours to update one website)
2	High	SRD and Quadra FD should continue to promote Fire Smart education through FireSmart workshops (*i.e.,* Quadra's 'Safety Day'), open houses, presentations, and information mailouts. Supply FireSmart resources during these engagement campaigns and promote the FireSmart Begins at Home mobile app as a method of conducting home assessments. Promote overall home fire safety by providing information on fire extinguishers, fireplace maintenance, chimney maintenance, etc.	Educate homeowners of FireSmart principles and encourage residents to FireSmart their homes. Aim to conduct the engagement and promotion campaign before and during the fire season. The SRD should consider FireSmart workshops for each of the priority neighbourhoods outside of the Quadra Island Fire Improvement District. Consider providing fire extinguisher maintenance and re-certification at these workshops.	SRD (Quadra FD, Local FireSmart Representatives, Fire Extinguisher Professional)	Yearly (pre-fire season)	50% of residents from top 3 FireSmart priority neighbourhoods attend	UBCM CRI funding is available (~40 hours for planning and 1 day for each workshop)
3	High	SRD and Quadra FD should both develop a FireSmart/Wildfire Preparedness page on their websites with links to FireSmart BC information, local updates, etc.	Websites are effective platforms to distribute information. SRD should consider creating a fire weather decal on its front page displaying the current fire weather (that could double as a button to its FireSmart page).	SRD/Quadra FD (Consultant)	1 year	Webpage updated	UBCM CRI funding is available (~$3000 contracted service. ~40 hours for set-up. Additional hours for updates as required)
4	High	SRD should apply for funding to complete Home Ignition Zone	HIZ assessments can be completed by a Local FireSmart Representative	SRD	3 years	5 homes in each priority	UBCM CRI funding is available for both

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
		Assessments (HIZ) or Home Partners Program (HPP)Wildfire Mitigation Assessments on residential properties. Inform residents (through mail-outs, social media, etc.) of the program and provide online and mail-in sign-up options for a set of potential assessment dates.	and assess the home and property's risk from wildfire. HPP Wildfire Mitigation Assessments[29] area more detailed and comprehensive assessment completed by fire professionals (*ex.* firefighter) that have completed FireSmart Wildfire Mitigation Specialist training. The assessment process accurately evaluates a home and property for wildfire exposure, while engaging the homeowner in their unique risk and ways to reduce it.	(LFR or HPP Mitigation Specialists – may be a consultant)		neighbourhood (Table 15) have been assessed	HIZ and HPP assessments. (~$250/structure)
5	High	In conjunction with recommendation #4, SRD should offer a local rebate program to residential property/homeowners that have completed eligible FireSmart assessments and activities. (Rebates are limited to 50% of the total cost of eligible activities, up to $500/property)	Rebate programs can be difficult to incentive owners to participate in. Currently underway in the Squamish-Lillooet Regional District[30], inform residents (through mail-outs, social media, etc.) that those who have had a HIZ or HPP assessment completed automatically qualify for the rebate program. Provide online and mail-in registration options.	SRD (Consultant)	5 years	Rebate program implemented on Quadra Island	UBCM CRI funding is available (cost/time dependent on number of registered properties)
6	High	SRD should apply for funding to complete Neighbourhood Wildfire Assessments for each of the priority neighbourhoods listed in Table 15 (the	Neighbourhood Wildfire Assessments provide a written evaluation of the overall neighbourhood wildfire hazard and should be completed by a	SRD	5 years	Assessments completed for neighbourhoods outside the Quadra	UBCM CRI funding is available

[29]More information on HPP assessments can be found here: https://www.firesmartcanada.ca/programs-and-education/firesmart-home-partners-program/
[30]Contact the SLRD for more information on how they have implemented this program. Additional information located here: https://www.slrd.bc.ca/emergency-program/preparedness/firesmart-program

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
		Quathiaski Cove general community area should be broken down into smaller, more distinct neighbourhoods).	certified Local FireSmart Representative to be recognized by FireSmart Canada. This could be contracted out in conjunction with recommendation #4.	(Local FireSmart Representative, Consultant)		Fire Improvement District.	(~$400-1000/neighbourhood depending on location and size)
7	High	Links to the Campbell River FireSmart Guide to Landscaping should be created on SRD's and Quadra FD's webpages. SRD should continue to include it, or reference to it, in annual FireSmart education mail-outs.	Increase FireSmart vegetation management knowledge Quadra's residents. Consider a social media 'blast' relating to it.	SRD (Quadra FD)	1 year	Posted on SRD's and Quadra FD's FireSmart webpages.	UBCM CRI funding is available (~ 20 hours in-house)
8	Moderate	SRD should support and facilitate priority neighbourhoods to self-organize to attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status. Once completed, support the development of FireSmart Neighbourhood Plans.	Neighbourhood Wildfire Assessments are a steppingstone towards FSCNRP status. Leverage the leadership of a Local FireSmart Representative.	Quadra (Local FireSmart Representatives)	5 years	Completed for priority neighbourhoods 1,2, and 3.	UBCM CRI funding is available ($5000/ neighbourhood; 40 hours/ initiative)
9	Moderate	SRD should encourage School District 72 to adopt and deploy existing wildfire education programs. Other options/value-added activities include consulting with the Association of BC Forest Professionals (ABCFP) and BCWS (North Island Mid Coast Fire Zone) as well as the Quadra FD and regional FireSmart representatives to facilitate and recruit volunteer teachers and experts to help with curriculum development to be delivered in the schools (field trips, guest speakers, etc.).	Emergency preparedness curriculum is available provincially, which includes preparedness for a variety of natural hazards, including wildfire (Master of Disaster, FireSmart BC Education box).	SRD	Yearly (pre-fire season)	One FireSmart education day per school year	UBCM CRI funding available (FireSmart BC Education box - $800 Junior K- Grade 12. Field trips, guest speakers, etc. ~$2500 per school)

5.2 LEGISLATION AND PLANNING

Legislation and planning regulation are effective tools for reducing wildfire risk due to ease of communication and enforcement.

A review and summary of bylaws and regulations relevant to wildfire risk and emergency planning were provided earlier in Section 2.4. Actions such as reviewing zoning bylaws *through a wildfire lens* to assess where they inadvertently promote conditions that may contribute to fire spread (*i.e.,* landscaping, fencing), and determining where bylaws can be updated or strengthened to reduce wildfire risk to development (such as adopting bylaws tied to wildfire hazard levels and requiring minimum standards for access, water supply, construction materials and techniques, and vegetation management) can help accomplish the goal of a more wildfire resilient community (note: development requirements addressing minimum standards for access, water supply, construction materials and techniques, and vegetation management can also be implemented through a wildfire hazard Development Permit Area – which is proposed as part of this CWRP and discussed below in Section 5.3 Development Considerations).

When considered through a wildfire lens, the South Quadra Island Fire Protection District Open Burning Bylaw is robust and fulfills almost all needs for addressing fire and wildfire risks, hazards, and mitigation on private, regional district, and Crown lands, but only within the improvement district's borders.

The South Quadra Fire Improvement District was enacted in 1960 at a time when few people lived in north Quadra. The area now has defined residential communities and is visited by many of the 100,000 summer visitors to the island.[31] The inability of the Fire Chief to impose fire bans in the entire WUI can lead to confusion of regulations as well as leave local fire risks unmanaged; the knowledge the Fire Chief has of local wildfire conditions and risks often supersedes that of both regional and provincial governments. Public consultation between SRD and north Quadra residents regarding a "North Quadra Open Burning Regulation" took place between 2018 and 2020, and resulted in the Regional Board adopting resolution 703/20 which states, "That no further public consultation be undertaken until more than 50% of property owners and 50% of property values petition in favor of a fire service for North Quadra be received by the SRD." Should residents show sufficient interest in this matter, SRD should explore some form of legislation that, at a minimum, extends fire and other associated wildfire risk bans enacted in the South Quadra Fire Improvement District to north Quadra, thus eliminating confusion on what regulations apply where and reducing wildfire risk across the WUI. This, and additional recommendations and action items SRD can implement relating to legislation and planning on Quadra are detailed below in Table 18.

[31] SRD Social Determinants of Health Fact Sheet: Quadra Island. Accessed via: https://srd.ca/wp-content/uploads/2019/06/Quadra-Community-Profile.pdf

Table 18: Legislation and planning recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To provide the means for SRD to implement wildfire risk reduction actions through by-laws and legislation by outlining local government responsibilities regarding wildfire.							
10	High	Complete or schedule periodic updates of the CWRP. 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 CWRP update should be initiated every 5 years.	A current (i.e., no more than 5 years old) CWRP isa requirement for further funding under the UBCM CRI Program.	SRD (Consultant)	5 years from adopting this CWRP document	Quadra always has an up-to-date CWRP and action plan	UBCM CRI funding is available (~$25,000 for full document / $10,000 for update)
11	High	Should residents show sufficient interest in this matter, SRD should explore ways to extend/apply fire bans and other associated wildfire risk bans enacted in the South Quadra Fire Improvement District to north Quadra.	To eliminate confusion on what regulations apply where, and to reduce wildfire risk across the WUI.	SRD (Consultant/Lawyers)	5 years	Legislation updated/created	UBCM CRI funding is available ($3000 contracted service)
12	Low	Quadra Islands OCP speaks to developing a Quadra Island Parks Plan. If/when this plan is developed, or any future land management plans/ legislation are developed/amended, ensure that FireSmart principles are adopted into them.	SRD has a responsibility to manage for wildfire hazards and risks in District-owned or adopted parks, trails, and greenbelts. Imbedding FireSmart principles, such as FireSmart vegetation/landscaping or trail-side vegetation maintenance in legislation can reduce overall wildfire risk in the WUI.	SRD (Consultant)	n/a	FireSmart imbedded into all future land management legislation.	UBCM CRI funding is available (cost/time dependent on scope of work)

5.3 DEVELOPMENT CONSIDERATIONS

Embedding FireSmart practices and considerations into development should be a leading priority of SRD. Wildfire risk factors that can be planned for and regulated through the land use planning and development process include:[32]

- Location of development (including hazardous or vulnerable land uses) in relation to high hazard forested vegetation, steep slopes, and other geographical features that contribute to extreme fire behaviour.
- Access and circulation patterns.
- Availability and adequacy of water supply.
- Type of construction materials on structures and attachments.
- Lot size and structure density.
- Design guidelines and architectural standards.

Noted in Section 3.2.3, all homes and businesses on Quadra are responsible for their own water needs, including Quadra FD. The FD is dependent on drafting water from local rivers/creeks/ponds and transporting it to the fire location. The Quadra FD Fire Chief stated that available water at drafting sites is vulnerable to drought conditions (which often coincides with the fire season). Quadra FD's drafting sites are mapped on paper with intentions to digitize the data within the next year. However, means to have water secured and stored close to WUI communities for firefighting purposes, especially during the fire season, should be explored by both the SRD and Quadra FD.

Protection of critical infrastructure 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 construction materials and vegetation/landscaping are equally important to consider – the structure itself may not be susceptible to fire, but the vegetation surrounding it could be, creating a barrier to access if ignited and a vector for fire spreading to surrounding homes and through the community. The Quadra Island Fire Hall #2 is shown below (Figure 4) as an example. The structure itself is largely FireSmart (concrete structure, wood panels with no cracks, fire rated roofing materials), but the surrounding unmanaged vegetation a fire risk. The firehall is planned to be moved in a few years – when done FireSmart principles for structure and vegetation should be applied.

Secondary power sources are important to reduce critical infrastructure vulnerability in the event of an emergency that cuts power for days, or even weeks. 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 long outages. The Quadra Island Community Centre has a mobile backup diesel

[32]CRI FCSF 2021 CWRP Supplemental Instruction Guide

generator. The generator is dedicated to the centre but can be moved and used elsewhere for emergency response, if required. The Quathiaski Cove sewer system also has a backup diesel generator.

Figure 4: Quadra Island Fire Hall #2

New and expanding residential development (especially outside the South Quadra Island Fire Improvement District) has resulted in the formation of highly intermix neighbourhoods with limited points of access and evacuation routes (often just one both out of the neighbourhood and from the neighbourhood to another part of the island). Additionally, properties are variable in building age and construction, with FireSmart compliance varying from one lot to the next. The property shown in Figure 5 demonstrates low FireSmart adherence: the roof, building, and deck construction are all wood and there is no 10m defensible space from structure to vegetated edge.

Figure 5: Example of a home and property within the WUI with low FireSmart adherence.

Much like regulations, it is important that that the Quadra Island Official Community Plan (OCP) adopt language and framework *through a wildfire lens* so that future land use and development are guided with wildfire risk reduction and preparedness in mind, especially within the WUI. One of the most powerful tools the SRD can employ is the development of a Wildfire Hazard Development Permit Area (DPA) for the protection of developments from hazardous conditions. Example municipalities and regional districts that have added Wildfire DPAs into their respective OCPs include the District of West Vancouver and the Regional District Okanagan-Similkameen. The following aspects should be considered in the OCP review and wildfire hazard DPA development:

1) Establish DPA objectives (*e.g.,* minimize risk to property and people from wildfires, minimize risk to forested areas surrounding the municipality, and conserve the visual and ecological assets of the forests surrounding communities, etc.).
2) Where possible, it is recommended to mandate FireSmart construction materials, some of which may be beyond the BC Building Code within the established wildfire hazard development permit area.
3) Engage the development community in the DPA development process to educate, inform, and allow for input. This can be accomplished in a variety of formats, including, but not limited to, workshops, informational sessions, or open houses.

Recommendations and action items that the SRD can implement to embed FireSmart practices and considerations into development are detailed below in Table 19.

Table 19: Development considerations recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To embed FireSmart practices and considerations into all development within Quadra.							
13	High	Develop a wildfire hazard DPA and update Quadra's Official Community Plan (OCP) when completed. To meet objectives, consider including the following elements: • minimum setbacks from forested edges based on FireSmart, • fuel management based upon qualified professional recommendations, • landscaping to FireSmart guidelines, • building materials and design based on NFPA 1144 and FireSmart standards, • underground servicing, • prompt removal of combustible construction materials or thinning/fuel management waste, and • a minimum of two access/evacuation routes for all neighbourhoods.	To embed FireSmart values into all aspects of community development and planning, especially to those communities within the WUI. Variations of a Wildfire DPA, with differing levels of FireSmart adherence required, are being developed/employed by municipalities and regional districts across BC.[33]	SRD (Consultant)	5 years	Interface wildfire DPA created and adopted	UBCM CRI funding is available (~$20,000 contracted service and 40 hours in-house)
14	High	Explore opportunities to enhance water access/drafting sites across the WUI for Quadra FD, wildland firefighters, and organized communities outside of the Quadra Island Fire Improvement District. Opportunities include building permanent cisterns/reservoirs adjacent to/within communities that can be filled during the winter, or are on the edge/near known accessible drafting sites and are gravity fed and covered to reduce evaporation during fire season.	This will likely involve multiple jurisdictions and entities including SRD, Quadra FD, BCWS, FLNRORD and multiple professional assessments (engineering, riparian, biology).	SRD (BCWS, Quadra FD, FLNRORD, Consultant)	5years (for siting and planning)	Locations for cisterns / reservoirs identified in priority neighbourhoods.	SRD (unknown)

[33] Example municipalities and regional districts include District of West Vancouver and the Regional District Okanagan-Similkameen.

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
15	High	Quadra's functional infrastructure (*i.e.,* Firehalls, Emergency Reception Centres, Emergency Housing Locations, sewer lift/pump stations, etc.) should have backup gas- or diesel-powered generators. SRD/Quadra FD/Private owners should invest in secondary power sources to continue these services in the case of a prolonged or extensive power outage as a result of a wildfire. Upgrade or realign resources, as prioritized.	Ensure that generators have sufficient fuel supply for extensive power outages (3 + days) so that they can function as required in the event of an emergency.	SRD (Quadra FD, Private Owners)	5 years	All functional CI have backup power sources	SRD Quadra FD (~$30,000 per site - depending on requirements)
16	High	Engage a qualified professional (such as a Local FireSmart Representative) to complete formal FireSmart assessments of all critical infrastructure. Plan and implement action items in the sequence of importance. Additionally, SRD should request that Telus Communications Inc and Rogers Communications conduct FireSmart assessments on all communication infrastructure and implement mitigation work as required.	Critical infrastructure, such as fire halls and emergency shelters, are identified in Table 7. Make sure to update the list of critical infrastructure when Quadra's emergency planning and response documents have been completed.	SRD (Local FireSmart Representative or Consultant)	3 years	Assessments completed and action items being planned for	UBCM CRI funding is available (~$1000 per location – contracted service)
17	High	Use fire-resistant construction materials, building design and landscaping for all critical infrastructure when completing upgrades or establishing new infrastructure.	Vegetation setbacks around critical infrastructure should be compliant with FireSmart principles (*e.g.,* no combustible material within 10 m of structures).	SRD	Ongoing	New and upgraded critical infrastructure are FireSmart	SRD ($ variable: CI specific)
18	High	Apply a landscaping standard to Quadra zoning and development permit documents (*i.e.,* bylaw 1213 Quadra Island Zoning Bylaw) that lists flammable, non-compliant vegetation and landscaping materials, non-flammable drought and pest resistant alternatives, and tips on landscape design to reduce maintenance, watering requirements; to avoid wildlife attractants, and to reduce wildfire hazards.	Consider including the landscaping standard as part of the wildfire hazard DPA, as well as making it publicly available for residents and homeowners outside of the DPA.The Campbell River FireSmart Guide to Landscaping can be used.	SRD	5 years	Landscaping standard created (or adopted) and built into the interface wildfire DPA	UBCM CRI funding is available ($0 if using FireSmart Canada guidelines; ~20 hours in-house)

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
19	High	Conduct a full review and updating of the Quadra OCP, including Schedule B, to imbed FireSmart principles within the stated objectives and policies and to guide future land use and development decisions. Examples include updating: • 2.2a Objectives – Settlement Patterns to include wildfire as a natural hazard to be considered and planned for. • 2.2j Objectives – Forests / Silviculture and 3.7 Community Planning Policies – Forests/Silviculture to include management practices of forest areas within the WUI that decrease wildfire risk (through proper cut-block placement, clean-up of combustible fuels within harvested areas (slash – scattered and pile), and reforestation techniques/planting). • 2.2m Objectives – Parks & Recreation, 3.10 Community Planning Policies – Parks and Recreation, and Schedule B2.3.7.1/2 to consider the planning, adoption, and maintenance of parks through a wildfire lens. • 3.1 Community Planning Policies – Settlement Patterns (xii) to include FireSmart vegetative setbacks. • 3.3.2 Community Planning Policies – Road Transportation to include the removal of road-side vegetation for wildfire risk reduction.	The OCP sections recommended for updating should not be considered the complete list of sections that should be reviewed and updated, but rather a guide to how FireSmart principles can be viewed and actioned in it. See the Fraser Valley Regional District Electoral Area D OCP Update, the Cariboo Regional District Electoral Area G OCP, and other regional district electoral areas as examples.	SRD (Consultant)	5 years	Required OCP sections updated	UBCM CRI funding is available (~20 in-house hours and ~$10,000 including $1,500 for administration (SRD) and $8,500 for consultant costs (100 hrs @ $85/hr).
20	Moderate	Existing single access/egress neighbourhoods should be reassessed for potential secondary access/evacuation routes. There could be opportunities for an easement or agreement-on-use on the edge of an individual's private property, routes via woodlots and TFL 47, or a combination (to be used only in emergency evacuation situations).	It is recognized that landscape geography and private property can make this difficult. Start by contacting forest land managers and discuss using resource roads as emergency evacuation routes.	SRD	5 years	Where determined possible, secondary egress routes are being planned for development	SRD (Cost/time dependent on level of discussions and planning)

5.4 INTERAGENCY COOPERATION

Identifying and linking stakeholders such as government, private landowners, park and recreation staff/managers, forest land managers, and emergency services can reduce wildfire risk, increase funding opportunities, and allow SRD to obtain valuable local knowledge.

Community FireSmart Resiliency Committee (CFRC)

Quadra's CFRC reflects the key planners and responders most involved in local FireSmart, wildfire resiliency planning, and wildfire and emergency response specific to Quadra. Table 20below details the agencies involved, their current representatives and titles, and their role within the CFRC. The CFRC should meet regularly to discuss wildfire preparedness, plans to implement recommendations and action items within this CWRP, and to share relevant, local wildfire information.

Table 20: Quadra's Community FireSmart Resiliency Committee (CFRC)

Agency	Title	Person[34]	Role	Comments
Strathcona Regional District	Protective Services Coordinator	Shaun Koopman	*Primary:* provide data, information, and other relevant plan content; work to determine CWRP actions; conduct outreach with other stakeholders and the public to discuss the plan and receive additional input.	Implement Quadra's Community Wildfire Resiliency Plan. Provide outreach to and communicate with applicable stakeholders.
Quadra Fire Department	Fire Chief	Sharon Clandening	*Primary:* provide data, information, and other relevant plan content; work to determine CWRP actions; conduct outreach with other stakeholders and the public to discuss the plan and receive additional input.	Implement Quadra's Community Wildfire Resiliency Plan as jurisdictionally possible. Provide outreach to and communicate with applicable stakeholders.
BCWS North Island Mid Coast Fire Centre	Wildfire Technician	Dan Harris	*Advisory, support and approval, program development and monitoring:* review and approve funding program (CRI and WRR) applications. Additionally, for potential fuel management activities, provide the technical expertise (proposed treatment areas, prescription review, treatment implementation, and burn plan review).	Centre staff can provide FireSmart subject matter and prevention program and funding program expertise. Reviewing and approving funding program applications by the fire centre is a requirement of the currently available funding streams (CRI and WRR).
	Wildfire Officer	Todd Flanagan		
Quadra Island Emergency Program (QIEP)	Leadership Team	n/a	*Advisory/Engagement/Partner:* supports development of plan and may communicate support with other interest groups and public; reviews plan content; may provide some data and information or suggestions for	The QIEP includes Emergency Support Services and Neighbourhood Emergency Preparedness programs on Quadra Island.

[34]Current person operating in this role at the time this document was written.

Agency	Title	Person[34]	Role	Comments
			resources; may provide input on specific actions relate to areas of interest.	
We Wai Kai First Nation	Cape Mudge reservation resident	To be determined	*Advisory/Engagement/Partner:* supports development of plan and may communicate support with other interest groups and public; reviews plan content; may provide some data and information or suggestions for resources; may provide input on specific actions relating to areas of interest.	Recommended to be involved via the We Wai Kai CWRP 2021.[35]

Local Stakeholders and Land Managers

Almost all the Crown land within Quadra's WUI (and some private land) is managed under an active woodlot or tree farm license (a small portion of Crown land is managed by BC Parks – Main Lake Park and Rebecca Spit Marine Park). Forestry activities can either increase wildfire risk (through fuels accumulations and unsafe work practices) or decrease wildfire risk (through proper cut-block placement, clean-up of combustible fuels within harvested areas (*i.e.,* slash – scattered and piled), and reforestation techniques/planting). Local land managers and stakeholders within the WUI should be included in communications regarding wildfire, FireSmart, CRI, and WRR activities planned in and around areas they manage/have interests with, as well as be consulted on what parts of their tenure overlap with Quadra's WUI and how they can reduce wildfire risk to adjacent homes and structures. Table 21 details these entities, their contacts, and other additional information.[36]

Table 21: Local stakeholders and land managers within the Wildland-Urban Interface to be included in the wildfire, FireSmart, CRI, and WRR activities and communications (as applicable)[37]

Stakeholder or Land Manager	Contact Title	Contact Person	Comments
TFL 47 (Mosaic Forest Management acts as Timberlands Manager)	Area Forester	Jennifer Peschke	Responded to initial CWRP information gathering questionnaire. Mosaic is interested in learning more about WUI stocking/reforestation for wildfire resiliency on Quadra Island.
Woodlot 0042	Woodlot License Manager	Forever Wood Ltd	Responded to initial CWRP information gathering questionnaire.

[35]Being developed by B.A. Blackwell & Associates. Planned completion date March 2022.
[36] Copper Mountain Mining Corporation, operator of the mine approximately 20km south of Quadra, did not respond to inquiries regarding involvement in the preparation of this document.
[37]As identified in BC Data Catalogue FLNRORD Managed License data and/or current Woodlot Management Plans

Stakeholder or Land Manager	Contact Title	Contact Person	Comments
Woodlot 0025	Woodlot License Manager	Alex Hartford	No replies to communications regarding this CWRP.
Woodlot 1610	Woodlot License Manager	Grant Hayden, Markus Kellerhals	No replies to communications regarding this CWRP.
Woodlot 1897	Woodlot License Manager	Benner Forestry Ltd	No replies to communications regarding this CWRP.
Woodlot 1898	Woodlot License Manager	Buttle Lake Resources	No replies to communications regarding this CWRP.
Woodlot 1899	Woodlot License Manager	Snarpen Contracting Ltd	No replies to communications regarding this CWRP.
Woodlot 1969	Woodlot License Manager	Cape Mudge Forestry	No replies to communications regarding this CWRP.
BC Parks	BC Parks Area Supervisor	n/a	Responded to communications regarding Main Lake Park.

Communications with Mosaic's Area Forester highlighted strategies currently employed to reduce/manage wildfire risk in the TFL47 tenure area. These include reducing woody fuel on site post-harvesting by providing firewood to the community, harvesting in small openings, and maintaining riparian buffers promoting the retention of hardwood (fire-resistant) species. Communications with the woodlot 0042 license manager highlighted similar strategies employed to reduce/manage wildfire risk within the woodlot. In addition to those mentioned above in TFL 47, woodlot 0042 also owns fire tools, a water tank, and fire pumps that can be employed if required. The woodlot manager has completed S-100 wildfire specific training which includes the proper deployment and use of the equipment. However, there has been no formal training/education between the woodlot and BCWS – something the SRD could facilitate (potentially via a forest licensee – BCWS specific workshop) to provide an opportunity for further wildfire education and training opportunities to those most directly involved in managing wildland forest fuels within Quadra's WUI.

FireSmart BC hosts an annual conference that brings together wildfire practitioners from across the province and is open to all participants but is of special interest to those involved in wildfire and emergency management. SRD's Protective Services Coordinator attended and presented in 2021.

Additional recommendations and action items SRD can implement to continue growing interagency relationships and increase interagency cooperation are listed below in Table 22.

Table 22: Interagency cooperation recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To broaden from a department or agency single jurisdiction-based approach to a risk-driven, multi-agency and multi-scalable approach.							
21	High	Engage with forest licensees within the WUI (woodlots and TFL47) to: 1) Identify parts of the license area that are in the WUI and what goals would be for this zone regarding harvesting, post-harvest debris disposal, and reforestation prescriptions so that both harvesting operations and the future forest stand maintain or enhance wildfire resiliency. 2) Gauge interest in facilitating a forest licensee – BCWS specific wildfire education and training day/workshop.	1) Reduce interface wildfire risk throughout managed forest lands that are closest to structures in the WUI. Consider involving BCWS North Island Mid-Coast Zone and FLNRORD personnel in discussions and planning. Slash management is a priority for wildfire risk reduction. 2) Promote wildfire management and wildfire mitigation tools/tactics to those managing the wildland forest land base. Consider adding the S-100 course/training to those who attend.	1/2) SRD (FLNRORD, Stakeholders, BCWS, Consultant)	5 years	1) License managers know where their tenure area overlaps with the WUI 2) Licensee – BCWS specific workshop/training day completed.	1) SRD (time/cost dependent) 2) UBCM CRI funding is available – education (~40 hours for planning and 1 day for each workshop)
22	High	Plan Quadra CFRC scheduled meetings, especially before and during the fire season.	Forward relevant information to forest land managers within the WUI, including BC Parks.	SRD (Stakeholders)	Ongoing	1 meeting each year prior to fire season	SRD (~$300/yr)
23	High	Continue to have relevant SRD members attend annual FireSmart BC conferences, hosted by the BC FireSmart Committee.	Participation will continue to foster a strong relationship between SRD and FireSmart BC/Canada. Notify the Quadra FD Fire Chief of the conference and encourage attendance.	SRD (Quadra FD)	Ongoing – yearly	SRD rep. and Quadra FD Fire Chief attend yearly	UBCM CRI funding is available (cost/time dependent on conference location)
24	Moderate	Encourage BC Parks to communicate fire risk (*i.e.,* add fire danger ratings at main trailheads) and enforce provincial fire bans when patrolling in Main Lake Provincial Park.	Educate island visitors of wildfire risk and current fire bans during wildfire seasons.	SRD (BC Parks)	5 years	Consultation with BC Parks completed	SRD (~2 hours)
25	Moderate	Continue to promote right-of-way best management practices (BMPs) for regular brushing and clearing of woody debris and	Tree failures adjacent to power lines (transmission and distribution) are common occurrences and represent	Quadra (BC Hydro,	5 years	BMPs in use for the region	UBCM CRI funding is available

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
		shrubs in coordination with FortisBC and BC Hydro to help reduce fire risk, utility pole damage, and subsequent outages.	significant risks to ignition within the WUI. Encroachment of understory vegetation and overhanging trees were noted by consultants in various locations.	FortisBC)			(~30 hours in-house)

5.5 CROSS-TRAINING

All staff who are expected to participate in the development and implementation of this plan, or participate in wildfire response and recovery, should be appropriately trained. This includes both SRD staff and members of Quadra FD.

All members of the Quadra FD receive weekly structural firefighting, rescue, first responders, vehicle extraction, and other training to the internationally accepted National Fire Protection Association (NFPA) standards. Fire department members also train annually for the BCWS S-100 (Basic Fire Suppression and Safety) course as well as the ICS-100 (Incident Command System Level 100) course. One fire department staff member has completed FireSmart Local FireSmart Representative (LFR) training and FireSmart Home Partners Program Mitigation Specialist training. BCWS operates the Quinsam fire base in Campbell River – fire zone representatives and Quinsam crew members have engaged in yearly cross-training opportunities in the past, but these have been put on hold due to COVID-19.

Recently, Cortes Island Fire Rescue and Oyster River Volunteer Fire Rescue Association both attained Superior Tanker Shuttle Service accreditation. Accredited Superior Tanker Shuttle Service is a recognized equivalency to hydrant protection. To be accredited, fire departments must commit to maintaining a high standard of organization, and practice delivering the service regularly. The fire department must be able to show, through testing and documentation, that it can continuously provide water supplies in excess of the minimum required for hydranted municipal-type water supplies.[38] Quadra FD should make it a goal to attain this accreditation, as it sets a standard for firefighting departments which have to shuttle water and also makes property owners eligible for reduced insurance rates.

SRD staff members have completed indigenous cultural safety and humility training and ICS-100 training. One staff member has completed FireSmart LFR training.

Additional wildfire and emergency response training opportunities include:

- SPP-WFF 1 (Wildland Firefighter Level 1)
- BC Structure Protection Program- S115

Emergency simulation exercises that involve those who would participate in wildfire response and recovery create valuable cross-training opportunities. For Quadra, this would include district staff, Quadra FD, local mutual aid partner fire departments, BC Ferries, BCWS, and the QIEPP. In 2018, an emergency evacuation scenario was actioned in-person, evacuating 50 people from Quadra, using BC Ferries for transport and communicating only by the QIEP volunteers' ham radios. The next year, a small emergency support services drill was completed. SRD should look to continue these drills and exercises, identifying

[38] https://fireunderwriters.ca/Grading/Superior-Tanker-Shuttle-Service

and addressing weaknesses in evacuation communication, coordination, and implementation. Planning one specific to wildfire, prior to the wildfire season, is recommended.

Additional recommendations and action items SRD can implement to create and continue to grow cross-training opportunities are listed below in Table 23.

Table 23: Cross-training recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To support the development of comprehensive and effective wildfire risk reduction planning and activities, as well as a safe and effective response.							
26	High	Complete and participate in regular testing of, and updates to, the Evacuation Plan for Quadra. Include yearly (pre-fire season is best) wildfire emergency simulation exercises. Identify hazards, barriers to access (i.e., locked gates, tight or no turnarounds), and other response issues and develop measures to address them.	Include SRD emergency response staff, BCWS, BC Ferries, QIEP, and mutual aid partner fire departments.	SRD (see comments)	Yearly (pre-fire season)	Table-top response exercises conducted at least once every two years	UBCM CRI funding is available (12 planning hours; 60 person-hours per exercise)
27	High	Ensure all Quadra FD fire personnel attain SPP-WFF1 certification at a minimum.[39] 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). Quadra FD 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 Quadra FD personnel are qualified to respond to wildfire emergencies and use wildfire suppression equipment. 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).	Quadra FD	Ongoing/yearly	FD members training continually updated	UBCM CRI funding is available (~$600/16 hrs per person)
28	High	SRD should facilitate: 1)additional Local FireSmart Representative (LFR) Training for Quadra residents, district, and Quadra FD staff. Quadra FD should facilitate:	Increase SRD's and Quadra FD's capabilities to provide FireSmart programs and resources to the community. Consider engaging the community leaders within the QIEP to identify	SRD/Quadra FD (QIEP)	2 years	1+ additional LFR in SRD staff 1+ additional LFR and Mitigation Specialist in Quadra FD	UBCM CRI funding is available (~$2000/16 hrs per person)

[39] The SPP-WFF 1 (Wildland Firefighter Level 1) course will replace the S-100 Basic Fire Suppression and Safety and S-185 Fire Entrapment Avoidance courses for structure firefighters (only) and exceeds the NFPA 1051 Level 1 standard.

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
		2) additional FireSmart Home Partners Mitigation Specialist Training opportunities for Quadra FD staff.	potential LFR candidates from each neighbourhood.				
29	Moderate	SRD should leverage Local FireSmart Representatives (LFR) to: 1) conduct outreach into priority FireSmart Neighbourhoods to identify potential community champions, and 2) schedule and conduct FireSmart Community Champion Training.	Increase Quadra's FireSmart priority neighbourhoods' capabilities to assume FireSmart planning and mitigation activities themselves.	SRD (LFRs)	1) 2-3 years 2) 2-4 years	Community champion identified for each high-risk FireSmart neighbourhood.	1) SRD: ~80 hours 2) UBCM CRI funding is available
30	Moderate	Quadra FD should attain Superior Tanker Shuttle Service accreditation.	This accreditation sets a standard for firefighting departments which have to shuttle water. A secondary benefit is to property owners as they are eligible for reduced insurance rates.	Quadra FD	5 years	Accreditation attained	Quadra FD

5.6 EMERGENCY PLANNING

When several wildfire emergencies are taking place throughout the province, BCWS resource availability may become scarce. Deployment of provincial resources occurs based on the Provincial Coordination Plan for Wildland Urban Interface Fires.[40] Therefore, government wildfire preparedness and resource availability are critical components of community wildfire resilience – individuals and agencies need to be ready to act.

Pre-Incident Planning

A pre-incident plan is a compilation of essential fire management information needed to save valuable time during fire suppression operations. During a busy wildfire season provincial resources are stretched thin, and any information that local governments can provide to BCWS crews is helpful. A pre-incident plan should be developed and tested using tabletop simulations, and if necessary, revised prior to every fire season. BCWS should be involved in this process to ensure that any mapping done as part of the Fire Management Planning process is not unnecessarily duplicated. These plans and maps (some of which are wholly or partially developed as part of this document) should consider at a minimum:[41]

- **Command:** Authority, constraints, structural protection needs, management constraints, etc.
- **Operations:** Helicopter base locations, flight routes, restrictions, and water intakes, fire control line locations and natural barriers, crew/personnel safety zones and staging locations, fuel caches, etc.
- **Logistics:** Base camp locations, roads and trails, utilities (CI), communications.
- **Planning:** Maps (structures, vegetation and fuel, hazards, critical infrastructure, archaeology and environmentally sensitive areas, water sources, access/egress, etc.).

Quadra's evacuation planning and management documents are currently being updated. They are developed to cover worst-case scenarios but recognize that it is most likely only a portion of Quadra Island that would be evacuated in a single event. Quadra is divided into evacuation zones, by community, with dedicated evacuation routes. Communication of an emergency to Quadra residents by SRD can go out via the Connect Rocket Community system. The system will call or text cellphones and call landlines at a rate of 300 numbers per minute but is limited to only those numbers registered to it. During an emergency, road traffic can be managed by Mainroad (public roads maintenance contractor). Mainroad staff can assist with coordinating traffic control on the island and at the ferry terminals and can close roadways to reduce conflicting traffic. Mainroad also has two programmable message boards available in Campbell River that can be utilized. During large-scale evacuation orders, BC Ferries can be utilized and cars may be restricted to allow for as many walk-on passengers as possible. Quadra's emergency planning documents also

[40] 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
[41] CRI FCSF 2021 CWRP supplemental instruction guide

recognize scenarios where harbor and wharf evacuations would be initiated. Harbors and wharfs that can be utilized should be identified, mapped, and included as critical infrastructure (Table 7). The documents also speak to staging areas – temporary locations at an incident where personnel and equipment are kept while awaiting tactical assignment (these may include temporary fueling stations). All potential staging areas should also be identified, mapped, and included as critical infrastructure (Table 7).

Mentioned previously, the QIEP is a group of over 100 trained local volunteers helping Quadra Island prepare for, and respond to, an emergency or disaster. The QIEP has a well-organized neighbourhood watch, with dedicated leaders for each neighbourhood. The QIEP structure is shown below in

Figure 6.

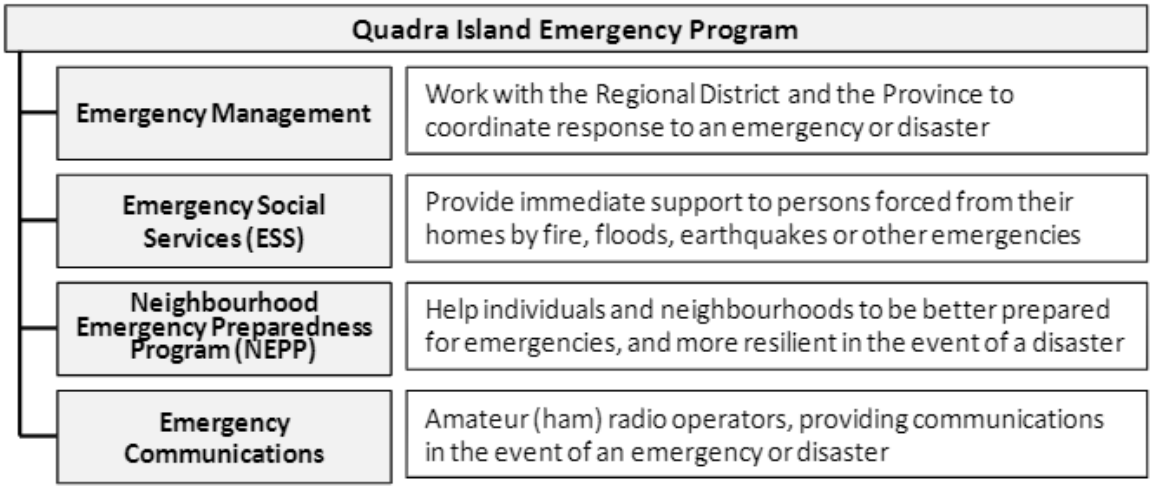


Figure 6: Quadra Island Emergency Program (QIEP) structure

Wildfire Preparedness Condition Level

As part of pre-incident planning, SRD should consider developing local daily action guidelines based on expected wildfire conditions. Table 24 below provides a template that can be tailored specifically to Quadra, outlining actions that SRD staff, Quadra FD, and other emergency staff can take as fire danger levels change throughout the year (but mostly through the fire season).[42] Year-round, the fire danger signs posted throughout Quadra should be updated to reflect the current fire danger.

[42]CRI FCSF 2021 CWRP supplemental instruction guide

Table 24: Example of a Wildfire Response Preparedness Condition Guide

FIRE DANGER LEVEL	ACTION GUIDELINES
LOW	• All SRD and Quadra FD staff on normal shifts. • Direct public to BCWS (or updated FireSmart/Wildfire webpages) for fire danger rating info.
MODERATE	• All SRD and Quadra FD staff on normal shifts. • Information gathering and dissemination through Quadra's CFRC. • Regional fire situation evaluated. • Rain profile for assessment after lightning storms. • Direct public to BCWS (or updated FireSmart/Wildfire webpages) for fire danger rating info.
HIGH	• All SRD and Quadra FD staff on normal shifts. • Regional fire situation evaluated. • SRD conducts a social media blast directing public to BCWS (or updated FireSmart/Wildfire webpages) for fire danger rating info. • SRD EOC staff notified of Fire Danger Level. • Establish weekly communications with Quadra CFRC. QIEP neighbourhood leaders and/or LFRs going door to door in their neighbourhoods to discuss fire danger levels and mitigation actions. Local firefighting tools/equipment are tested. • Rain profile for assessment after lightning storms.
EXTREME	• Rain profile for assessment after lightning storms. • Detection patrols conducted by Quadra FD as required. • SRD conducts a social media blast directing public to BCWS (or updated FireSmart/Wildfire webpages) for fire danger rating info. • SRD EOC staff considered for activation level 1 standby. • EOC support staff, a water tender, heavy machinery operators, and arborists may be considered for standby/extended shifts. • BC Ferries notified and included in Quadra CFRC discussions/information sharing. • Provide regular updates to the public via social media and websites on the fire situations. • Provide updates as information changes– consider using the Connect Rocket system for Extreme fire weather danger notification.
FIRE(S) ONGOING	• All conditions apply as for Extreme (regardless of actual fire danger rating). • Mobilize EOC support if evacuation is possible, or fire event requires additional support. • Mobilize Wildfire Incident Command Team. • Implement Evacuation Alerts and Orders based on fire behaviour prediction and under the direction of the EOC or BCWS. • Provide regular updates to the public via social media, websites, and Connect Rocket on the fire situations.

Mutual Aid Partners

Quadra FD has in place mutual aid agreements with the SRD and includes the Campbell River Fire Department. Mutual aid is not used often due to travel constraints.[43] Quadra FD can and will respond to mutual aid callouts in the regional district area, if required minimum capacity is left on island. Quadra FD also has a mutual aid agreement with BCWS via the general all fire department agreement. Quadra FD has a contract with BCWS to go outside the Quadra Island Fire Improvement District for rescues only – if someone is trapped in a house fire then Quadra FD will respond as a rescue.

Firefighting Resources – Quadra FD

Quadra FD's firefighting vehicles include fire trucks and water tanker trucks. The water tanker trucks are used to transport water from the water storage reservoir at each fire station to the source of the fire.[44] Quadra FD also has an additional 21 mapped ponds/lakes/creeks that are accessible to their tanker trucks to refill from. Although currently mapped on paper, the FD has plans to digitize the locations and maps and make them available in each tanker truck.[45] Quadra FD also recognizes that many properties are difficult to access due to long and/or narrow driveways. The FD is currently mapping driveways by length so that they know how much hose is required when responding to fires at specific addresses.

Table 25 summarizes the available firefighting resources to Quadra FD and its members. It is recommended that Quadra FD continues to work with BCWS to train with wildfire fighting equipment and regularly evaluate the need for more equipment and training. Quadra FD is equipped to handle WUI wildfire response, but additional equipment, such as more structure protection units (sprinklers), are recommended.

Table 25: Quadra Fire Department (FD) firefighting resources

Fire Department	Number of Members	Firefighting Equipment Type	Apparatus Type	Description / Comment
Quadra FD	1 Fire Chief (full-time) 1 Assistant Fire Chief (part-time)	Structural	2 x Fire Engine	500-gallon tank 1250 gallon per minute pump
			2 x Tanker Truck	2000-gallon tank
			2 x Hose-laying truck	Fire hose
		Wildfire	Wildfire: Nomex Overalls (PPE)	For every member
			6 x Portable Pumps	Honda pumps
			1 Structure Protection Unit	Can cover 3 houses
			1 ½ -inch Hose	1000 feet

[43]Quadra FD Fire Chief via CWRP information gathering questionnaire
[44]Quathiaski Cove Water System Feasibility Study (2021).
[45]Quadra FD Fire Chief via CWRP information gathering questionnaire

Fire Department	Number of Members	Firefighting Equipment Type	Apparatus Type	Description / Comment
	38 Volunteer Members		Econoflow (3/4") Hose	1000 feet
			Wildfire: Hand tools	Pulaskis, Mcleods, Shovels, etc.

Firefighting Resources – Quadra Communities

The Copper Bluffs, Open Bay, and Granite Bay communities outside of the Quadra Island Fire Improvement District, recognizing their vulnerabilities to wildfire and a lack of structural fire response, have purchased (through private funds, or been donated) and store a mix of fire fighting equipment in local caches.

Copper Bluffs:[46] Available to the community are two units. The first, a "community wagon", has a mix of reservoirs, pumps, hoses, and a fire fighting trailer (Table 25). The second unit, designed to back up the former, is a 975 C6500 5-ton Hiab flat deck truck with 4 - 250 water totes plumbed to a central location so all totes feed the outlet point. Water is pumped via a Briggs and Stratton water pump, with connection points purposely made the same as the quick connection on the community wagon so either pump can be used. Additional equipment with this unit includes 1 1/2" fire hose, fire hose to 3/4" flex hose adapter, and 3/4" flexible hose with nozzles. Priorities for the coming year will focus on building integration with existing gear (couplings, gaps, etc.), increasing the number of trained residents, and potentially purchasing another small mobile unit for quick response to new fires.

Figure 7: Copper Bluffs firefighting trailer

Open Bay:[47] Available to the community is a dual axle flat deck cargo trailer holding a 750-gallon tank that can be moved by any tow-hitch equipped truck. The tank is equipped with plumbing to connect with the Honda pressure pump on hand. The pump, along with several hundred feet of 1 1/2 " quick connect hose, splitters, water thieves, and valving to fill backpack pumps, feed 1 1/2" and 3/4" foam injection nozzles, and adapters to convert to our 3/4 " econoflow hose, are all stored in containers on the trailer. Additional equipment with this unit includes a chainsaw with associated personal protection equipment, four backpack (water) fire pumps, four shovels, four pulaskis, and floodlights with stands and extension cords.

[46]Via email correspondence with Norm MacLeod and Roger Ehlert, Copper Bluffs residents.
[47]Via email correspondence with Paul Leeson, Open Bay resident.

Priorities for additional equipment include a small generator, a spare water pump, and additional personal protection equipment.

Granite Bay:[48] Available to the community is a local map and list showing where people live and what equipment they have including phone, radio, internet, water pump, and water pump hose. Linking multiple pumps has been done successfully by residents to fight fires away from water sources. Water access is a noted problem.

All communities noted that locating funding sources to expand available equipment, address long term ongoing maintenance of equipment, and provide additional training will go a long way towards more effective community firefighting response. BCWS recommends that private property owners/strata groups avoid actions on wildfires outside of their property, otherwise the risk and liability of their actions is passed on to BCWS when they respond.

Additional emergency response recommendations and action items are detailed below in Table 26.

[48]Via email correspondence with Jude McCormick, Granite Bay resident.

Table 26: Emergency preparedness recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To create specific wildfire response pre-incident plans so those responding to a wildfire emergency know who is available to help with what and when, and to improve SRD's, Quadra FD's, and communities' ability to respond to (during and after) a wildfire emergency.							
31	High	Quadra FD should continue engaging BCWS to conduct annual reviews ensuring PPE and wildland equipment resources are complete, in working order, and the crews are well-versed in their set-up and use. Identify equipment deficiencies and plans to fill them.	Maintain an annual structural and interface training and equipment review program and maintain a strong relationship between Quadra FD and BCWS.	Quadra FD	Yearly (pre-fire season)	Wildland firefighting equipment resources are complete	Quadra FD (~20 hours in-house)
32	High	For communities outside of Quadra FD's fire response area, SRD should: 1) Facilitate equipment review and community member training opportunities with BCWS. 2) Explore further equipment funding and training opportunities to grow each communities' ability to fight structural and wildland fires.	Invite persons from other communities (as listed in Table 15to participate. Utilize the QIEP in identifying communities and persons to coordinate with on Quadra.	SRD (BCWS, Quadra FD)	5 years and ongoing	At least one equipment check and training opportunity with BCWS planned and conducted	UBCM CRI funding available (~20 hours planning and one day each for training and equipment checks)
33	High	Quadra FD should complete planned digitization of important fire and emergency response information, such as water drafting sites and driveway lengths.	To ensure prompt and effective response to fire emergencies within Quadra FD's fire response area. Quadra FD should reach out to the SRD to see if the District's GIS department can provide this service.	Quadra FD	2 years	Required information is digitized and available electronically	Quadra FD
34	High	SRD should include evacuation harbors and wharfs, as well as tactical staging areas, identified in Quadra's updated emergency response documents as critical infrastructure.	To ensure these locations are included for FireSmart assessment and mitigation activities so that, through a wildfire lens, they are as safe and functional as possible.	SRD	When documents completed	List of critical infrastructure is updated.	SRD (~8 hours in-house)
35	High	SRD should apply for UBCM CRI funding to hire a FireSmart coordinator (full-time basis).	To manage the planning and implementation of recommendations and action items in this report.	SRD	2 years	FireSmart coordinator hired	UBCM CRI funding is available

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
							($59,000 contract pay)
36	Moderate	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.	Consider adding a section for "what we need for prompt response on your property"[49] that details key information/items/locations first responders and emergency responders require when responding to incidents.	SRD (Quadra FD)	5 years	Pamphlets created and available to the public	SRD (Cost to develop: 40 hours total and $5.00/ pamphlet)
37	Moderate	Update Quadra's HRVA and/or emergency management plans with information and data from this CWRP. Develop wildfire-specific incident plans and associated maps. Incorporate items listed in the Pre-Incident Planning subsection above. Local Fire Threat and stakeholders'/tenure holder's contact information should be incorporated within the map. The map should be included in the Quadra Island Evacuation Plan and shared with fire suppression personnel, BCWS, and industrial operators (Woodlots, TFL 47) to support emergency response in the event of a wildfire. The map should be reviewed as needed to incorporate additions and/or changes.	Wildfire incident plans and maps will support emergency response in the event of a wildfire and/or evacuation event. These plans help target emergency planning and effort in meaningful and effective ways, such as knowing where fire guards can/can't be built, as well as minimizing the need for using machinery to build cat guards in sensitive areas.	SRD (Consultant, BCWS)	5 years	Wildfire incident plans and associated maps were created and made available	SRD (Cost to EOC/EPC; 12 planning hours and ~$6,000 contracted service)

[49] Recently conducted on Thetis Island.

5.7 VEGETATION MANAGEMENT

As discussed in Section 4.1, fuel is the only aspect of the fire behavior triangle that can be modified to reduce wildfire threat. Fuel or vegetation management reduces potential wildfire intensity and ember exposure to people, structures, and other values through manipulation of both natural and cultivated vegetation within or adjacent to a community. A well-planned vegetation management strategy can greatly increase fire suppression effectiveness and reduce damage to property and values. Three main zones are discussed to appropriately scale and plan vegetation management activities across the WUI landscape (see Appendix A-2: Proximity of Fuel to the Community for expanded descriptions and information):

1) the Home and Critical Infrastructure Ignition Zone,
2) the Community Zone; and
3) the Landscape Zone.

Vegetation management can largely be accomplished through two different activities:

Residential-Scale FireSmart Landscaping

Residential FireSmart landscaping refers to the removal, reduction, or conversion of flammable [landscaping] plants to create more fire-resistant areas in the FireSmart Noncombustible Zone and Priority Zones 1, 2 and 3. This is called the Home (or Structure) Ignition Zone (Figure 8).

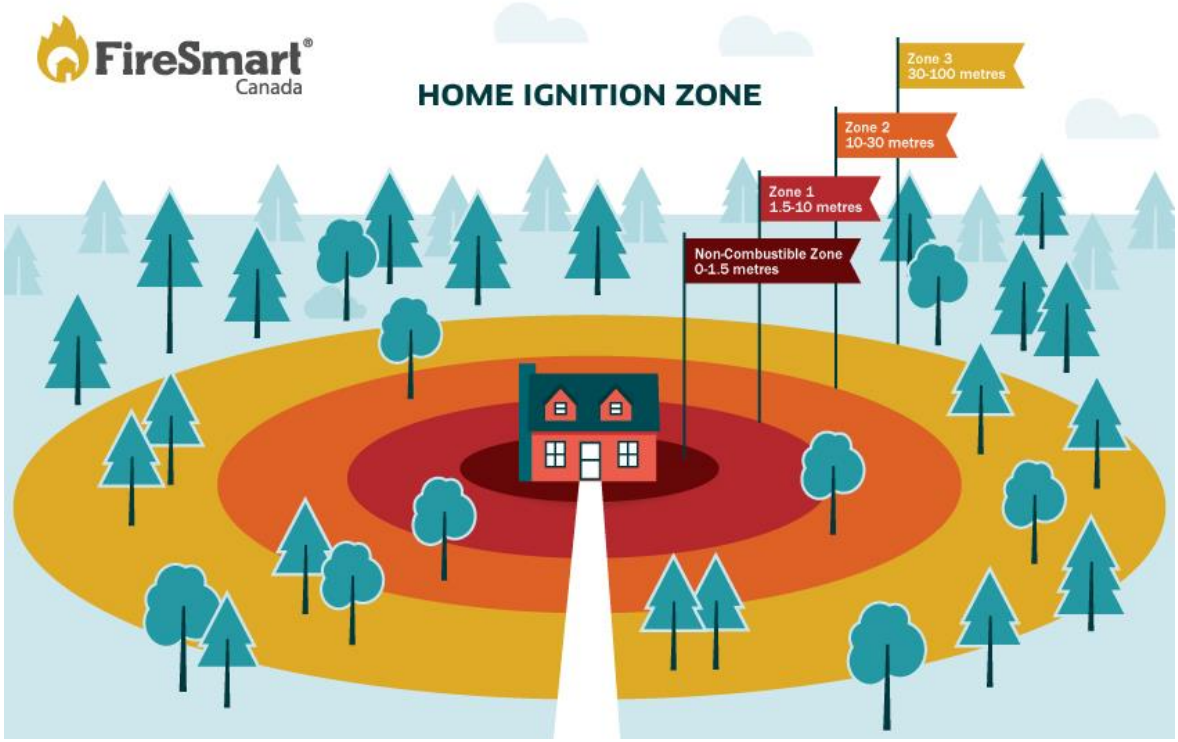


Figure 8: FireSmart home and critical infrastructure ignition zone

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 firebrands (embers). Firebrands can be transported long distances ahead of the wildfire, across fire guards and fuel breaks, and accumulate within the Home or Structure Ignition Zone (0 – 100 m) in densities that can exceed 600 embers per square meter. Combustible materials found within the Home or Structure Ignition Zone 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 Home and Structure Ignition Zone 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.

It was noted during field visits that compliance to FireSmart vegetation management was highly variable between properties and that, overall, FireSmart vegetation management actions should be continued to be considered. SRD has organized and implemented (2020, 2021) an annual wood and yard waste chipping disposal program on Quadra which has been very well received. SRD has applied again to UBCM CRI for funding to continue the program and should look to do so each year.

Fuel Management Treatments

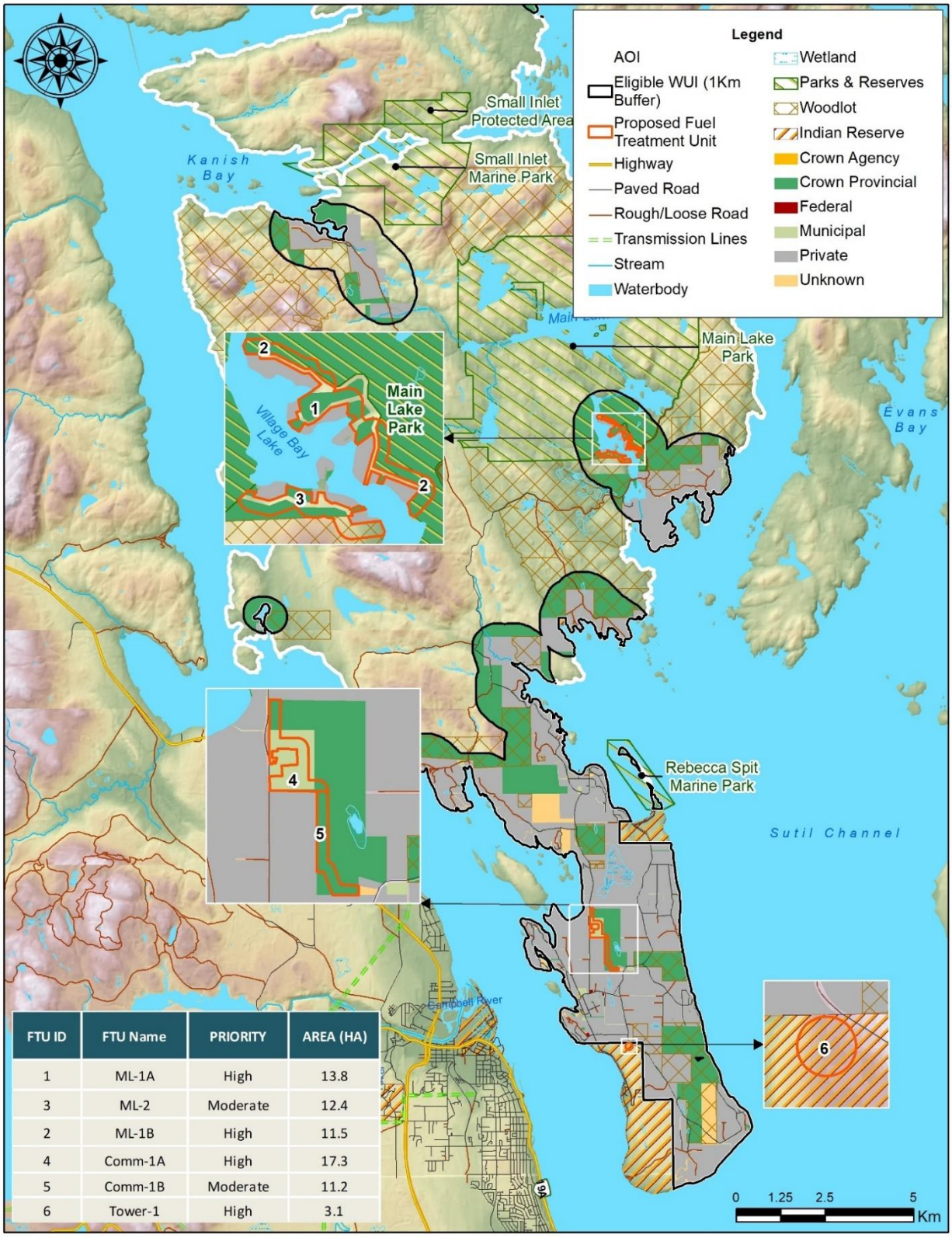
Fuel management refers to the manipulation or reduction of living or dead wildland forest and grassland fuels to reduce the rate of spread and head fire intensity and enhance likelihood of successful suppression. Fuel management treatments in the community and landscape zones should also be considered to further reduce wildfire risk to Quadra's WUI.

Fuel treatment opportunities may be a linear fuel break (minimum of 1 km) or polygon treatments for discrete areas. The intent of establishing fuel treatments is to modify fire behaviour. They should be designed to keep surface fires on the ground to avoid them becoming more dangerous crown fires. Fuel treatments also provide anchor points to fire-fighting crews for suppression activities.[50] The application of appropriate suppression tactics in a timely manner with sufficient resources is essential for fuel treatments to be effective. To increase the efficacy of fuel treatments, FireSmart standards should be applied to structures and associated vegetation and other fuel to reduce the risk of structures igniting. Fuel treatment units require periodic maintenance to retain their effectiveness.

Fuel treatments proposed within a CWRP are expected be able to be completed within the lifetime of the document – approximately 5 years. Multiple proposed fuel treatment units (PTUs) have been proposed within Quadra's WUI in the highest priority areas. The treatment units are described in Table 27 and

[50] 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

shown on Map 6. Priority rankings have been given based on the Wildfire Risk Assessment completed in Section 4. No fuel treatments have been proposed in woodlots within southern Quadra. Field work visiting the WUI edges of the woodlots, along with communications with woodlot managers, showed that current harvest practices are promoting wildfire risk reduction characteristics. However, the SRD should emphasize the importance of post-harvest slash management (recommendation #21) towards WUI wildfire risk. Fuel treatments have been proposed in We Wai Kai Nations' Cape Mudge Village reservation land (located on the southwest tip of Quadra Island) as part of the We Wai Kai Nation 2021 CWRP. SRD should collaborate with We Wai Kai Nation to treat (or assist We Wai Kai Nation to facilitate treatment of) these units as they directly impact Quadra's WUI.



FTU ID	FTU Name	PRIORITY	AREA (HA)
1	ML-1A	High	13.8
3	ML-2	Moderate	12.4
2	ML-1B	High	11.5
4	Comm-1A	High	17.3
5	Comm-1B	Moderate	11.2
6	Tower-1	High	3.1

Map 6: Quadra CWRP Proposed Fuel Treatment Units

Table 27: Summary of Proposed Fuel Treatment Units

Map #	FTU Name	Total Area (ha)	Treatment Unit Location / Type	Priority	Wildfire Behavior Threat (ha)			Overlapping Values / Treatment Constraints	Treatment Rationale
					Extreme + High	Mod.	Low		
1	ML-1A	13.8	Structure Ignition Zone; Landscape Zone	High	0.0	7.3	6.4	This TU abuts private land along its southern edge and Main Lake Provincial Park along its north and east/west edges. Prescription and treatment riparian considerations for Village Bay Lake required. Access to the TU area is either by boat or walking trail. Archeological assessments may be required as identified through First Nation consultation during the prescription development. Plan to prescribe and treat ML-1A and ML-1B together.	These units are located on the edge of boat/trail access private cabins situated on the north shoreline of Village Bay Lake and represent a 100m buffer from the private property lines. The units are entirely composed of C-5 fuel types on a dry, warm south aspect with overstory and understory stem mortality due to drought. The properties and cabins exhibit very low FireSmart structure and vegetation compliance, increasing fire ignition and transfer risks. The TUs are upwind (south) of early season fire winds, and downwind (north) of main season fire winds. Situated in the Home Ignition Zone of the cabins on Crown land, and acting also as a linear fuel break, treating these units would reduce the risk of a fire spreading between cabins as well as into the surrounding unmanaged forest landscape.
2	ML 1-B	11.5	Structure Ignition Zone; Landscape Zone	High	0.0	9.7	1.8	This TU is an extension of ML-1A but represents the TU area within Main Lake Provincial Park. Prescription development should include consultation with BC Parks Area Supervisor so that the park's ecological values are properly incorporated and managed for in the prescription.	
3	ML-2	12.4	Structure Ignition Zone; Landscape Zone	Moderate	0.0	0.0	12.4	This TU abuts private land along its north edge, Main Lake Provincial Park along its west edge, and overlaps with woodlot 1898 on is east edge. Prescription and treatment riparian considerations for Village Bay Lake required. Access to the TU area is either by boat or walking trail. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This unit is located on the edge of boat/trail access private cabins situated on the south shoreline of Village Bay Lake and represents a 100m from the private property lines. The unit is entirely composed of C-5 fuel types on a cooler north aspect. The properties and cabins exhibit very low FireSmart structure and vegetation compliance, increasing fire ignition and transfer risks. The TU are downwind (south) of early season fire winds, and upwind (north) of main season fire winds. Situated in the Home Ignition Zone of the cabins on Crown land, and acting also as a linear fuel break, treating these units would

Map #	FTU Name	Total Area (ha)	Treatment Unit Location / Type	Priority	Wildfire Behavior Threat (ha)			Overlapping Values / Treatment Constraints	Treatment Rationale
					Extreme + High	Mod.	Low		
									reduce the risk of a fire spreading between cabins as well as into the surrounding unmanaged forest landscape.
4	Comm-1A	17.3	Structure Ignition Zone; Community Zone	High	0.0	5.7	11.6	Located entirely on Regional District park land, This TU abuts private land on its north and south edges, and W Road on its west edge. It surrounds the Quadra Island Community Centre and associated playgrounds, parking lots, and fields – a high use recreation area. Walking trails are present in the TU. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This TU represents a pseudo-linear/polygon fuel break/area. The polygon area overlaps the Community Centre's (critical infrastructure – emergency reception centre) Structure Ignition Zone, and the arms extending north and east-west create an additional fuel break. Composed of both C5 and C3 fuel types, treating this area would protect valuable emergency critical infrastructure while also creating a fuel break both upwind and downwind of structures.
5	Comm-1B	11.2	Structure Ignition Zone; Community Zone	Moderate	0.0	0.0	11.2	Located entirely on Crown land, This TU abuts private land on its west and south edges, and TU Comm-1A on its north edge. Access is via walking trails. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	This TU represents a linear fuel break that can be used to extend TU Comm-1A. Covering an area of unmanaged forest land, it is composed of C5 fuel types. Treating this TU would create a nearly 2km long north-south and east-west fuel break adjacent to critical infrastructure (Community Centre, Fire Hall, Ambulance Hall), abutting private managed forest land, and upwind from the more densely populated Quathiaski Cove community – providing a suppression opportunity if a fire were to originate there before travelling north into a mostly forested, intermix-community part of the island towards Hariot Bay.
6	Tower-1	3.1	Structure Ignition Zone; Community Zone	High	n/a	n/a	n/a	This TU is located entirely on We Wai Kai First Nation Cape Mudge reservation land – consultation will be required. It is proposed as a TU in the We Wai Kai 2021 CWRP – SRD should lobby for its treatment by We Wai Kai, or apply to We Wai Kai for permission to treat it	This TU represents a 100m buffer polygon feature around critical communications infrastructure, covering the Structure Ignition Zone. Although located on We Wai Kai Cape Mudge reservation land, the communication towers are critical infrastructure to all of Quadra Island. Composed of mixed forest types, vegetation management

Map #	FTU Name	Total Area (ha)	Treatment Unit Location / Type	Priority	Wildfire Behavior Threat (ha)			Overlapping Values / Treatment Constraints	Treatment Rationale
					Extreme + High	Mod.	Low		
								itself. Archeological assessments may be required as identified through First Nation consultation during the prescription development.	work should focus on removing fuels that could let fire move towards the structure so the structure and the attached/surrounding components (*i.e.* electrical and support cables) are not unduly impacted by flames.

Recommendations and action items increase FireSmart vegetation management and practices within the WUI and associated Home and Critical Infrastructure Ignition Zones, Community Zones, and Landscape Zones are provided below in Table 28.

Table 28: Vegetation management recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
Objective: To reduce the potential wildfire intensity and ember exposure to people, infrastructure, structures, and other values through manipulation of both the natural and cultivated vegetation that is within or adjacent to a community.							
38	High	Continue implementing the yearly community/neighbourhood chipping program. Education of FireSmart yard and landscaping principles, including chipping specifications should be incorporated into the program.	To reduce wildfire hazards on private property within the WUI and promote FireSmart vegetation management knowledge and education.	SRD	Yearly	Continued high amount of participation by Quadra residents	UBCM CRI funding is available (Costs/time in line with previous year)
39	High	Proceed with detailed assessment, prescription development, and treatment of fuel treatment units identified and prioritized in this CWRP.	To reduce wildfire hazards in the WUI's highest priority Structure, Community, and Landscape Zones.	SRD (Consultant)	5 years	Prescriptions for high priority units developed. Treatment completed on one TU.	UBCM CRI funding is available (~$500/ha prescription; ~$8000/ha treatment)
40	High	As part of fuel treatment implementation on TU Comm-1A, SRD should develop interpretive signage to demonstrate pre- and post-fuel treatment forest stands.	Increase public awareness and support of fuel management practices.	SRD	5 years	Signs placed in one high-public use area, post-treatment	UBCM CRI funding is available (~$500/sign)
41	High	When operational fuel treatments are conducted, treatment monitoring 10 years out should be completed by a qualified professional. This can be completed with a CWRP update or as a stand-alone exercise.	Assess the efficacy of the treatment and schedule maintenance activities. It is cheaper to perform maintenance early when regeneration is small.	SRD (Consultant)	10 years	All completed fuel treatments are reassessed within 10 years, and ongoing, post-treatment	UBCM CRI funding is available (~100/ha for assessment)

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost ($) or Person Hours
42	High	Lobby We Wai Kai First Nation for prescription development and implementation of fuel treatment units proposed in the We Wai Kai 2021 CWRP.	To reduce wildfire hazards in the Quadra's Landscape Zone.	RDOS (We Wai Kai First Nation)	5 years	Prescriptions for high priority units developed. Treatment completed on one TU	UBCM CRI funding is available (~$500 per hectare)
43	High	In line with recommendation #21, SRD should emphasize the importance of post-harvest slash management to those forest license holders within the WUI.	Consider involving BCWS and promoting tools such as the Critical Surface Intensity Worksheet[51,52] – developed to assess if the surface fuel loading prescribed/present will limit the chances of crown fire ignition, based on the retained height to live crown (or prescribed pruning height) of the treated/harvested stands.	SRD (BCWS, WUI forest license holders)	5 years	Post-harvest slash management in the WUI is considering wildfire risk reduction	SRD (~40 hours consultation with BCWS and outreach to forest license holders)

[51] Worksheet located here: https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/critical_surface_intensity_worksheet_v4.xlsx
[52]Additional information and tools located here: https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/vegetation-and-fuel-management/fire-fuel-management/fuel-management

SECTION 6: APPENDICES

6.1 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: Fire Risk Threat Assessment Methodology).
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: Proximity of Fuel to the Community).
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: Fire Spread Patterns). Wind speed, wind direction, and fine fuel moisture conditions influence wildfire trajectory and rate of spread.
4. Consideration of topography in relation to values. 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 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 Appendix F: Fire Risk Threat Assessment Methodology. Wildfire Risk Assessment plot worksheets are provided in Appendix B: Wildfire Risk Assessment – Worksheets and Photos(under separate cover), plot locations are summarized in Appendix D: WUI Threat Plot Locations, and the field data collection and spatial analysis methodology is detailed in Appendix F: Fire Risk Threat Assessment Methodology.

6.1.1 APPENDIX A-1: FIRE RISK THREAT ASSESSMENT METHODOLOGY

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.[53] 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.[54] It should be noted that there are significant

[53]Forestry Canada Fire Danger Group. 1992. Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3.
[54]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.

limitations with the fuel typing system which should be recognized. Major limitations include a fuel typing system designed to describe fuels that sometimes 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.[54] Details regarding fuel typing methodology and limitations are found in Appendix E: Fuel Typing Methodology and Limitations. There are several implications of the aforementioned limitations, which include: fuel typing further from the developed areas of the study has 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 29 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 WUI is C-3, 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.[54] 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 the level of curing. 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.

Table 29. Fuel Type Categories and Crown Fire Spot Potential. Only summaries of fuel types encountered within the WUI are provided (as such, other fuel types, i.e., C-1, C-2, C-4, S-2, and S-3 are not summarized below).

Fuel Type	FBP / CFDDRS 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 bedrock 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)	A 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
S-1	Slash (jack/lodgepole pine, white spruce)	Any conifer slash	Moderate to high rate of spread and high to very high-intensity surface fire	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 WUI 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, recurring patterns of fuel type errors were found in the provincial dataset (largely due to recent harvesting). They were:

- S-3 fuel types being incorrectly identified by the PSTA as C-5 or C-3

The resulting updated fuel types were shown earlier on Map 3.

6.1.2 APPENDIX A-2: PROXIMITY OF FUEL TO THE COMMUNITY

Home and Critical Infrastructure Ignition Zones

Multiple studies have shown that the principal factors regarding home and structure loss to wildfire are the structure's characteristics and immediate surroundings. The area that determines the ignition potential of a structure to wildfire is referred to as (for residences) the Home Ignition Zone (HIZ) or (for critical infrastructure) the Critical Infrastructure Ignition Zone (CIIZ).[55,56] Both the HIZ and CIIZ include the structure itself and four concentric, progressively wider Priority Zones out to 100 m from the structure (Figure 9 below). More details on priority zones can be found in the FireSmart Manual.[57]

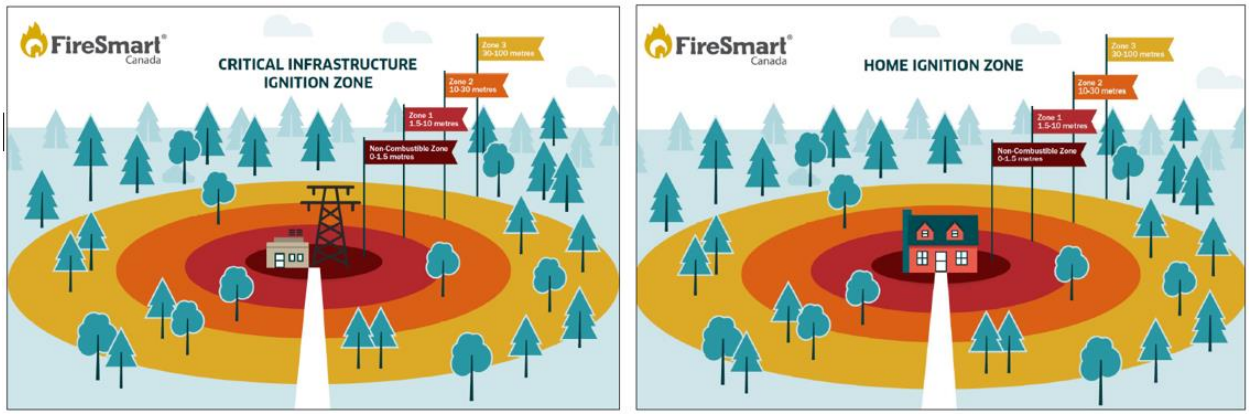


Figure 9: FireSmart Home and Critical Infrastructure Ignition Zone (HIZ, CIIZ)

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/CIIZ in densities that can exceed 600 embers per square meter. Combustible materials found within the HIZ/CIIZ combine to provide fire pathways allowing spot surface fires ignited by embers to spread and carry flames or smouldering fire into contact with structures.

Because ignitability of the HIZ/CIIZ is the main factor driving structure loss, the intensity and rate of spread of wildland fires beyond the community have not been found to necessarily correspond to loss potential. For example, FireSmart homes with low ignitability may survive high-intensity fires, whereas highly

[55] 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.
[56] Cohen, J. Preventing Disaster Home Ignitability in the Wildland-urban Interface. Journal of Forestry. p 15 - 21.
[57] https://firesmartcanada.ca/ and https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart

ignitable homes may be destroyed during lower-intensity surface fire events.[56] Increasing ignition resistance would reduce the number of homes simultaneously on fire; extreme wildfire conditions do not necessarily result in WUI fire disasters.[58] It is for this reason that the key to reducing WUI fire structure loss is to reduce structure ignitability. Mitigation responsibility must be centred on the owners of structures and the real property. 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.

Community Zone

Vegetation management in the Community Zone encompasses all non-provincial Crown publicly owned lands that are within local government jurisdiction/management and are typically beyond 30 metres from private structures (in some cases, this may also include small isolated provincial Crown land parcels within administrative boundaries).[59] Vegetation management planning and implementation on most Community Zone lands should be directed through a formal fuel management prescription developed by a forest professional with wildfire vegetation management within their scope of practice[59]. Depending on the results of FireSmart Structure Ignition Zone assessments on individual structures, vegetation management may be required out beyond 30 metres and up to 100 metres (FireSmart Priority Zone 3) on larger private parcels.[59] Municipal or Regional government parks, trails, outdoor event spaces and fields, etc. are all part of the Community Zone. Many Community Zone open spaces/lands are often associated with high use by the public thus increasing accidental ignition potential and the wildfire risk to properties and homes surrounding them.

Landscape Zone

The Landscape Zone encompasses provincial Crown lands that are located outside local government jurisdiction/management. Vegetation (fuel) management planning and implementation is primarily the responsibility of the provincial government, working collaboratively to align landscape objectives with the CWRP objectives[59]. Vegetation management planning and implementation in the Landscape Zone and on all forested provincial Crown lands must be directed through a formal fuel management prescription developed by a forest professional with wildfire vegetation management within their scope of practice.[59]

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, to reduce hazard levels adjacent to the community. Continuity of fuel treatment is an

[58]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/.

[59]CRI FCSF 2021 Supplemental Instruction Guide

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 a wildfire to intensify, resulting in a heightened risk to values. 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 30 describes the classes associated with the proximity of fuels to the interface.

Table 30. Proximity to the Interface.

Proximity to the Interface	Descriptor*	Explanation
WUI 100 HIZ/CIIZ and Community Zones	(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 Community and Landscape Zones	(100-500m)	Treatment would affect wildfire behaviour approaching a value, as well as the wildfire's ability to impact the value with short- to medium-range spotting; should also provide suppression opportunities near a value.
WUI 1000 Landscape Zone	(500-1000 m)	Treatment would be effective in limiting long-range spotting but short-range spotting may fall short of the value and cause a new ignition that could affect a value.
Landscape Zone	>1000 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.

6.1.3 APPENDIX A-3: FIRE SPREAD PATTERNS

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. Figure 10 below displays the daily average ISI values for Quinsam Base, which represents wind speeds and directions for the south of the WUI. Figure 11 below that displays the daily average ISI values for Maurelle, which represents wind speeds and directions for the north of the WUI.

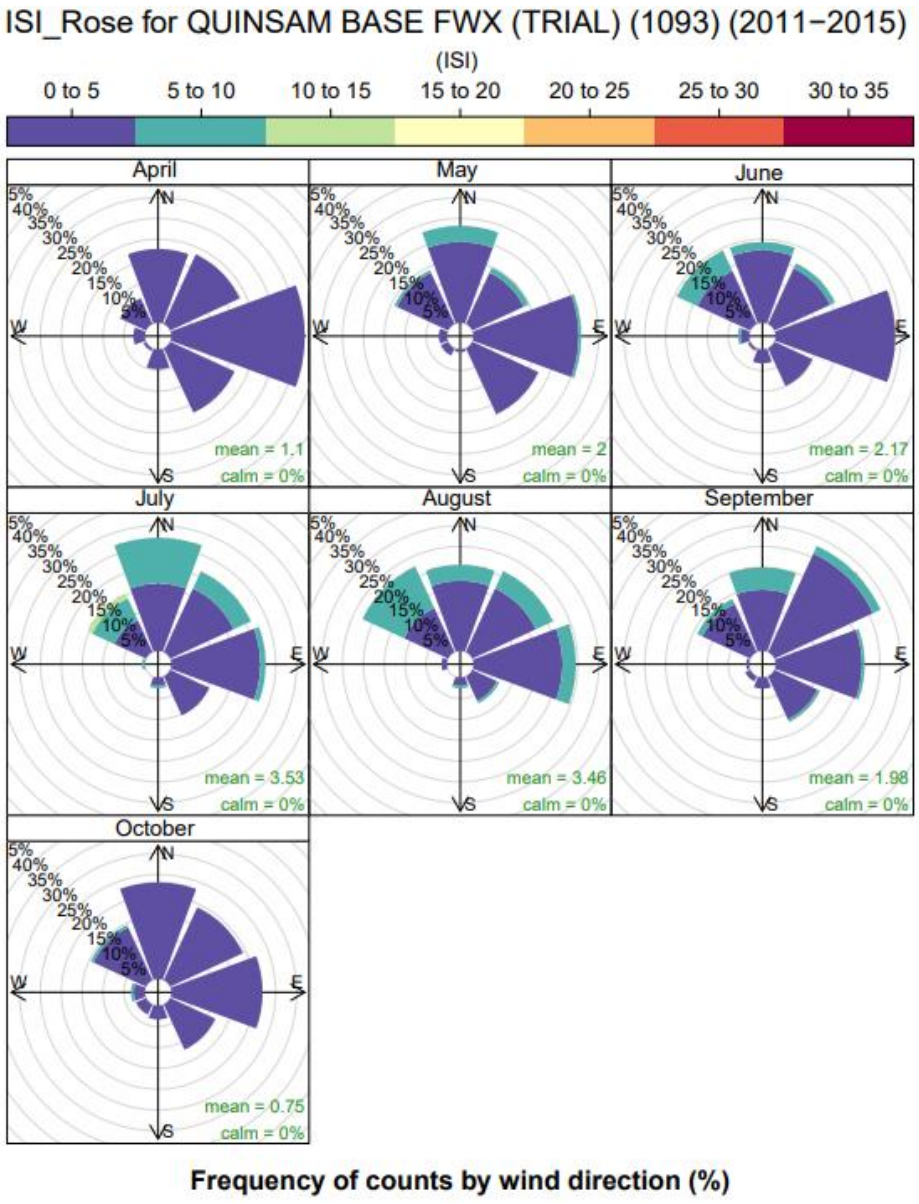


Figure 10: Initial Spread Index (ISI) roses depicting average daily wind speed and direction for each month during the fire season (April – October). Data taken from the Quinsam Base fire weather station 2011 – 2015.

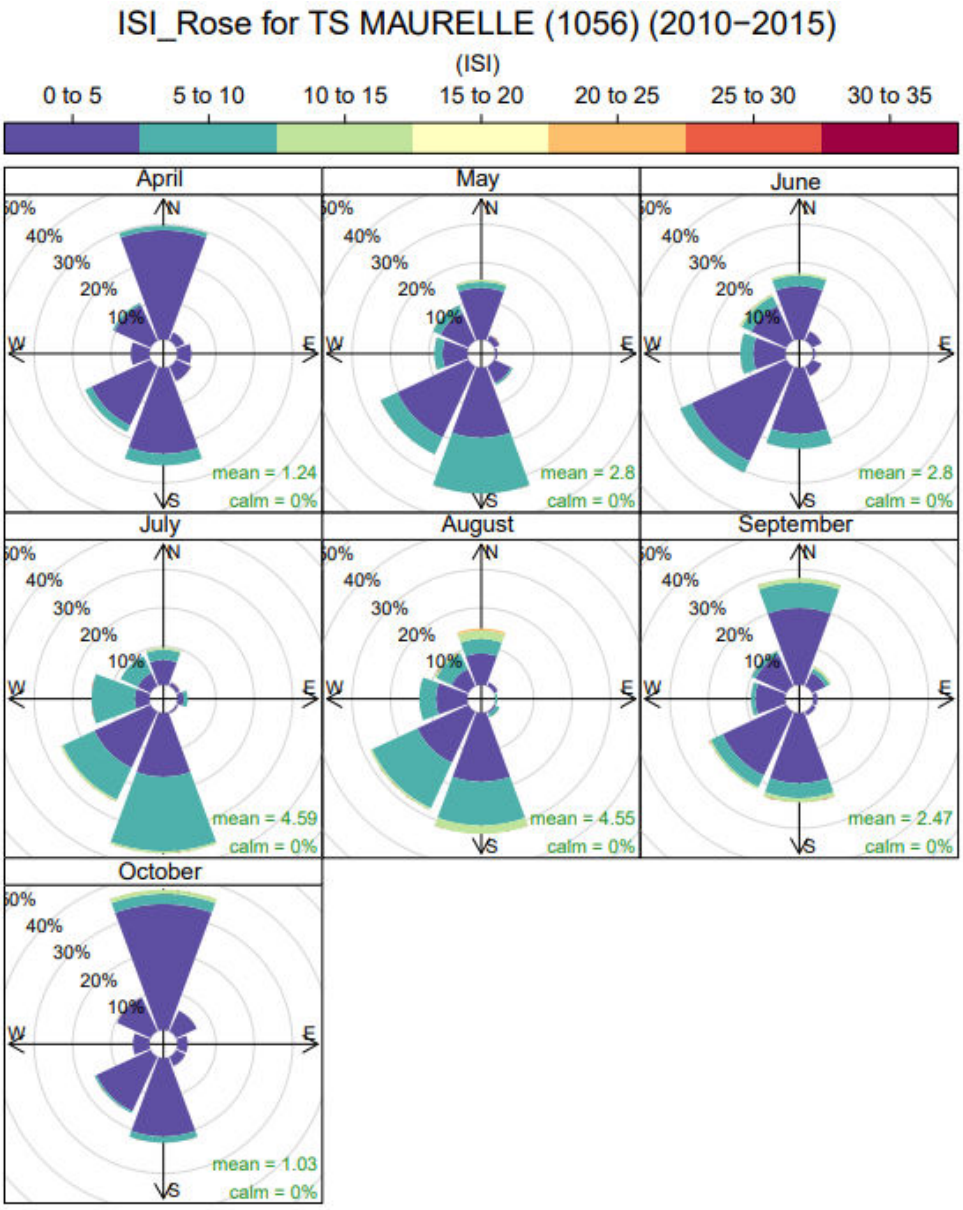


Figure 11: Initial Spread Index (ISI) roses depicting average daily wind speed and direction for each month during the fire season (April – October). Data taken from the Maurelle BCWS fire weather station 2010 – 2015

6.2 APPENDIX B: WILDFIRE RISK ASSESSMENT – WORKSHEETS AND PHOTOS

Provided separately as PDF package.

6.3 APPENDIX C: MAPS

Provided separately as PDF package.

6.4 APPENDIX D: WUI THREAT PLOT LOCATIONS

Table 31 displays a summary of all WUI threat plots completed during CWRP fieldwork. 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 31. Summary of Wildland-Urban Interface Threat Assessment Worksheets.

WUI Plot ID	Geographic Location	Wildfire Behaviour Threat Class	WUI Threat Class*
BOLD-1	Bold Point (in a woodlot)	80 Moderate	n/a
BOLD-2	Main Lake	79 Moderate	n/a
BOLD-3	Bold Point (in a woodlot)	68 Moderate	n/a
COVE-1	Cove (Woodlot)	77 Moderate	n/a
GRAN-1	Granite Bay (Woodlot 1969)	72 Moderate	n/a
GRAN-2	Granite Bay	142 High	28 High
GRAN-3	Granite Bay	89 Moderate	n/a
OPEN-1	Open Bay	64 Moderate	n/a
OPEN-2	Open Bay	70 Moderate	n/a
QUAD-1	Quarry Pit	92 Moderate	n/a
QUAD-2	Cannery road JCT w/ main road	64 Moderate	n/a
QUAD-3	Hopespring Trail	68 Moderate	n/a
QUAD-4	Hopespring Trail	91 Moderate	n/a
QUAD-5	Woodlot 25	77 Moderate	n/a
QUAD-6	Community center	78 Moderate	n/a
QUAD-7	Woodlot 25	67 Moderate	n/a
QUAD-8	Smith Road	82 Moderate	n/a
QUAD-9	Woodlot 42	75 Moderate	n/a
QUAD-10	Woodlot 42	68 Moderate	n/a
QUAD-11	Woodlot 42	91 Moderate	n/a

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

6.5 APPENDIX E: FUEL TYPING METHODOLOGY AND LIMITATIONS

The initial starting point for fuel typing for the WUI 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 WUI was not available. Fuel types within the WUI have been updated using satellite photo imagery 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 the photo imagery to areas that were 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 WUI. 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 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.[60]

[60]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

6.6 APPENDIX F: FIRE RISK THREAT ASSESSMENT METHODOLOGY

As part of the CWRP process, spatial data submissions are required to meet the defined standards in the Program and Application Guide. Proponents completing a CWRP can obtain open-source BC Wildfire datasets, including Provincial Strategic Threat Analysis (PSTA) datasets from the British Columbia Data Catalogue. Wildfire spatial datasets obtained through the BC Open Data Catalogue used in the development of the CWRP include, but are not limited to:

- PSTA Spotting Impact
- PSTA Fire Density
- PSTA Fire Threat Rating
- PSTA Lighting Fire Density
- PSTA Human Fire Density
- Head Fire Intensity
- WUI Human Interface Buffer (1436m buffer from structure point data)
- Wildland Urban Interface Risk Class
- Current Fire Polygons
- Current Fire Locations
- Historical Fire Perimeters
- Historical Fire Incident Locations
- Historical Fire Burn Severity

As part of the program, proponents completing a CWRP are provided with a supplementary PSTA dataset from BC Wildfire Services. This dataset includes:

- Fuel Type
- Structures
- Structure Density
- Eligible WUI (2Km buffer of structure density classes >6).

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

- AOI
- Proposed Treatment
- WUI (1Km buffer of structure density classes >6)

The provided PSTA data does not 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 from the localized Fire Threat feature class that is included in the Local Fire Risk map required for project submission. 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 CWRP. This is accomplished by traversing as much of the Eligible WUI as possible (within time, budget and access constraints). Threat Assessment plots are completed on the 2012, 2017, and 2020and version forms, 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 fieldwork to ground-truth fuel typing and threat ratings (completed 15 WUI threat plots on a variety of fuel types, aspects, and slopes and an additional 366 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 32 were used as the basis for building the analytical model. The features were 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 32. 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 are 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	

WUI Threat Sheet Attribute	Used in Analysis?	Comment
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	The elevation model was used to determine slope.
Terrain	No	
Landscape/ topographic limitations to wildfire spread	No	
STRUCTURAL SUBCOMPONENT		
Position of structure/ community on the slope	No	
Type of development	No	
Position of assessment area relative to values	Yes	Distance to the structure is used in the analysis; position on slope relative 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 Threats, or Low, Moderate, High, or Extreme WUI Threats.

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'.

Limitations

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 that is required by the UBCM CRI program.

The threat class ratings are based initially upon (geographic information systems) GIS analysis that best represents the WUI wildfire risk assessment worksheet and is updated with ground-truthing WUI threat plots. WUI threat plots were completed in a variety of fuel types, slopes, and aspects 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: Fire Risk Threat Assessment Methodology and Appendix E: Fuel Typing Methodology and Limitations) impacts the threat assessment, as well.

6.7 APPENDIX G: LIST OF FIRST NATIONS AND ASSOCIATED GOVERNMENTS CONSULTED

Organization/Government	Contact Title	Email(s)/phone	Location
Ahousaht First Nation	n/a	greg.louie@ahousaht.ca 250-670-9563	General Delivery, Ahousaht, BC, V0R 1A0
Cowichan Tribes	Referrals Coordinator	Lands.reception@cowichantribes.com 250-748-3196	5760 Allenby Road, Duncan, BC, V9L 5J1
Halalt First Nation	Chief and Council	manager@halalt.org 250-246-4736	7973 Chemainus Road, Chemainus, BC, V0R 1K5
Homalco First Nation	n/a	referrals@homalco.com 250-923-4979	1218 Bute Crescent, Campbell River, BC, V9H 1G5
Hupacasath First Nation	Chief and Council	info@hupacasath.ca 250-724-4041	P.O. Box 211, Port Alberni, BC, V9Y 7M7
Klahoose First Nation	Economic Development and Treaty	kathyfrancis@klahoose.org 250-935-6536	P.O. Box 9, Squirrel Cove, Cortes Island, BC, V0P 1T0
K'omoks First Nation	Chief and Council	reception@komoks.ca 250-339-4545	3330 Comox Road, Courtenay, BC, V9N 3P8
Lake Cowichan First Nation	Chief and Council	carole@lcfn.ca 250-749-3301	P.O. Box 159 313B Deer Road, Lake Cowichan, BC, V0R 2G0
Lyackson First Nation	Chief and Council	referrals@lyackson.bc.ca 1-888-592-5766	7973A Chemainus Road, Chemainus, BC, V0R 1K5
Mowachaht/Muchalaht First Nation	Council of Chiefs	n/a 250-283-2015	P.O. Box 459, Gold River, BC, V0P 1G0
Nanwakolas Council	n/a	referrals@nanwakolas.com 250-286-7200	1441 16th Avenue, Campbell River, BC, V9H 1V8
Penelakut Tribe	Chief and Council	robert@penelakut.ca 250-246-2321	P.O. Box 360, Chemainus, BC, V0R 1K0
Stz'uminus First Nation	Chief and Council	referrals@coastsalishdevcorp.com 250-245-7155	12611A Trans Canada Highway, Ladysmith, BC, V9G 1M5
Tla'amin Nation	Chief and Council	clint.williams@TN-bc.ca 604-483-9646	4779 Klahanie Road, Powell River, BC, V8A 0C4
Tseshaht First Nation	Chief and Council	n/a 250-724-1225	5091 Tsuma-as Drive, Port Alberni, BC, V9Y 8X9
We Wai Kai Nation	Main Office	n/a 250-914-1890	690 Headstart Crescent, Campbell River, BC, V9H 1P9
Wei Wai Kum Nation	Chief and Council	referrals@weiwaikum.ca 250-286-6949	1650 Old Spit Road, Campbell River, BC, V9W 3E8

6.8 APPENDIX H: GLOSSARY OF TERMS

Danger tree - Live or dead tree whose trunk, root system or branches have deteriorated or been damaged to such an extent as to be a potential danger to human safety.

Fire danger - A general term used to express an assessment of both fixed and changeable factors of the fire environment that determine the ease of ignition, rate of spread, the difficulty of control, and fire impact.

Fire season - The period(s) of the year during which fires are likely to start, spread, and damage values-at-risk sufficient to warrant organized fire suppression; a period of the year set out and commonly referred to in fire prevention legislation.

Fuel - Fuel is any organic matter, living or dead, in the ground, on the ground, or in the air that can ignite and burn.

Available fuel - The quantity of fuel (in a particular fuel type) that would be consumed under specified burning conditions.

- *Fine fuels* - Fuels that ignite readily and are consumed rapidly by fire (e.g. cured grass, fallen leaves, needles, small twigs). Dead, fine fuels also dry very quickly.
- *Ground fuels* - All combustible materials below the litter layer of the forest floor that normally support smouldering or glowing combustion associated with ground fires (e.g. duff, roots, buried punky wood, peat).
- *Ladder fuels* - Fuels that provide vertical continuity between the surface fuels and crown fuels in a forest stand, thus contributing to the ease of torching and crowning (e.g. tall shrubs, small-sized trees, bark flakes, tree lichens).
- *Medium fuels* - Fuels too large to be ignited until after the leading edge of the fire front passes, but small enough to be completely consumed.
- *Surface fuels* - All combustible materials lying above the duff layer between the ground and ladder fuels that are responsible for propagating surface fires (e.g. litter, herbaceous vegetation, low and medium shrubs, tree seedlings, stumps, downed-dead roundwood).

Fuel management - Fuel management is the modification of forest structure to reduce forest fuel accumulations available to burn in a wildfire. The main goal of fuel management is improving public safety. This may include treatments such as thinning, spacing and pruning trees, and removal of needles and woody debris from the forest floor.

Fuel type - An identifiable association of fuel elements of distinctive species, form, size, arrangement, and continuity that will exhibit characteristic fire behaviour under defined burning conditions.

High-risk activity - As defined in the Wildfire Regulation (s.1)

a) mechanical brushing;

b) disk trenching;
c) preparation or use of explosives;
d) using fire- or spark-producing tools, including cutting tools;
e) using or preparing fireworks or pyrotechnics;
f) grinding, including rail grinding;
g) mechanical land clearing;
h) clearing and maintaining rights of way, including grass mowing;
i) any of the following activities carried out in a cutblock excluding a road, landing, roadside work area or log sort area in the cutblock:
    i) operating a power saw;
    ii) mechanical tree felling, woody debris piling or tree processing, including de-limbing;
    iii) welding;
    iv) portable wood chipping, milling, processing or manufacturing;
    v) skidding logs or log forwarding unless it is improbable that the skidding or forwarding will result in the equipment contacting rock;
    vi) yarding logs using cable systems

Interface fire - Interface fires are fires that have the potential to involve buildings and forest fuel or vegetation simultaneously in the WUI.

Prescribed fire - The knowledgeable and controlled application of fire to a specific area to accomplish planned resource management objectives. These fires are managed in such a way as to minimize the emission of smoke and maximize the benefits to the site.

Slash - Debris left as a result of forest and other vegetation being altered by forestry practices and other land use activities (e.g. timber harvesting, thinning and pruning, road construction, seismic line clearing). Slash includes material such as logs, splinters or chips, tree branches and tops, uprooted stumps, and broken or uprooted trees and shrubs.

Spot fire - A spot fire is less than 0.01 hectares (10 metres by 10 metres).

Wildfire - An unplanned fire - including natural or unauthorized human-caused fires - occurring on forest or rangelands, burning forest vegetation, grass, brush, scrub, peat, or a planned prescribed fire set under the regulation which spreads beyond the area authorized for burning.

Wildland urban interface - The wildland-urban interface (WUI) is an area where combustible forest fuel is found adjacent to homes, farms, structures or other outbuildings. This may occur at the interface, where development and forest fuel (vegetation) meet at a well-defined boundary, or in the intermix, where development and forest fuel intermingle with no clearly defined boundary.