

Community Wildfire Resiliency Plan



We Wai Kai Nation Cape Mudge Village and Quinsam Reserve

February 23, 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	
	

Cover Photo: Nuyumbalees Cultural Centre (<https://wewaikai.com/programs/cultural-centre/>)

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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 Program, managed by the Union of BC Municipalities, 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 is the first CWRP created for We Wai Kai Nation. The area of interest for this plan is We Wai Kai Nation's inhabited reserve lands, specifically Cape Mudge Village and Quinsam Reserve. This CWRP provides We Wai Kai Nation 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, law and policy development in areas of fire risk, and the management of potentially hazardous forest stands in the two eligible Wildland Urban Interfaces (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 the WUIs. The result of the analysis shows that the majority of both WUIs have low wildfire threat class ratings which represents developed and undeveloped land that will not support significant wildfire spread. A small portion (1%) of Cape Mudge Village's WUI is high threat class (landscapes or forest stands that provide continuous forested fuels that will support candling, intermittent crown or continuous crown fires).

Quinsam Reserve and Cape Mudge Village are both interface communities – the homes and structures and largely situated adjacent to vegetated/forested landscapes. Neither of the communities are remotely located, so effective emergency response via land, water or air is possible. However, evacuation from Cape Mudge Village is more difficult as transport via water or air is required to reach more extensive emergency services on Vancouver Island. The most likely threat of wildfire ignition in both communities is from human activities (*i.e.*, pile burning, spark ignition, home fire spread). A fire in Quinsam Reserve will likely spread south-west with the aid of the prevailing north-easterly summer winds. A fire in Cape Mudge Village will likely spread north with the aid of southerly summer winds in the northern Salish Sea.

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. Mitigation should be centered on construction practices and regulations, vegetation management around structures, and resident education. Citizen 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.

This year, the Campbell River Fire Department and We Wai Kai Nation, specifically Quinsam Reserve, have applied in partnership to the FireSmart Community Funding & Supports program. FireSmart education

and community events, such as a Community FireSmart Day where FireSmart educational materials are distributed to Quinsam Reserve residents, as well as critical infrastructure and home ignition zone assessments are planned to be completed in 2022. We Wai Kai Nation government should follow suit for Cape Mudge Village.

A total of 35 recommendation and action items are presented in Table 1 within this Executive Summary and are more thoroughly discussed in their appropriate sections within the plan. Because portions of the WUIs extend outside of We Wai Kai Nation's reserve lands onto both provincial Crown land and private land, the Nation's 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 risk and consequence to Quinsam Reserve and Cape Mudge Village. We Wai Kai Nation will have to further prioritize implementation based on resources, strengths, constraints, and availability of funding, and regularly update the prioritization and course of actions as variables change through time.

Table 1: We Wai Kai Nation's CWRP Action Plan

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
Education (Section 5.1)							
<i>Objective: To provide information to We Wai Kai Nation citizens empowering them to adopt and conduct FireSmart practices to mitigate the negative impacts of wildfire to their homes, businesses, and communities.</i>							
1	High	This CWRP report and associated maps should be made publicly available by WWKN through its 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, or committees that WWKN becomes part of.	WWKN	1 year	Available for download or viewing on We Wai Kai Nation's webpage	We Wai Kai Nation (no cost)
2	High	Follow through with the planned education and community events for Quinsam Reserve led by the Campbell River FD FireSmart Coordinator. Promote FireSmart approaches for wildfire risk reduction to Cape Mudge Village citizens through FireSmart workshops, open houses, and/or presentations. Supply FireSmart resources to residents of both communities during these engagement campaigns and promote the FireSmart Begins at Home mobile app as well as the FireSmart 101 online course. ¹	Aim to conduct the engagement and promotion campaign before and during the fire season. Include education specific to Cape Mudge Village and Quinsam Reserve, such as emphasizing the importance of safe debris removal methods and FireSmart firewood storage. Provide information on FireSmart landscaping. Enacting an all-encompassing "Safety Day" (coast guard, BC Ambulance, RCMP, BC Wildfire Service, WWKN personnel) that incorporates the Wildfire Community Preparedness Day CRI initiative can be an effective way to draw participation from the greatest number of citizens.	WWKN & Campbell River FD FireSmart Coordinator	Yearly (pre-fire season)	Growing citizen participation each year.	UBCM CRI funding is available and covers the education and community events in Quinsam Reserve (~40 hours for planning, 1 day for Cape Mudge workshop, 1 day for Quinsam workshop)
3	High	Develop a FireSmart/Wildfire Preparedness page on We Wai Kai Nation's website (with a direct link from the opening webpage).	Additional consideration should be put towards adding the current wildfire risk level for both Cape Mudge and Quinsam to the We Wai Kai opening webpage.	WWKN (Consultant)	2 years	Webpage updated	UBCM CRI funding is available

¹ This and other FireSmart education and training courses can be accessed via: <https://firesmartbc.ca/events/category/course/>

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
		Include links to FireSmart BC and other relevant wildfire resources.					(~\$3000 contracted service. ~40 hours for set-up. Additional hours for updates as required)
4	High	Recommendation #15 speaks to developing FireSmart landscaping guidelines. When available, make these guidelines available on the We Wai Kai Nation FireSmart webpage and hand out pamphlets/literature relating to it to Cape Mudge and Quinsam residents.	To increase FireSmart vegetation management knowledge amongst residents of Cape Mudge and Quinsam. Landscaping standards that can be adopted include the FireSmart BC Landscaping Guide ² and the Campbell River FireSmart Guide to Gardening. ³ Review and amend the guidelines taking into consideration We Wai Kai Nation’s culturally valuable plant species.	WWKN (Local FireSmart Representatives)	1 year from when the guidelines are made available	Posted on We Wai Kai Nation’s FireSmart webpage and materials given to Cape Mudge and Quinsam residents	UBCM CRI funding is available (~ 20 hours in-house; no cost)
5	Moderate	Follow through with the planned FireSmart initiatives amongst the residents in Quinsam Reserve and start promoting FireSmart amongst the private landowners in Cape Mudge Village. Supply FireSmart resources to residents via pamphlets left on their docks or at their cabin/home front doors. Promote the FireSmart Begins at Home mobile app as a method for them to conduct home assessments.	Fires started on private properties in both Cape Mudge and Quinsam can easily affect WWKN structures, property, and lives.	WWKN & Campbell River FD	2 years	FireSmart information provided to adjacent private landowners	We Wai Kai Nation (~ 16 hours) UBCM CRI funding is available
6	Low	Attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status as planned, which the Campbell River FD FireSmart Coordinator will assist with, for Quinsam Reserve. WWKN and/or Local	Leverage the leadership of a Local FireSmart Representative.	WWKN & Campbell River FD	5 years	Status achieved for Cape Mudge Village and Quinsam Reserve	UBCM CRI funding is available

² <https://firesmartbc.ca/resource/landscaping-guide/>

³ <https://srd.ca/wp-content/uploads/2020/10/final-cr-firesmart-guide-to-gardening-pdf-version-min-1.pdf>

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
		FireSmart Representatives should support and facilitate Cape Mudge Village to self-organize and also attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status.		(Campbell River FD FireSmart coordinator and/or Local FireSmart Representatives)			
Legislation and Planning (Section 5.2)							
<i>Objective: To provide the means for WWKN to implement wildfire risk reduction actions through laws and legislation by outlining government responsibilities regarding wildfire.</i>							
7	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 is currently a requirement for further funding under the CRI Program.	WWKN (Consultant)	5-7 years from adopting this CWRP document	We Wai Kai Nation always has an up-to-date CWRP and action plan	UBCM CRI funding is available (~\$30,000 for full document / \$10,000 for update)
8	High	Update the WWKN 2015 Residential Zoning Law to include a Wildland-Urban Interface Zone for Cape Mudge Village and Quinsam Reserve and embed FireSmart principles (especially vegetation and fuel loading limit guidelines) within it.	Consider making this zone the FireSmart Home and CI Ignition Zones 1-3. Fuel loading limit guidelines would help limit the amount of vegetative debris left in a location following any vegetation management (i.e., yard pruning) or resource extraction (i.e., logging) activities.	WWKN (Consultant)	1 year	Law updated or created speaking to this requirement	UBCM CRI funding is available
9	High	Update the WWKN 2021-8 Clean Air Law to prohibit the burning of leaves, foliage, weeds, crops, or stubble for domestic or agricultural use during periods of moderate or higher fire danger risk ratings.	To limit the chance of fire escapement during times of hazardous fire danger, reducing wildfire risk within both of the WUIs. It has been recommended by the Campbell River FD that WWKN adopt the City of Campbell River's Clean Air Bylaw and provide the City enforcement abilities.	WWKN (Consultant)	1 year	Law updated or created speaking to this requirement	UBCM CRI funding is available

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
10	High	Create a building regulations law that recommends following FireSmart construction materials and landscaping guidelines.	FireSmart construction materials are discussed in the FireSmart Begins at Home – Home Development Guide. ⁴ Landscaping: reference can be made to WWKN’s FireSmart landscaping guidelines (recommendation #4). It has been recommended by the Campbell River FD that the building regulations law is aligned with the designated Wildfire Hazard Development Permit Area and it’s associated requirements.	WWKN (Consultant)	2 years	Law created speaking to this requirement	UBCM CRI funding is available
Development Considerations (Section 5.3)							
<i>Objective: To embed FireSmart practices and considerations into all development within We Wai Kai Nation’s Cape Mudge Village and Quinsam Reserve..</i>							
11	High	Develop a wildfire hazard DPA and update WWKN’s CCP when completed. To meet objectives, consider including the following elements: <ul style="list-style-type: none"> • 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.	Embed FireSmart values into all aspects of community development and planning. This can also be accomplished through updating and creating new laws/regulations regarding building and landscaping, as well as zoning (see recommendation #8 and #10). Campbell River FD recommends that FireSmart principles for Wildfire Hazard DPAs are consistent throughout different areas (i.e., City of Campbell River and We Wai Kai Nation).	WWKN (Consultant)	5 years	Interface wildfire DPA created and adopted	UBCM CRI funding is available (~\$25,000 contracted service and 40 hours in-house)

⁴ Can be accessed via: https://firesmartcanada.ca/wp-content/uploads/2019/10/FS_Developer_Booklet.pdf

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
12	High	After the planned Home FireSmart assessments for Cape Mudge Village and Quinsam Reserve are completed, the recommendations should be implemented.	All homes in both communities should be assessed.	WWKN & Campbell River FD	5 years	All homes upgraded to stated FireSmart standards	WWKN (\$ and time dependent on scope and scale of work completed)
13	High	After the planned Critical Infrastructure FireSmart assessments for Cape Mudge Village and Quinsam Reserve are completed, the recommendations should be implemented.	All critical infrastructure in both communities should be assessed.	WWKN & Campbell River FD	5 years	All CI upgraded to stated FireSmart standards	WWKN (\$ and time dependent on scope and scale of work completed)
14	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). This could be regulated/mandated for future works via recommendation #10 and #11.	WWKN	Ongoing	New CI are FireSmart	WWKN (\$ variable: CI specific)
15	High	(If not accomplished through updates to laws/regulations or a Wildfire Hazard DPA) Develop or adopt a landscaping standard 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.	Landscaping standards that can be adopted include the FireSmart BC Landscaping Guide ⁵ and the Campbell River FireSmart Guide to Gardening. ⁶	WWKN	3 years	Landscaping standard created (or adopted) and either built into the interface wildfire DPA or implemented through laws/regulations	WWKN; UBCM CRI funding is available (\$0 if using FireSmart Canada guidelines; ~20 hours in-house)

⁵ <https://firesmartbc.ca/resource/landscaping-guide/>

⁶ <https://srd.ca/wp-content/uploads/2020/10/final-cr-firesmart-guide-to-gardening-pdf-version-min-1.pdf>

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16	High	Update WWKN's CCP to ensure boat access and transportation capabilities are available during high and extreme fire danger to residents in Cape Mudge Village for evacuation purposes.	Secure egress route via marine transport for Cape Mudge Village in case roads are cut off.	WWKN	3 years	Marine transportation vessels easily accessible during high and extreme fire danger for residents of Cape Mudge Village	WWKN (~80 in-house hours)
Interagency Cooperation (Section 5.4)							
<i>Objective: To broaden from a department or agency single jurisdiction-based approach to a risk driven, multi-agency and multi-scalable approach.</i>							
17	High	At least one WWKN resident or government staff member from Cape Mudge Village should join the Quadra Island CFRC Community FireSmart Resiliency Committee (CFRC). For Quinsam Reserve, once the CFRC including First Nation communities and SRD Electoral Area D is created, WWKN should reach out to both the City of Campbell River and the SRD to voice its interest in joining it.	Creates opportunities for synergies and information sharing of wildfire risk reduction activities across jurisdictions.	WWKN (Quadra Island CFRC, City of Campbell River, SRD EA-D)	Ongoing	Continued participation	WWKN (cost to government ~\$300/yr)
18	High	Engage and work with surrounding forest licensees (i.e., Woodlot 0042) to: 1) Identify the parts of woodlot 0042 that are in the Cape Mudge Village 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) Ensure that high-risk activities, such as vegetation management, pile burning, and harvesting do not occur during	1) Reduce interface wildfire risk throughout managed forest lands that are closest to structures in the WUI. Consider involving BCWS North Island Mid Coast Fire Zone and FLNRORD personnel in discussions and planning. 2) Reduce the chance of fire ignitions and reduce spread potential during an ignition event.	1) WWKN (FLNRORD, Stakeholders, Consultant) 2) Stakeholders	5 years	1) Discussions and planning initiated 2) High-risk activities not conducted	1) WWKN (cost to government) 2) Cost of equipment paid by stakeholder

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		high/extreme fire danger times. Lobby for adequate fire suppression tools being on-site during high-risk activities.				during high/extreme fire danger	
19	High	Continue to promote right-of-way best management practices (BMPs) for regular brushing and clearing of woody debris and shrubs in coordination with BC Hydro to help reduce fire risk, utility pole damage, and subsequent outages.	Tree failures adjacent to power lines are common occurrences and represent significant risks to ignition within the WUI.	WWKN (BC Hydro)	5 years	BMPs in use for the region	UBCM CRI funding is available (~30 hours in-house)
Cross-Training (Section 5.5)							
<i>Objective: To support the development of comprehensive and effective wildfire risk reduction planning and activities, as well as a safe and effective response.</i>							
20	High	Provide Incident Command System Training to those WWKN personnel most directly involved in managing and coordinating emergency response.	Increase WWKN's ability to plan and provide appropriate and timely responses in emergency situations.	WWKN	2 years	At least one WWKN personnel trained in both Cape Mudge Village and Quinsam Reserve	WWKN (UBCM Emergency Management funding available)
21	High	WWKN should reach out to BCWS North Island Mid Coast Fire Zone, as well as Campbell River FD and Quadra FD, for cross-training opportunities to plan and conduct Basic Fire Suppression and Safety S100 training to WWKN personnel along with Cape Mudge Village and Quinsam Reserve residents.	Increase the wildfire emergency preparedness of WWKN personnel as well as Cape Mudge Village and Quinsam Reserve residents.	WWKN (BCWS, Campbell River FD, Quadra FD)	3 years, then ongoing	WWKN (Cape Mudge Village and Quinsam Reserve) has persons trained in S-100	UBCM CRI funding is available for wildfire courses (~\$2000/16 hrs per person)
22	High	WWKN should participate in local fire department (and regional partners) wildfire and emergency preparedness/response tabletop exercises.	Simulation exercises create valuable cross-training opportunities across agencies, governments, and jurisdictions. Reach out to Strathcona Regional District and the City of Campbell River to discuss and organize.	WWKN (participating agencies, governments, etc.)	Ongoing (yearly at minimum)	One wildfire (or other emergency) tabletop exercise participated in each year for both Cape Mudge Village	WWKN (cost to government ~\$1,000/yr)

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						and Quinsam Reserve	
23	1) High 2) High	WWKN should facilitate... 1) Local FireSmart Representative (LFR) Training, and 2) FireSmart Community Champion Training ... opportunities for applicable WWKN emergency management personnel along with Cape Mudge Village and Quinsam Reserve residents.	Increase WWKN as well as Cape Mudge Village and Quinsam Reserve residents' capabilities to provide FireSmart knowledge, programs, and resources to the communities.	WWKN (FireSmart Canada)	3 years	1 LFR for both Cape Mudge Village and Quinsam Reserve within 1 year	UBCM CRI funding is available (~\$2000/16 hrs per person)
Emergency Planning (Section 5.6)							
<i>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 WWKN's ability to respond to (during and after) a wildfire emergency.</i>							
24	High	Recommendations that may improve fire response for Cape Mudge Village and Quinsam Reserve from the 2021 Quadra Island CWRP and 2020 City of Campbell River CWPP should be lobbied for by WWKN. Example: WWKN should lobby the City of Campbell River to increase the staffing at the No. 2 Fire Hall which is only staffed during the daytime hours 7 days a week. Response to the WWKN during evening would be greatly improved with the No. 2 Fire Hall fully staffed 24/7.	Since firefighting equipment and training is limited in both communities, advocating for increased fire response from the contracted fire departments is key to ensuring the safety of residents and structures.	WWKN (Quadra FD, City of Campbell River, and Campbell River FD)	3 years	Recommendations from both reports specific to increasing fire response for Cape Mudge Village and Quinsam Reserve were approved for Quadra FD and Campbell River FD	WWKN (time and cost amount of engagement)
25	High	Conduct yearly (pre-fire season is best) response exercises for Cape Mudge Village and Quinsam Reserve. Identify hazards, barriers to access (i.e., locked gates, tight or no turnarounds), and other response issues and develop measures to address them.	Consider adding this into an all-hazards response exercise day for maximum participation. Reach out to the Strathcona Regional District, Quadra FD, and Campbell River FD to plan and coordinate.	WWKN (BCWS, Local Fire Departments, etc.)	Yearly (pre-fire season)	Response exercises conducted at least once every two years	WWKN (80 planning hours; 8 person-hours per person per exercise)

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26	High	Update WWKN's Hazard, Risk, and Vulnerability Analysis (HRVA) and 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 shared with fire suppression personnel and BCWS 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.	WWKN (Consultant, BCWS, regional partners, stakeholders)	5 years	Wildfire incident plans and associated maps were created and made available	WWKN (Cost to government. 12 planning hours and ~\$8,000 contracted service)
27	High	Most critical infrastructures (CI) in Cape Mudge Village and Quinsam Reserve that require electricity don't have backup power sources (i.e., gas- or diesel-powered generators). Invest in secondary power sources to continue the services of these critical infrastructures in the case of a prolonged or extensive power outage as a result of a wildfire (or another emergency). Upgrade or realign resources, as prioritized.	Ensure that backup gas or diesel generators have sufficient fuel supply for extensive power outages (3 + days) so that they can continue to function as required in the event of an emergency.	WWKN	5 years	All CI that require electricity have backup power sources	WWKN (~\$30,000 per CI - depending on requirements)
28	High	Consider consolidating/streamlining emergency action guidelines used by adjacent jurisdictions (i.e., Strathcona Regional District, City of Campbell River). Reach out to them and see what they have in place and if they should be copied or referenced to by WWKN.	Emergency planning may be improved by implementing emergency guidelines that nearby jurisdictions use.	WWKN (Adjacent jurisdictions)	5 years	Nearby jurisdictions have been contacted and their emergency action guidelines have been reviewed	WWKN (~40 person-hours)

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29	1) High	1) Assist in reviewing and checking the compatibility all of the sprinkler units in Cape Mudge Village.	Increase the emergency firefighting capabilities of Cape Mudge Village and Quinsam Reserve.	WWKN (BCWS)	5 years	All sprinklers in Cape Mudge Village have been reviewed and checked for compatibility. Residents are trained on any firefighting equipment in both communities.	WWKN (Time and cost dependent on level of effort)
	2) High	2) Recommend other firefighting equipment Cape Mudge Village and Quinsam Reserve could purchase. Schedule training on newly purchased and current firefighting equipment in both communities.					
30	High	Hire a full-time FireSmart coordinator to lead WWKN's FireSmart programs in both Cape Mudge Village and Quinsam Reserve.	Alternatively, WWKN can reach out to the City of Campbell River and SRD to see if there is an opportunity to collaborate and cost share a full time FireSmart Coordinator position. Any approved funding would offset the cost to each partner.	WWKN (City of Campbell River and SRD may be involved)	5 years	A full-time FireSmart coordinator for We Wai Kai Nation or a shared FireSmart coordinator with local governments	UBCM CRI funding is available
Vegetation Management (Section 5.7)							
<i>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.</i>							
31	High	Proceed with detailed assessment, prescription development, and treatment of fuel treatment units identified and prioritized in this CWRP.	High priority treatment units should be prescribed and implemented first.	WWKN (Consultant)	5 years	Prescriptions developed and treatments implemented for all units.	UBCM CRI funding is available (~\$700/ha prescription; ~\$9500/ha treatment)
32	High	Where operational fuel treatments are conducted, treatment monitoring 5-10 years afterwards should be completed by a qualified professional. This can be	To assess the efficacy of the treatment and schedule maintenance activities. It is cheaper to perform maintenance early	WWKN (Consultant)	Maximum 10 years post-treatment	All completed fuel treatments are reassessed	UBCM CRI funding is available

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		completed with a CWRP update or as a stand-alone exercise.	when conifer regeneration is small and fuel loading amounts are low.			5-10 years after treatment	(~\$150/ha for assessment)
33	High	In the future, We Wai Kai Nation's trained Local FireSmart Representatives (LFRs) should assist Cape Mudge Village and Quinsam Reserve residents in complying with FireSmart vegetation management principles at both the home and community level.	Increase wildfire resiliency throughout Cape Mudge Village and Quinsam Reserve by collectively FireSmarting homes.	WWKN (LFR's – when completed training)	5 years, and then ongoing.	LFR's in Cape Mudge Village and Quinsam Reserve. LFR's are active in promoting FireSmart	WWKN (~\$500 per home)
34	High	Implement a yearly community/ neighbourhood chipping program in both Cape Mudge Village and Quinsam Reserve. Education of FireSmart yard and landscaping principles, including chipping specifications should be incorporated into the program.	To reduce wildfire hazard on private properties within the WUIs and promote FireSmart vegetation management knowledge and education.	WWKN	Yearly	Continued high amount of participation by WWKN residents in both communities	UBCM CRI funding is available (Costs/time in line with previous year)
35	Moderate	As part of fuel treatment implementation, WWKN should develop interpretive signage to explain and describe pre- and post-fuel treatment forest stand conditions.	Increase citizen awareness and support of fuel management practices.	WWKN	1-year post-treatment of a MUDGE-# PTU	Signs placed in one MUDGE-# PTU	UBCM CRI funding is available (~\$750/sign)

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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
CRI	Community Resiliency Investment
CWPP	Community Wildfire Protection Plan
CWRP	Community Wildfire Resiliency Planning
DPA	Development Permit Area
EMBC	Emergency Management British Columbia
FBP	Fire Behavior Prediction System
FNESS	First Nations' Emergency Services Society of British Columbia
FSCCRP	FireSmart Canada Community Recognition Program
HIZ	Home Ignition Zone (also see Structure Ignition Zone)
HRVA	Hazard Risk and Vulnerability Analysis
ISC	Indigenous Services Canada
LRMP	Land and Resource Management Plan
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
NDT	Natural Disturbance Type
PSTA	Provincial Strategic Threat Assessment
OCP	Official Community Plan
SWPI	Strategic Wildfire Prevention Initiative
UBCM	Union of British Columbia Municipalities
UTG	Uchucklesaht Tribe Government
VAR	Values at Risk
WRA	Wildfire Response Agreement
WRR	Wildfire Risk Reduction
WUI	Wildland Urban Interface
WWKN	We Wai Kai Nation

SECTION 1: INTRODUCTION

In May 2021, B.A. Blackwell and Associates Ltd. was retained to assist We Wai Kai Nation (WWKN) in developing a Community Wildfire Resiliency Plan, hereinafter referred to as the CWRP. This CWRP focuses 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).⁷ 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 to We Wai Kai Nation's populated reservation lands (Cape Mudge Village and Quinsam Reserve), to describe the potential consequences of wildfire to the communities, and to examine options and strategies to reduce wildfire risks. This CWRP provides a reassessment of the level of wildfire risk to the WUIs and gives WWKN 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 homes and critical infrastructure from wildfire, and
- 3) Reduce wildfire behaviour threats within the WUIs.

To help guide and accomplish the above strategies, this CWRP will provide WWKN's emergency planners and land and resource managers with:

- 1) An updated assessment of wildfire risk to Cape Mudge Village and Quinsam Reserve,
- 2) An updated assessment of values at risk and potential consequences in the event of a wildfire,
- 3) Updated 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
- 5) Options and strategies to reduce wildfire risk in the seven FireSmart disciplines: education, legislation and planning, development considerations, interagency cooperation, cross-training, emergency planning, and vegetation management.

⁷ 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).

1.2 PLAN DEVELOPMENT SUMMARY

The CWRP development process consisted of five general phases:

- 1) Consultation involving key WWKN representatives, structural and wildfire specialists, and stakeholders. This included WWKN current Chief Administrative Officer (Steve Wilson), WWKN past Chief Administrative Officer (Stephen Conway), WWKN Lands Assistant (Samantha Chickite), WWKN Proposal Writer (Jason Price), WWKN Housing Co-ordinator (Anthony Smith), WWKN Public Works Manager (Murray Abercrombie), and BCWS North Island Mid Coast Fire Zone Wildfire Technician (Kate McLean).
- 2) Information sharing with First Nations (see Appendix G: List of First Nations and Associated Governments Consulted) and other stakeholders.
- 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).

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

We Wai Kai Nation's emergency preparedness and response for Cape Mudge Village and Quinsam Reserve can be found within their respective Emergency Plans from 2019. Within each plan, roles and responsibilities are defined for the Chief & Council, Chief Administrative Officer, Emergency Program Coordinator, and Emergency Management Committee with regards to the activation of the emergency plan, emergency organization, evacuation processes, and coordinating post-disaster relief programs and assistance.

2.2 LINKAGES TO OTHER CWPPS/CWRPS

Quadra Island 2011 CWPP⁸

B.A. Blackwell & Associates completed a CWPP in 2011 for Quadra Island. We Wai Kai Nation's Cape Mudge Village reservation land was included in the AOI for this plan. Recommendations relevant to this CWRP include:

- Improvement to access. Ensuring that the gates on Sutil Road can be unlocked by residents and emergency personnel during a wildfire event will provide a secondary egress and access route for the Cape Mudge area (removal of the boulder at the north end of the road and replacement with a gate is also a key part of developing this route).

City of Campbell River 2020 CWPP

Strategic Natural Resource Consultants completed a CWPP in 2020 for the City of Campbell River⁹. We Wai Kai Nation's Quinsam Reserve was included in the AOI for this plan. Recommendations relevant to this CWRP include:

- Developing a plan to create FireSmart Communities. The FireSmart program relies on local personnel to guide neighborhoods.
- Creating a wildfire specific Emergency Response Plan for the City of Campbell River.

⁸ B.A. Blackwell & Associates LTD is currently updating the Quadra Island CWPP. When completed, WWKN should look to it for recommendations that compliment each other working towards shared wildfire resiliency.

⁹ Strategic Natural Resource Consultants, 2020. City of Campbell River CWPP.

2.3 WE WAI KAI NATION'S COMPREHENSIVE COMMUNITY PLAN

A Comprehensive Community Plan (CCP) 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 2 below summarizes the objectives and policies within We Wai Kai Nation's 2019 CCP that are directly relevant to community wildfire resilience.

Table 2: Summary of We Wai Kai Nation's 2019 Comprehensive Community Plan emergency and wildfire-related objectives and policies, and their relationship to this CWRP

Section, Sub-section, Goal	Description and Relationship to CWRP
Chapter 3: We Wai Kai Community Wellbeing - Emergency Services at Cape Mudge	Work with the community, Community Paramedics, Island Health and KDC to identify gaps and create solutions. Continue to build internal capacity for emergency health care. <ul style="list-style-type: none"> Identified as critical infrastructure in section 3.2, the Health Centre and other structures in Cape Mudge Village vital to emergency shelter and health care should be adequately protected from wildfire.
Chapter 8: Climate Change - Climate Change Action Plan	Work with climate change experts to develop a We Wai Kai specific Climate Action Plan. <ul style="list-style-type: none"> Discussed in section 4.1, climate change is expected to exacerbate wildfire conditions across BC and this should be addressed in the Climate Action Plan when developed.
Chapter 8: Climate Change - Fire Protection	Develop a wildfire response plan to protect members and properties. Create a Fire Chief position. Assess fire hazards within the communities (houses, dry grass, dead trees). <ul style="list-style-type: none"> Addressed in section 5.3, home and critical infrastructure assessments should be completed in Cape Mudge Village and Quinsam Reserve to increase fire resiliency in those communities. Maps and recommendations from this CWRP, especially Section 5.6 Emergency Planning, should be incorporated into the plan.
Chapter 8: Climate Change - Smoke from Wildfires	Identify and develop clean air stations/facilities. Work with Elders to ensure air filtration in homes. <ul style="list-style-type: none"> Discussed in section 2.4, promoting clean air on We Wai Kai reserve lands via the Clean Air Law is essential in keeping We Wai Kai Nation citizens safe and healthy. Smoke from wildfires is a major hazard and health risk, especially to the elderly and those vulnerable to lung and breathing issues.

2.4 WE WAI KAI NATION LAWS

Table 3 below contains existing WWKN laws which are directly relevant to wildfire risk reduction, emergency response, and community resilience post-disaster.

Table 3: Summary of WWKN wildfire and emergency-related laws and their relation to this CWRP

We Wai Kai Law	Description and Relationship to CWRP
2008 Land Code	We Wai Kai Nation has developed a Land Code under the First Nations Land Management Act, which if ratified by We Wai Kai electors ("Electors") will replace existing Indian Act rules for the administration of existing and future We Wai Kai

We Wai Kai Law	Description and Relationship to CWRP
	<p>reserve lands (“We Wai Kai Lands”). It gives the Nation control over its own Reserve lands. This enables We Wai Kai to make business and administrative decisions in a timelier manner. [According to the 2012 Land Use plan, the Land Code was ratified in the fall of 2009]</p> <ul style="list-style-type: none"> • <i>Allows for quicker decision making which may result in increased resiliency to disasters, including wildfire, within each community.</i>
<p>2015 Residential Zoning Law</p>	<p>We Wai Kai Nation has developed a Residential Zoning Law for We Wai Kai Lands. The various land uses are depicted in the We Wai Kai Nation Land Use Plan, which provides specific regulations and permitted uses for each of the zones. This Residential Zoning Law applies to existing residential areas as well as those lands designed as "Future Residential Lands". These Residential and Future Residential Lands are intended only for the use and occupation of We Wai Kai Citizens.</p> <ul style="list-style-type: none"> • <i>Regulates various land uses within the We Wai Kai Lands which may protect development from hazards, including wildfire.</i>
<p>2016 Timber Cutting and Removal process and permit policy</p>	<p>We Wai Kai Nation Timber Cutting and Removal process and permit policy is developed to govern forestry operations on reserve lands by ensuring that all forest practices on reserve land are carried out in accordance with the We Wai Kai Nation’s environmental and cultural values as well as the Provincial regulations and legislation.</p> <ul style="list-style-type: none"> • <i>Prohibits leaving green waste from forestry operations, which helps decrease surface woody debris accumulations, thus reducing the fuel loading hazard risk within the WUI.</i>
<p>2021-8 Clean Air Law</p>	<p>The general objective and purpose of this Law shall be to regulate burning and the emission of air pollutants and promote clean air on We Wai Kai Lands.</p> <ul style="list-style-type: none"> • <i>Grants the Chief authority to impose a fire ban. Regulating burning, and banning it during times of high or extreme fire weather ratings, will lead to a lower chance of wildfire ignitions on We Wai Kai Lands.</i>

2.5 WE WAI KAI NATION LAND USE PLAN¹⁰

The 2012 We Wai Kai Nation Land Use Plan is the higher-level planning document for all five designated We Wai Kai reserve lands. The Land Use Plan goals are to:

1. Provide for a range of housing types and opportunities on Reserve and target residential development at Quinsam and Cape Mudge.
2. Ensure there is opportunity for a variety of economic activities that create employment and provide financial returns to WWK.
3. Ensure that environmentally and culturally sensitive areas are protected from development and that environmentally sustainable options are pursued.
4. Provide a full range of recreational and cultural opportunities available to residents living in both communities.

¹⁰ We Wai Kai Nation, 2012. We Wai Kai Nation Land Use Plan.

5. Ensure there is a "town centre" in both Quinsam Reserve and Cape Mudge Village which focuses on the development of community facilities.

2.6 LINKAGES TO HIGHER LEVEL PLANS AND LEGISLATION

Table 4 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. All proposed treatment units herein are solely on We Wai Kai Nation reservation lands.

Table 4: Higher Level Plans and Relevant Legislation on Crown Land within the WUI

Plan/Legislation	Description and Relationship to CWRP
Land Use Plans	<p>Vancouver Island Land Use Plan¹¹</p> <ul style="list-style-type: none"> • <i>The Vancouver Island Land Use Plan (VLUP) is the higher-level planning document for all of Vancouver Island (this includes Quadra Island/Cape Mudge). The plan provides strategic direction for the following categories: 1) Protected Areas Network; 2) Forest Land Base; 3) Regional Biodiversity Direction; 4) Food Production Activities; 5) Settlement Lands; 6) Energy and Mining Opportunities; 7) Integrated Coastal Management; and 8) Community Stability. The plan also identifies Land Use Zones, which are used to delineate areas which require specific management. No sections of the VLUP deal specifically with wildfire or fuel management.</i>
BC Provincial Open Burning Smoke Control Regulation (OBSCR) ¹²	<p>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.</p> <ul style="list-style-type: none"> • <i>Both the Quinsam and Cape Mudge WUI's are within the High Smoke Sensitivity Zone.</i> • <i>All proposed treatment units are within the High Smoke Sensitivity Zone.</i>

¹¹ The Province of BC, 2000. Vancouver Island Strategic Land Use Plan.

¹²<https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/regulations/openburningregulation>

SECTION 3: COMMUNITY DESCRIPTION

We Wai Kai Nation's (WWKN) Quinsam Reserve and Cape Mudge Village reservations are situated in close proximity to Campbell River on the east side of Vancouver Island. Cape Mudge Village lies in the southwest corner of Quadra Island and encompasses a total area of 447 hectares, while Quinsam Reserve is within the western boundary of the City of Campbell River and covers a total of 122 hectares.

WWKN has approximately 1200 citizens, with half of them living on reserve and the other half living off reserve. The citizens on reserve all live in either Quinsam Reserve, where 60 percent of the Nation's houses are, or Cape Mudge Village, which is home to the other 40 percent. Quinsam Reserve is home to, among other things, the Quinsam Crossing Economic Development Area, which includes a gas station, liquor store, restaurant, learning centre and the Band Administration Offices. Cape Mudge Village amenities include a swimming pool, church, pre-school and the Tsa-Kwa-Luten Lodge.

Emergency management, building and development, and land use planning are provided to Quinsam Reserve and Cape Mudge Village by We Wai Kai Nation. Drinking water and sewer service are provided to Quinsam by the City of Campbell River and to Cape Mudge by We Wai Kai Nation. In both Quinsam Reserve and Cape Mudge Village, solid waste management is performed by private contractors or reserve residents and BC Hydro supplies electricity.

The land in Quinsam Reserve is flat and shaped by bedrock. However, Cape Mudge Village is coastal and dominated by sedimentary marine deposits. These sediment deposits, along with sections of steep slopes and benches, are the reason for slope instability in Cape Mudge Village. This geographic region receives approximately 1,409 mm of average annual precipitation, with the vast majority falling as rain¹³. The forest stands in both areas are mostly second-growth comprised of western hemlock, western red cedar and Douglas-fir trees.

Cape Mudge Village and Quinsam Reserve are within the BC Wildfire Service (BCWS) North Island Mid Coast Fire Zone, which is part of the Coastal Fire Centre. Structural fire protection to Cape Mudge Village is contracted to Quadra Island Volunteer Fire Department, while structural fire protection to Quinsam Reserve is contracted to Campbell River Fire Department (Campbell River FD). Provincial wildfire response agreements¹⁴ are in place between the BC Office of the Fire Commissioner (OFC) and the Fire Chiefs Association of BC. The closest BCWS fire base for both communities is the Quinsam Fire Base, located in Campbell River adjacent to the Quinsam Reserve.

3.1 AREA OF INTEREST AND WILDLAND-URBAN INTERFACE

The Area of Interest (AOI) for the CWRP are We Wai Kai Nation's populated reservation lands: Cape Mudge Village and Quinsam Reserve. The associated eligible Wildland Urban Interfaces (WUIs) represent a one-

¹³ <https://www.campbell-river.climateemps.com/precipitation.php>

¹⁴ Information on WRA's can be accessed here: <https://pfla.bc.ca/wildfire-response-agreements-what-are-they/>

kilometer buffer around a structure density of 6+ structures/km² within each AOI and define the focus of this CWRP.

The Quinsam Reserve WUI encompasses a total of 858.5 hectares. Table 5 below shows the ownership breakdown by area (hectares) and percent of WUI. First Nation reserve land is categorized as Federal, and totals 14% of the WUI. Outside of the reserve land, the majority of the land base in the WUI is private (41%).

Table 5: Land Ownership within Quinsam Reserve's WUI

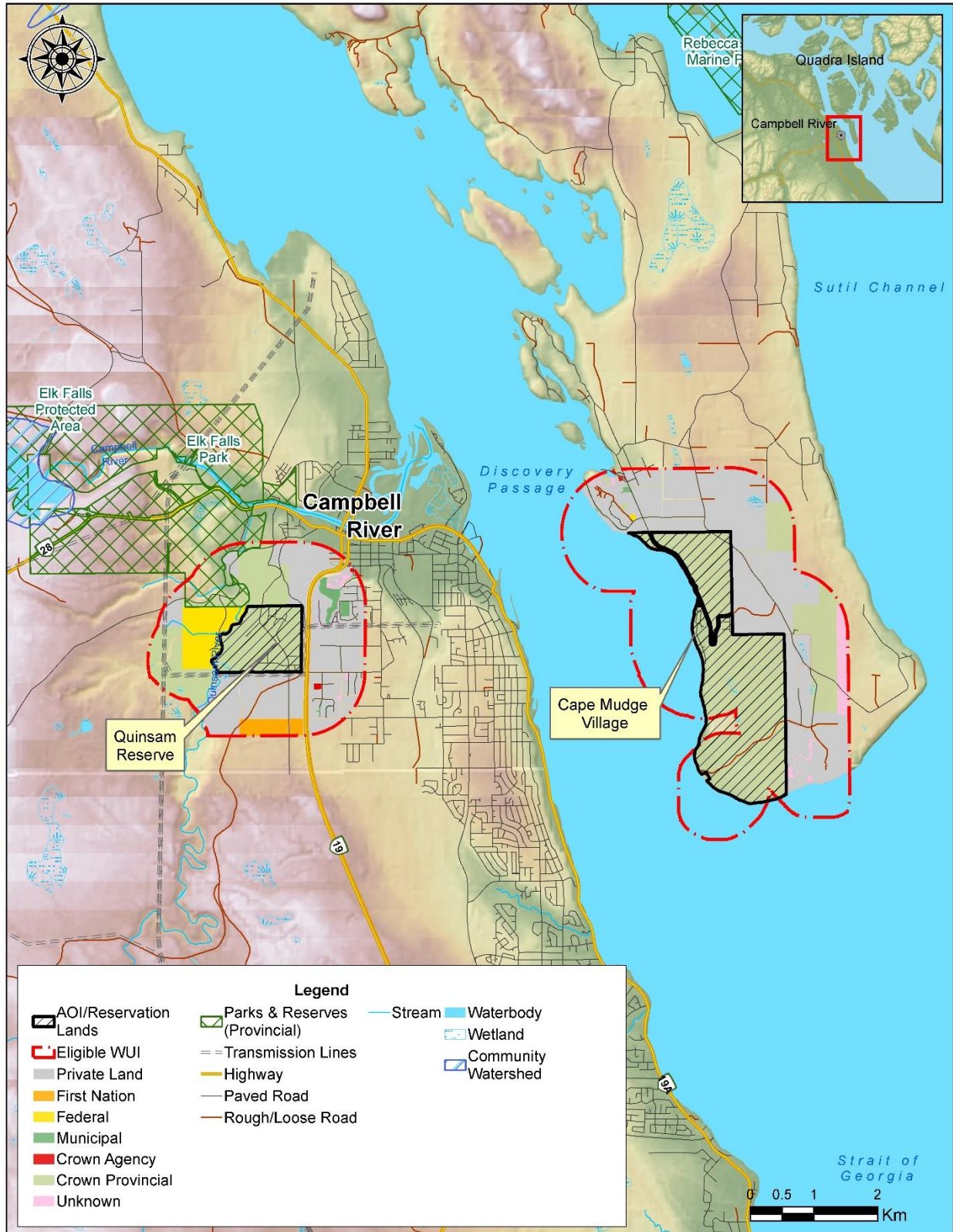
Land Ownership	Area (ha) in WUI	Percent Area of WUI
Quinsam Reserve (Federal)	121.6	14.2%
Crown Agency	1.3	0.2%
First Nation	25.2	2.9%
Crown Provincial	270.9	31.6%
Federal (non-reserve)	70.3	8.2%
Municipal	13.9	1.6%
Private	348.8	40.6%
Unknown	6.5	0.8%
Total	858.5	100%

The Cape Mudge Village WUI encompasses a total of 1,703.4 hectares, of which 542.8 hectares (32%) is ocean. Table 6 below shows the ownership breakdown by area (hectares) and percent of WUI. First Nation reserve land is categorized as Federal, and totals 26% of the WUI. Outside of the reserve land, and other than ocean, the majority of the WUI's land base is private (32%). If the area covered by ocean is removed, First Nation reserve land totals 39% of the WUI and private land totals 47%.

Table 6: Land Ownership within Cape Mudge Village's WUI

Land Ownership	Area (ha) in WUI	Percent Area of WUI
Cape Mudge Village reserve (Federal)	446.7	26.2%
Crown Agency	1.0	0.1%
Crown Provincial	127.7	7.5%
Federal (non-reserve)	0.9	0.05%
Municipal	0.9	0.05%
Private	546.9	32.1%
Unknown	36.4	2.1%
Ocean	542.8	31.9%
Total	1,703.4	100%

The AOI, WUI, and land ownership types for Cape Mudge Village and Quinsam Reserve are shown below on Map 1.



Map 1: Area of Interest and Wildland Urban Interface for Cape Mudge Village and Quinsam Reserve

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 for Cape Mudge Village is shown on Map 2 and for Quinsam Reserve on Map 3, while Table 7 and Table 8 detail the inventory of critical infrastructure identified in each WUI.

3.2.1 EMERGENCY RESPONSE, PUBLIC SERVICES, AND COMMUNICATIONS

In the event of an evacuation order for Cape Mudge Village or Quinsam Reserve, We Wai Kai Nation is responsible for offering support services, including reception centres, emergency operation centres, and evacuation means. In Cape Mudge Village, the Administration Hall & Health Centre acts as the emergency response centre for the community. In Quinsam Reserve, the We Wai Kai Administration Office is the primary emergency response centre. The Quinsam Centre acts as the health centre and alternate emergency response centre for the community.

Refuse for Quinsam Reserve is disposed of by residents at the Campbell River Waste Management Centre. In Cape Mudge Village, residents must arrange with private contractors for refuse to be picked up.¹⁵

There is cellular and internet coverage provided by Telus Communications Inc. and Rogers Communications Inc. to both Quinsam Reserve and Cape Mudge Village.

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 service for both Quinsam Reserve and Cape Mudge Village is provided by BC Hydro and received through a network of wooden pole distribution lines. In the event of a wildfire, BC Hydro will work with WWKN, municipal and regional emergency personnel and employ their emergency response protocols.¹⁶ Utility right-of-way best management practices such as regular brushing and clearing of woody debris and shrubs are employed to help reduce fire risk, utility pole damage, and subsequent outages.

Secondary power sources are important to reduce 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. This is discussed further in Section 5.6.

¹⁵ Information shared via information gathering questionnaires sent to WWKN in September and December of 2021.

¹⁶ <https://www.bchydro.com/safety-outages/emergency-preparation.html>

3.2.3 WATER AND SEWAGE

Water is provided to Cape Mudge Village by a well, reservoir, and pump station system located upslope from the community. Drinking water is treated on-site, and all water is gravity-fed from the reservoir. The reservoir holds 209,000 liters, and the wells have a back-up generator in case of an electrical failure. Water in Quinsam Reserve is provided by the City of Campbell River.

Both Cape Mudge Village and Quinsam Reserve have sewage systems. In Cape Mudge Village, sewage is pumped (via lift station) to an open air treatment pond at the back of the shoreline community behind the Village community hall. The lift station has no back-up power, but can hook up to the portable generator. The lift station also has an emergency overflow that is gravity/pressure triggered (and thus not dependant on power). In Quinsam Reserve, the community is connected to the City of Campbell River's sewage 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.

Two hazardous values were identified in Quinsam Reserve reservation land: the Shell gas station (in the south-east corner), and a large pile of stumps and other combustible wood-waste located south-west of the Treaty Society Building. Three hazardous values were identified in Cape Mudge Village reservation land: a log pile (for community firewood) surrounded by long grass directly south of the Administration Hall and Health Centre, two propane tanks (outdoors and uncovered) on the east side of the emergency supplies sea can, and chemicals for the pool stored in a small shed structure adjacent to the pool.

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, and
- 2) maintaining emergency fuel/propane emergency shut off procedures to be enacted immediately and efficiently in the event of an approaching wildfire or ember shower.

3.2.5 CULTURAL VALUES

There are no documented historic and archeological sites within the Quinsam Reserve WUI, however there is one overlap of an archeological site within the Cape Mudge Village WUI. 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 by the We Wai Kai Nation that should be known and managed for. In Quinsam Reserve, these include the Treaty Society Building and the Old

Community Hall. In Cape Mudge Village, these include Tsa-Kwa-Luten Lodge, Cape Mudge United Church, Cape Mudge Lighthouse and Nuyumbalees Cultural Centre.

WWKN, as well as other 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 and traditional use surveys 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. Community FireSmart Resiliency Committees provides an excellent platform for information sharing about cultural values.

Table 7: Critical Infrastructure and hazardous values within the Quinsam Reserve WUI

Critical Infrastructure Type	Critical Infrastructure Name	Coordinates	Address/Intersection
Emergency Response, Public Services, Electrical, Gas, and Communications			
Health Centre and Board Room	Quinsam Centre	50°01'00.6" N 125°17'19.4" W	2005 Eagle Drive, Campbell River
Administration	We Wai Kai Administration Office	50°01'06.4" N 125°17'26.9" W	Eagle Drive, south of Raven Crescent
Hazardous Values			
Combustible Materials	Quinsam Crossing Shell Gas Station	50°00'53.0" N 125°17'04.6" W	150 Brant Drive, Campbell River
	Stump and wood-waste dump site	50° 00'57.4" N 125°17'43.6" W	[west] End of Osprey Ave
Culturally Significant Sites and Structures			
Treaty Building	Treaty Society Building	50°01'01.7" N 125°17'23.4" W	South-west of Eagle Dr and Seahawk Dr intersection
Storage	Old Community Hall	50°01'06.8" N 125°17'28.6" W	Eagle Drive, south of Raven Crescent

Table 8: Critical Infrastructure and hazardous values within the Cape Mudge Village WUI

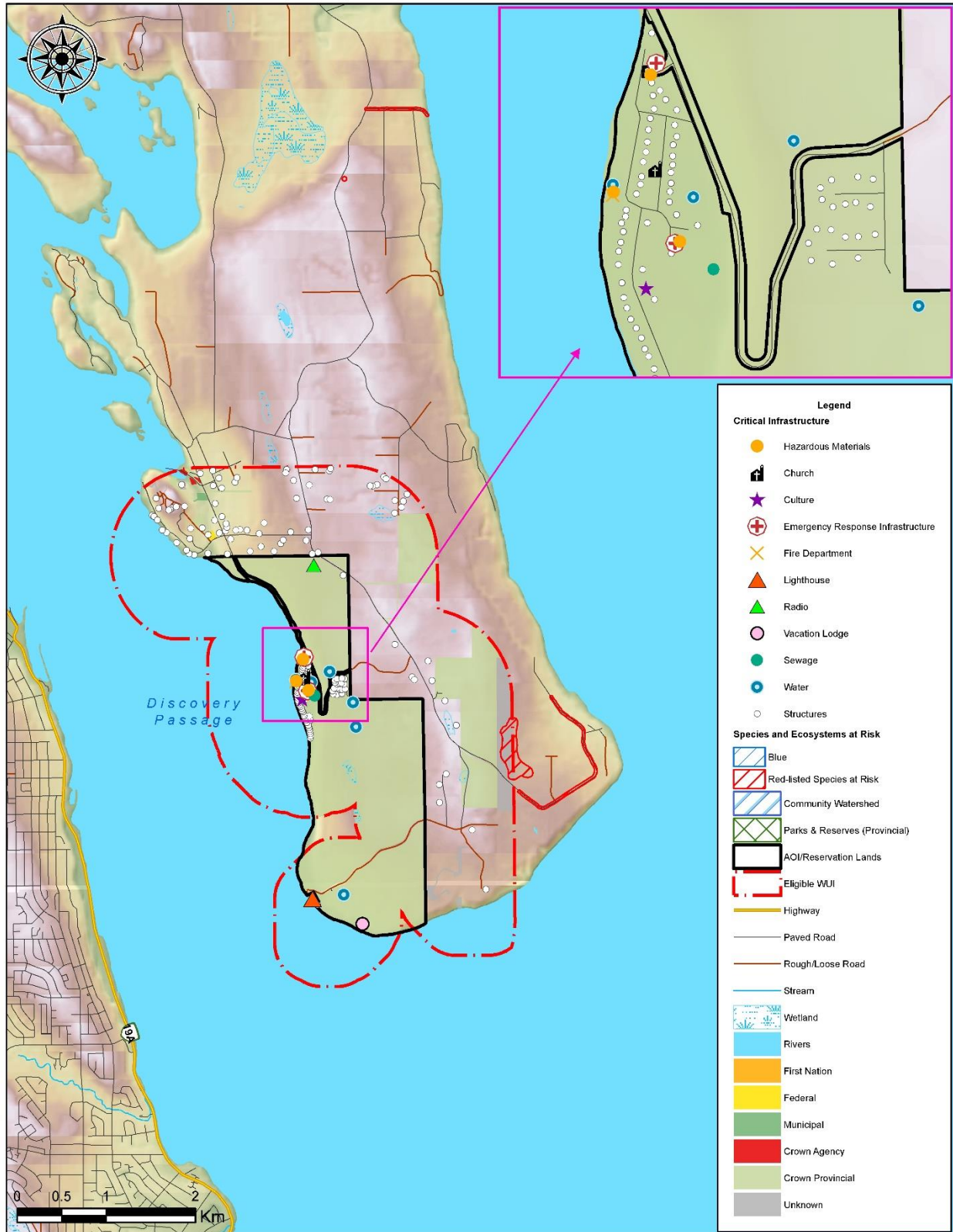
Critical Infrastructure Type	Critical Infrastructure Name	Coordinates	Address/Intersection
Emergency Response, Public Services, Electrical, Gas, and Communications			
Emergency Response Centre	Administration Hall and Health Centre	50°01'23.0" N 125°11'47.5" W	Intersection of where Green Road forks towards the ocean
Emergency Supplies	Sea can Containing Emergency Supplies	50°01'10.0" N 125°11'45.7" W	Southern point of Weway B Road
Communications	Radio Tower	50°01'55.9" N 125°11'41.0" W	573 Cape Mudge Road, Quathiaski Cove
Fire Response	Firefighting and Miscellaneous Equipment Building	50°01'14.0" N 125°11'52.1" W	West of Weway Road, adjacent to shore
Egress	Village Dock	50°01'23.0" N 125°11'47.6" W	Immediately west of the Administration Hall and Health Centre
Water and Sewage			
Water	Water Reservoir Tower	50°01'06.3" N 125°11'20.6" W	Southern end of Weway Flats
	Water Wells and Reservoir (used by lodge)	49°59'56.4" N 125°11'27.2" W	East of Cape Mudge Lighthouse, along Lighthouse Road
	Waterline	50°00'59.3" N 125°11'18.7" W	South of water reservoir tower
	Old Reservoir	50°01'17.6" N 125°11'33.5" W	West of Weway Road and Weway Flats intersection
	Old Water System	50°01'13.4" N 125°11'44.6" W	South-east of Cape Mudge United Church
	Swimming Pool	50°01'14.6" N 125°11'52.0" W	West of Weway Road, adjacent to shore
Sewage	Sewage Treatment Reservoir	50°01'08.9" N 125°11'41.8" W	East of emergency supplies sea can
Hazardous Materials			
Combustible Materials	Log Pile	50°01'21.9" N 125°11'47.9" W	Directly south of the Administration Hall and Health Centre
	Propane Tanks	50°01'10.9" N 125°11'45.0" W	East side of the emergency supplies sea can
	Pool Chemicals	50°01'14.2" N 125°11'51.9" W	Small shed structure adjacent to the pool
Culturally Significant Sites and Structures			
Vacation Lodge	Tsa-Kwa-Luten Lodge	49°59'45.9" N 125°11'16.2" W	1 Lighthouse Road, Quathiaski Cove
Church	Cape Mudge United Church	50°01'05.5" N 125°11'47.4" W	Weway B Road, Quathiaski Cove
Lighthouse	Cape Mudge Lighthouse	49°59'55.1" N 125°11'44.0" W	Lighthouse Road, Quathiaski Cove

Critical Infrastructure Type	Critical Infrastructure Name	Coordinates	Address/Intersection
Culture	Nuyumbalees Cultural Centre	50°01'06.9" N 125°11'47.5" W	34 Weway Road, Quathiaski Cove

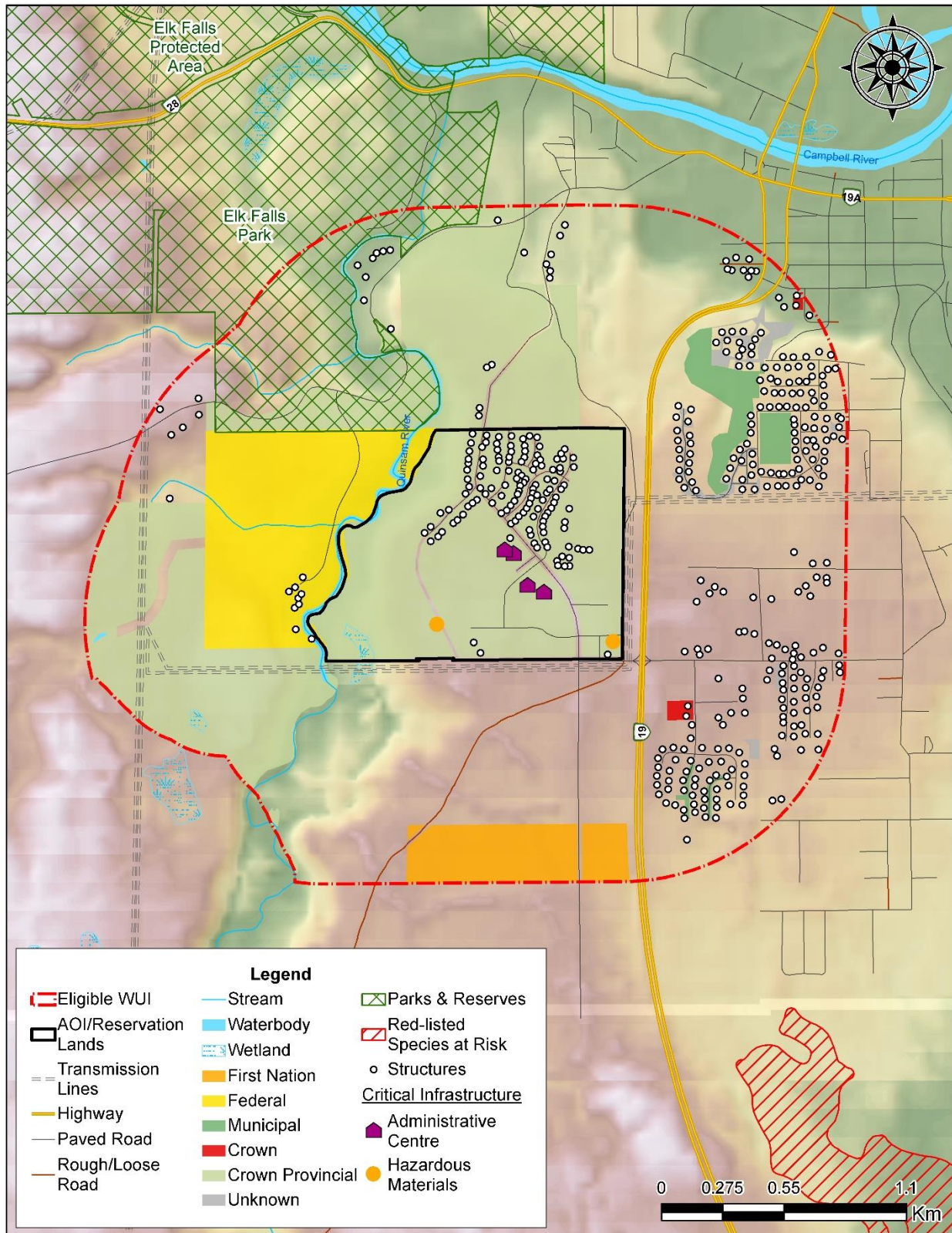
3.2.6 HIGH ENVIRONMENTAL VALUES

One known secured ecosystem or species at risk occurrence has been identified through the B.C. Conservation Data Center (CDC) that overlaps with the WUIs. However, it is proprietary and therefore unreleasable. All fuel management prescriptions must identify and mitigate potential impacts to any high environmental values identified in consultation with land managers and First Nations and may require mitigation measures for harvesting in some areas. Blue and Red-listed species at risk for Cape Mudge Village and Quinsam Reserve are also shown below on Map 2 and Map 3, respectively.

Elk Falls Provincial Park overlaps the northwest portion of Quinsam Reserve’s WUI, outside of the reservation lands. This area is frequented by the public that use its many trails for hiking and biking as well as fish in the Quinsam River. Additionally, the Quinsam River Hatchery, operated by the federal Department of Fisheries and Oceans, lies along the Quinsam River just west of the reserve.



Map 2: Critical Infrastructure and Species at Risk within the Cape Mudge Village WUI



Map 3: Critical Infrastructure and Species at Risk within the Quinsam Reserve WUI

SECTION 4: WILDFIRE RISK ASSESSMENT

This section summarizes the factors that contribute to local wildfire risk in the WUIs. Using verified and updated fuel types (Appendix A-1: Fire Risk Threat Assessment Methodology, Map 4 and Map 5) combined with field wildfire threat assessments and office-based analysis (Appendix A: Local Wildfire Risk Process), local wildfire risk for the WUIs were 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 each AOI that are most vulnerable to wildfire.

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

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

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 each 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 component¹⁷

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. Both of We Wai Kai Nation’s WUIs are characterized entirely by the CWHxm1: Coastal Western Hemlock Very Dry Maritime BEC subzone and variant. Historically, these forest ecosystems were usually even-aged, but sometimes post-fire regeneration periods produced stands with uneven-aged tendencies.¹⁸ However, logging over the last 100 years within the WUIs and surrounding areas along with a few historic wildfires in the early 1900s have left a mosaic of mostly even-aged forest stands. Forest health issues, both biotic and abiotic, can affect stand structure and fuel loading. The most notable forest health issue in the WUIs are large fires occurring after extended drought. The average return interval for these have been approximately 200 years.

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 field work

¹⁷ Province of Alberta

¹⁸ Forest Practices Code Biodiversity Guidebook. Accessed via:

<https://www.for.gov.bc.ca/ftp/hfp/external/!publish/FPC%20archive/old%20web%20site%20contents/fpc/fpcguide/BIODIV/chap2a.htm#ntv>

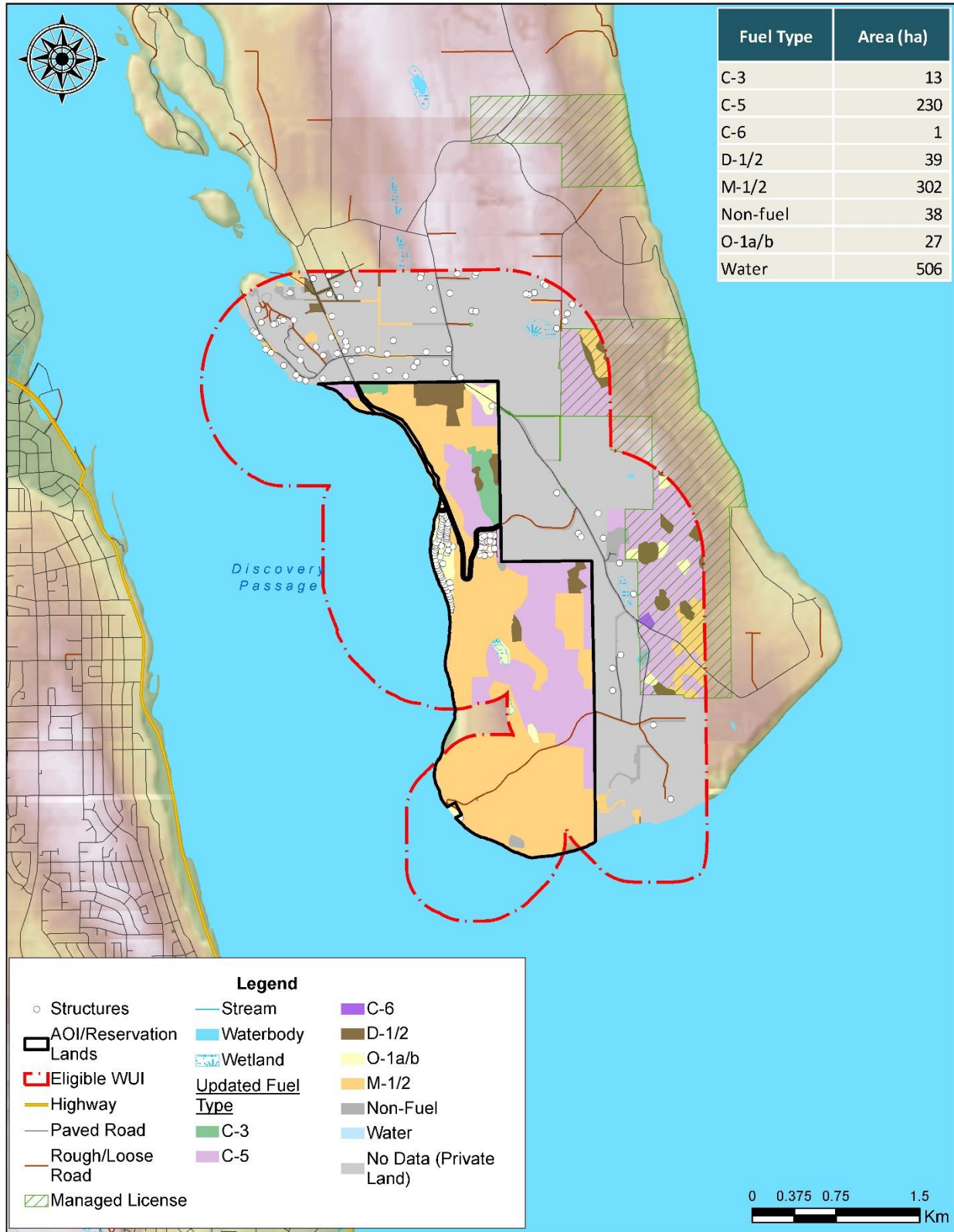
¹⁹ Forestry Canada Fire Danger Group. 1992. Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3.

verification) for the WUIs are detailed in Table 9 and Table 10 (excluding large waterbodies) and on Map 4 and Map 5 below. The main fuel type present in both WUIs that may be considered hazardous in terms of fire behaviour and firebrand spotting potential 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. 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-1a/b 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.¹⁹ Detailed fuel type descriptions and their associated wildfire risk can be found in Appendix A-1: Fire Risk Threat Assessment Methodology.

The two most prevalent fuel types in Cape Mudge Village’s WUI are C-5 and M-1/2. When excluding private land and large waterbodies, the C-5 fuel type totals 35.4% and the M-1/2 fuel type totals 46.4%.

Table 9: Updated fuel types (by assessable area and percent of WUI) within the Cape Mudge Village WUI, excluding large waterbodies

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.	12.5	1.9%
C-5	Well-stocked mature forest, crowns separated from the ground. Moderate understory herbs and shrubs. Little grass or surface fuel accumulation. Typically, undisturbed or selectively harvested forests.	230.2	35.4%
C-6	Pure, fully stocked conifer plantations with closed crowns and no understory or shrub layer. Typically, 15-25 years old.	1.2	0.2%
D-1/2	Deciduous stands/forest.	38.8	6.0%
M-1/2	Moderately well-stocked mixed stands of conifers and deciduous species, low to moderate dead stems and down woody fuels. Typically, areas harvested 10-20 years ago or floodplain forests.	302.2	46.4%
O-1a/b	Matted and standing grass communities; sparse or scattered shrubs; trees and down woody debris; areas harvested <7 years ago <i>with good slash management</i> .	27.4	5.9%
Non-fuel	Areas with no available fuel, such as gravel dumps, beaches, etc.	38.5	4.2%

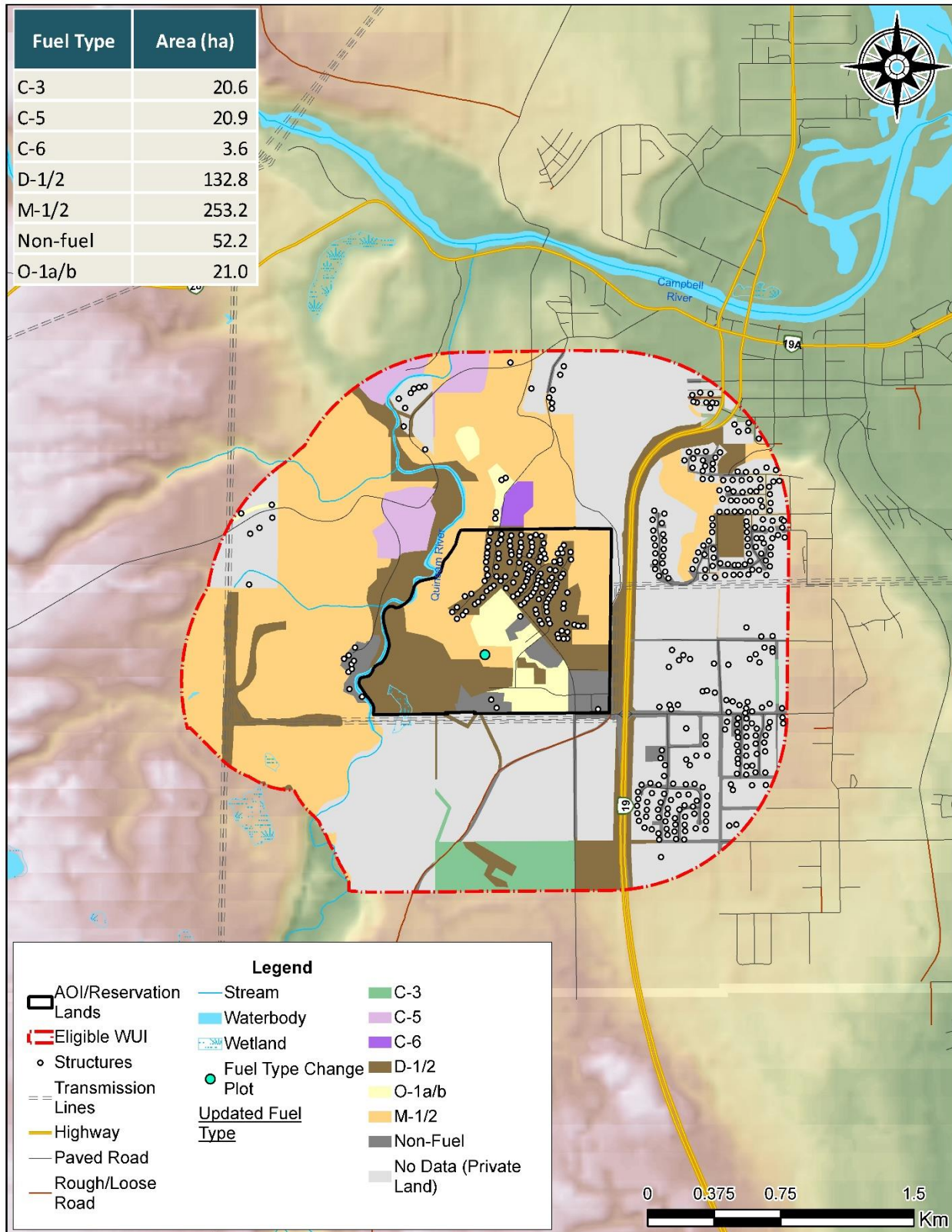


Map 4: Updated fuel types present in Cape Mudge Village's WUI

The two most prevalent fuel types in Quinsam Reserve’s WUI are M-1/2 and D-1/2. When excluding private land, the M-1/2 fuel type totals 50.2% and D-1/2 totals 26.3%.

Table 10: Updated fuel types (by assessable area and percent of WUI) within the Quinsam Reserve WUI

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.	20.6	4.1%
C-5	Well-stocked mature forests, crowns separated from the ground. Moderate understory herbs and shrubs. Little grass or surface fuel accumulation. Typically, undisturbed or selectively harvested forests.	20.9	4.1%
C-6	Pure, fully stocked conifer plantations with closed crowns and no understory or shrub layer. Typically, 15-25 years old.	3.6	0.7%
D-1/2	Deciduous stands/forest.	132.8	26.3%
M-1/2	Moderately well-stocked mixed stands of conifers and deciduous species, low to moderate dead stems and down woody fuels. Typically, areas harvested 10-20 years ago or floodplain forests.	253.2	50.2%
O-1a/b	Matted and standing grass communities; sparse or scattered shrubs; trees and down woody debris; areas harvested <7 years ago <i>with good slash management</i> .	21.0	4.2%
Non-fuel	Areas with no available fuel, such as gravel dumps, beaches, etc.	52.2	10.4%



Map 5: Updated fuel types present in Quinsam Reserve's WUI

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 for Cape Mudge Village and Quinsam Reserve. Considering fire danger varies from year to year, historical weather data can provide information on the number and distribution of days when each 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, which is located approximately 700 meters north of Quinsam Reserve and 6 kilometers west of Cape Mudge Village. This data is most applicable for inferring danger class days in both communities. It provides an 11-year fire weather data collection interval between the months of April and October.

According to Figure 2, fire weather in both WUIs is highest in August where an average of 11 days are ‘high’ danger class days and seven days are ‘extreme’ danger class. Overall, from July to September (peak fire season), a total of 25 of the 92 days (27%) over those three months are ‘high’ danger class days and 12 of the 92 days (13%) over the three months are ‘extreme’ danger class. This data illustrates that fire weather data in this area for the peak fire season is generally moderate to highly hazardous. Climate change trends are likely to increase the hazard in the future.

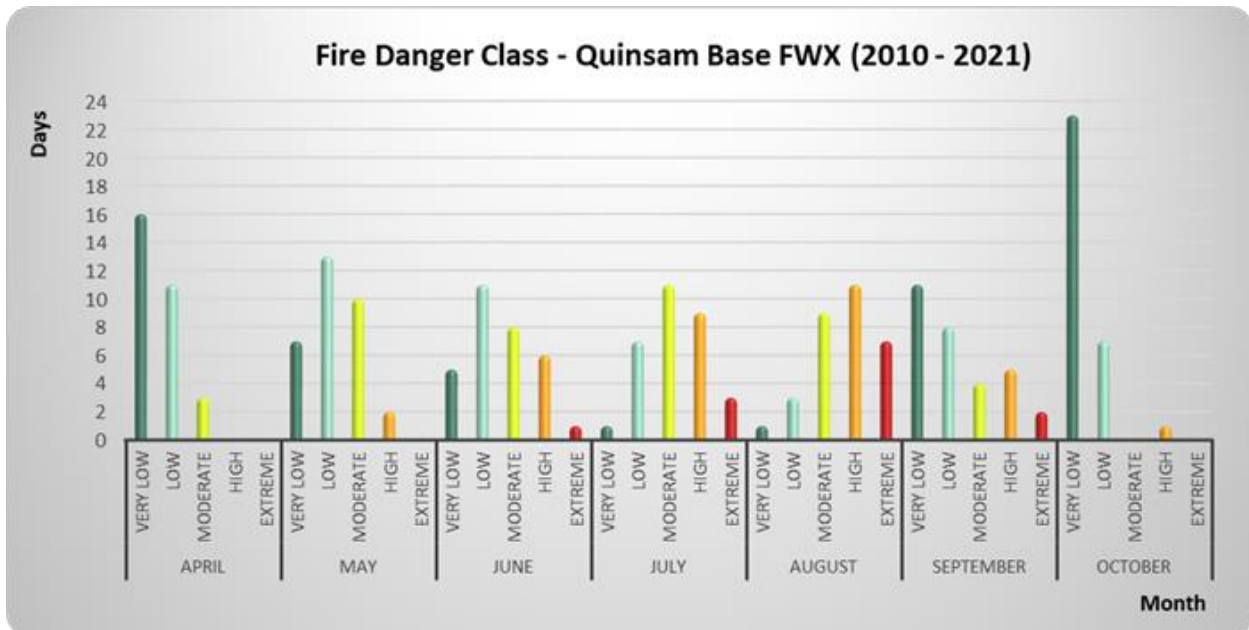


Figure 2: Average number of danger class days for the Quinsam Base BCWS fire weather station. Summary of fire weather data for the years 2010-2021

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 the *Climate Summary for the West Coast*²¹ the following climate predictions for the West Coast of BC are made, including Cape Mudge Village and Quinsam Reserve:

- Year-round moderate increases in temperature (an increase in mean temperature of 1.4°C by the 2050s).
- Decline in summer precipitation by approximately 10% by the 2050s. This trend is associated with drier fuels and soils, increasing fire behaviour potential.
- Increase in precipitation in other seasons - annual average of +6% by the 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.

Analysis of ISI data from the Quinsam Base BCWS weather station is best for inferring fire spread patterns for Quinsam Reserve. It shows that during the fire season (April – October) predominant winds originate from the northeast, driving fires in a southwest direction. Thus, the largest threat from fires to structures and values in Quinsam Reserve is from those fires that are northeast of them.

Analysis of ISI data from the TS Maurelle BCWS weather station is best for inferring fire spread patterns for Cape Mudge Village. It shows that during the fire season (April – October) predominant winds originate from the south (with some north influence), mostly driving fires in a north direction. Thus, the largest threat from fires to structures and values in Cape Mudge Village is from those fires that are south of them.

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>

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 11 shows the percent of the Cape Mudge Village and Quinsam Reserve WUIs by slope percent class and those classes fire behaviour implications. The vast majority of both WUIs (92%) are on less than 20% slope and will likely not experience accelerated rates of spread. 4% of the WUIs are likely to experience an increased rate of spread, 2% a high rate of spread, and 2% are likely to experience a very high or extreme rate of spread.

Table 11: Slope Class and Fire Behaviour Implications for the Cape Mudge Village and Quinsam Reserve WUIs

Slope	Percent of WUI	Fire Behaviour Implications
<20%	92%	Very little flame and fuel interaction caused by slope, normal rate of spread.
20-30%	4%	Flame tilt begins to preheat fuel, increasing rate of spread.
30-45%	2%	Flame tilt preheats fuel and begins to bathe flames into fuel, high rate of spread.
40-60%	1%	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, that value’s risk to increased fire behaviour can change dramatically – i.e., 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 as well as be impacted by increased amounts of preheating (convective heat). Table 12 summarizes the fire behaviour implications for slope position. A value located at the bottom of a slope is equivalent to a value on flat ground.

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.

Homes and critical infrastructure in Quinsam Reserve are all on flat ground and thus are associated with very little slope-driven flame and fuel interaction (the majority of the slopes recorded in Quinsam Reserve’s WUI are associated with major stream banks). In Cape Mudge Village, the homes and critical infrastructure vary in slope position – one part of the village is located on a flat shoreline bench, while the

other part of the village is located above this on an upper bench above a steep slope. The steep slope below the upper village can be associated with increased slope-driven flame and fuel interaction that causes high rates of fire spread. Managing fuel downslope of the homes and infrastructure there would reduce wildfire risk to those values.

4.2 WILDFIRE HISTORY

Historic Fire Regime

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

Both of We Wai Kai Nation's Quinsam Reserve and Cape Mudge Village WUIs are entirely characterized as being NDT 2 – ecosystems with infrequent stand-initiating events. When disturbances such as wildfires occurred, they were generally moderate in size, with some unburned areas as a result of terrain feature or high site moisture. The mean return interval for these disturbances is generally 200 years. 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.²⁴

Historical Wildfire Occurrences

Historical fire ignition and perimeter data for the Cape Mudge Village and Quinsam Reserve WUIs are depicted below in Map 6 and Map 7. Fire ignition data is available from 1950-2020 and fire perimeter data is available from 1919-2020 for both WUIs.

Based on the BCWS historical wildfire polygon dataset, wildfires in both WUI's are infrequent and ignitions rarely result in a wildfire event. The most recent fire overlapping Cape Mudge Village occurred in 1919, while the most recent fire overlapping Quinsam Reserve occurred in 1938.

Based on the BCWS historical fire ignition dataset, (shown below in Figure 3) almost all historical ignitions within both WUIs and the surrounding areas are human caused. Cape Mudge Village's WUI has experienced 11 recorded ignitions, of which only one was from lightning. Ignitions were relatively consistent at one to two per decade. Quinsam Reserve's WUI has experienced 12 recorded ignitions, all person caused. There were three ignitions in the 2000's, and four in the 2010's, showing an increasing trend. Overall, human-caused fires (including structure fires and machine fires) pose the highest wildfire ignition threat to both Cape Mudge Village and Quinsam Reserve.

²³ Province of British Columbia, 1995. Biodiversity Guidebook.

²⁴ 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.

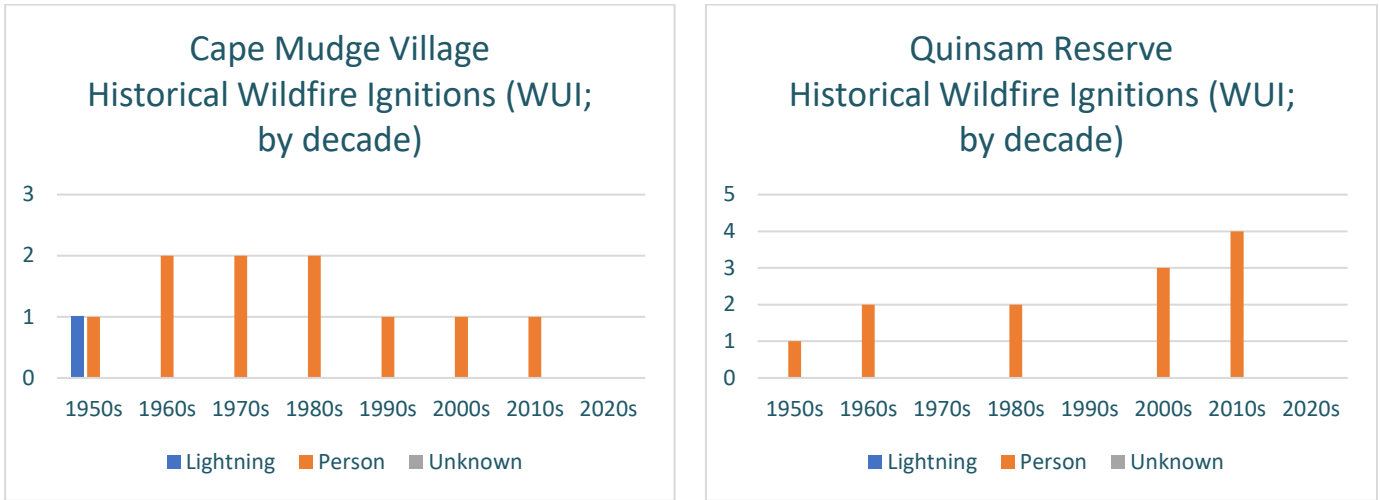
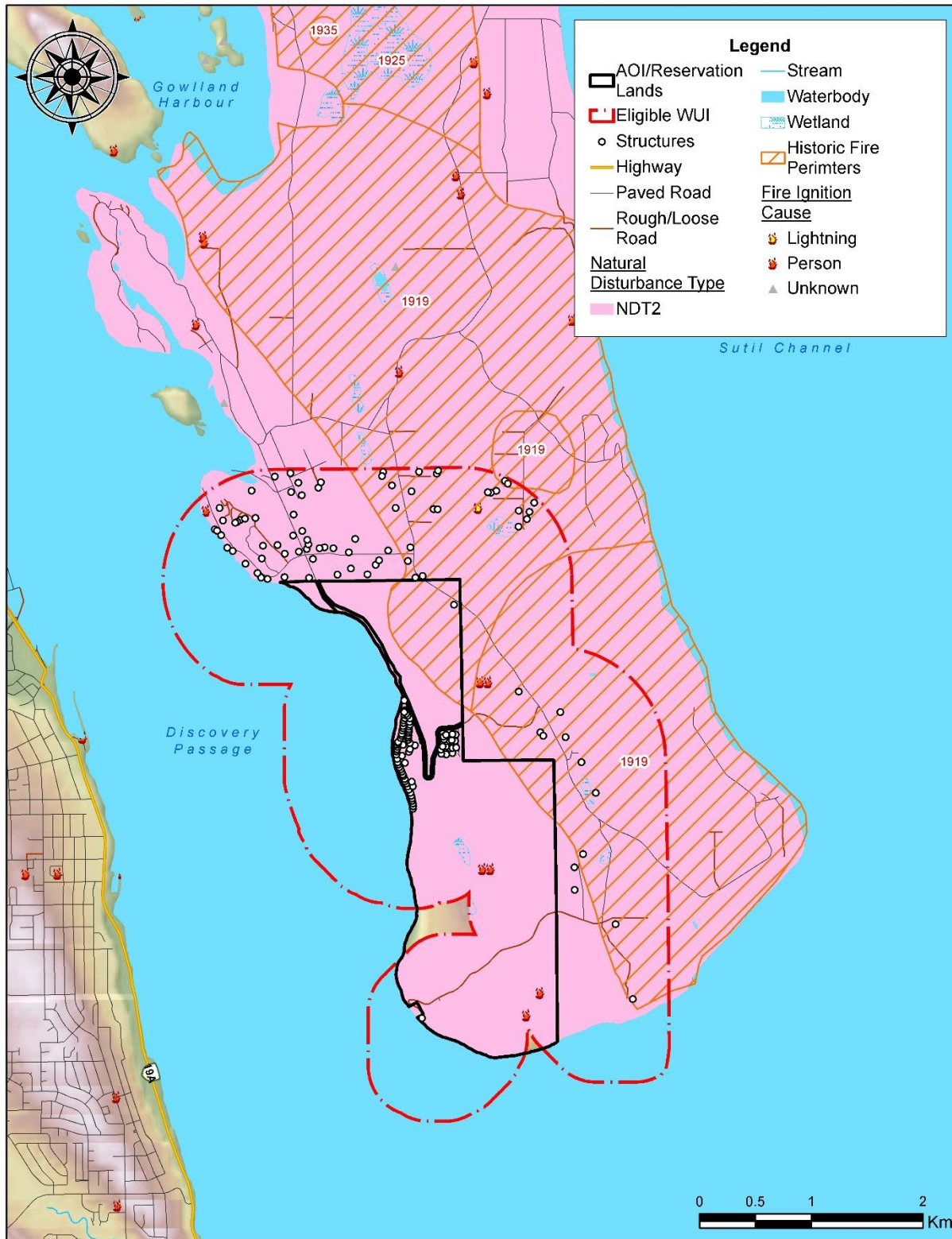
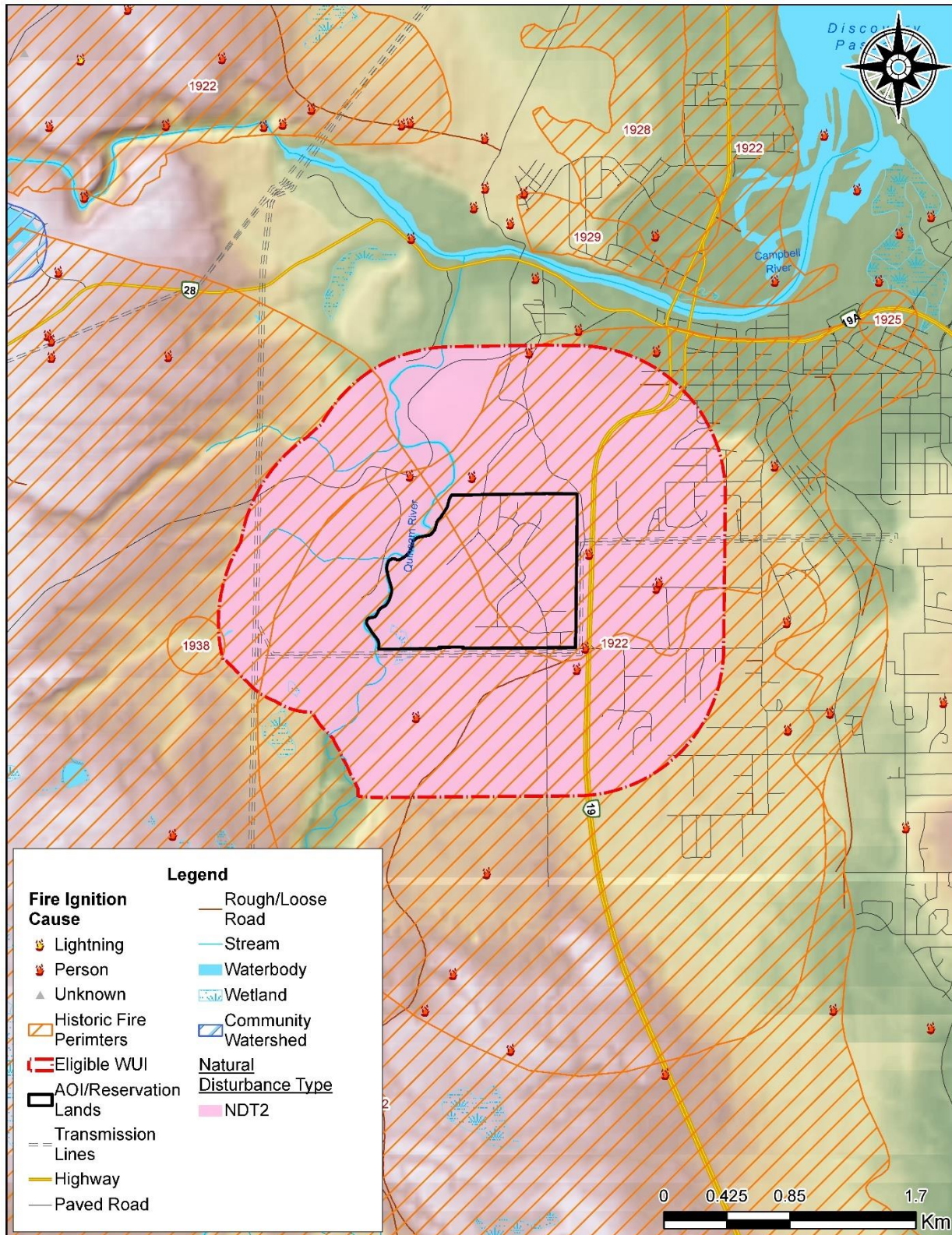


Figure 3: Historical Wildfire Ignitions (WUI; by decade) for Cape Mudge Village and Quinsam Reserve



Map 6: Natural disturbance regimes and historical fire ignitions and occurrences within the Cape Mudge Village WUI



Map 7: Natural disturbance regimes and historical fire ignitions and occurrences within the Quinsam Reserve WUI

4.3 LOCAL WILDFIRE THREAT ASSESSMENT

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

- *Fuel type attribute assessment* – ground-truthing/verification and updating as required to develop a local fuel type map (Appendix A-1: Fire Risk Threat Assessment Methodology, Map 4, Map 5).
- *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 (Section 4.1 – Wildfire Environment).
- *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.

It is important to note that the Local Wildfire Threat Assessment analyses do not apply to private land. Thus, approximately 32% of the Cape Mudge Village WUI and 41% of the Quinsam WUI 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 for Cape Mudge Village’s WUI are shown on Map 8 and in Table 13 below. 32% of the WUI is classified as No Data (includes Private Land and Private Managed Forest Land) and as such has not been allocated fire threat data. 52% of the WUI is either water, very low threat, or low threat. The remaining 16% of the WUI is moderate threat or higher, with less than 1% of that high threat, and 0% extreme threat.

Table 13: Wildfire threat summary for Cape Mudge Village’s WUI

Wildfire Threat		
Threat Class	Hectares	% of WUI
Extreme	-	-
High	12.5	<1%
Moderate	272.1	16%
Low	366.3	22%
Very Low/No Threat (Water)	505.7	30%
No Data (Private Land and Private Managed Forest Land)	546.9	32%

The results of the wildfire threat class analysis for Quinsam Reserve’s WUI are shown on Map 9 and in Table 14 below. 41% of the WUI is classified as No Data (includes Private Land and Private Managed Forest Land) and as such has not been allocated fire threat data. 54% of the WUI is low threat. The remaining 5% of the WUI is moderate threat. There are no areas of high or extreme threat classes.

Table 14: Wildfire threat summary for Quinsam Reserve’s WUI

Wildfire Threat		
Threat Class	Hectares	% of WUI
Extreme	-	0%
High	-	0%
Moderate	45.4	5%
Low	458.9	54%
Very Low/No Threat (Water)	-	0%
No Data (Private Land and Private Managed Forest Land)	354.2	41%

4.3.2 WUI RISK CLASS ANALYSIS

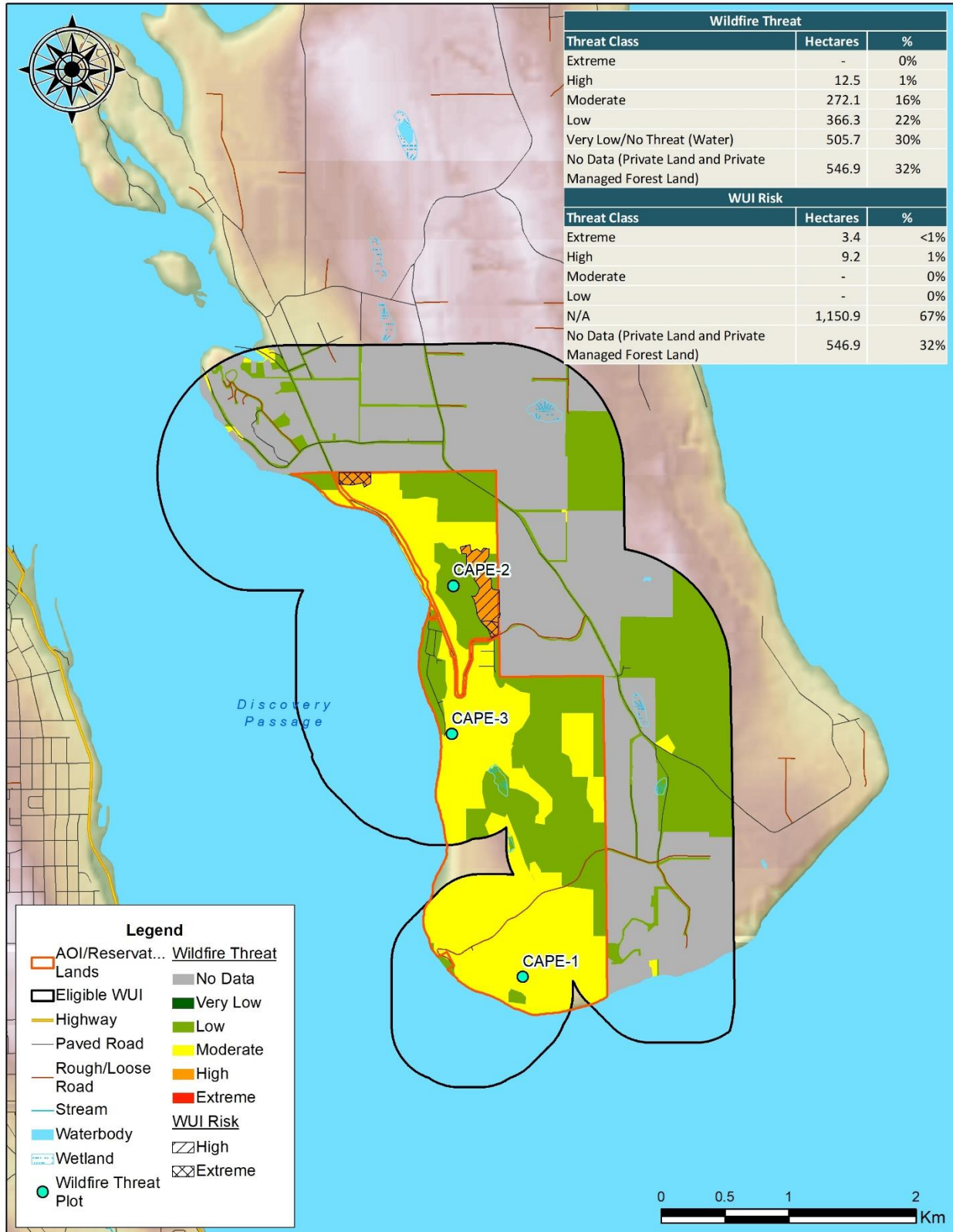
WUI Risk Classes are quantified when the Wildfire Threat (see above; Table 13 and Table 14) is assessed as high or extreme, causing the potential of unacceptable wildfire threats when near communities and developments. WUI Risk Classes are described below:

- **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.

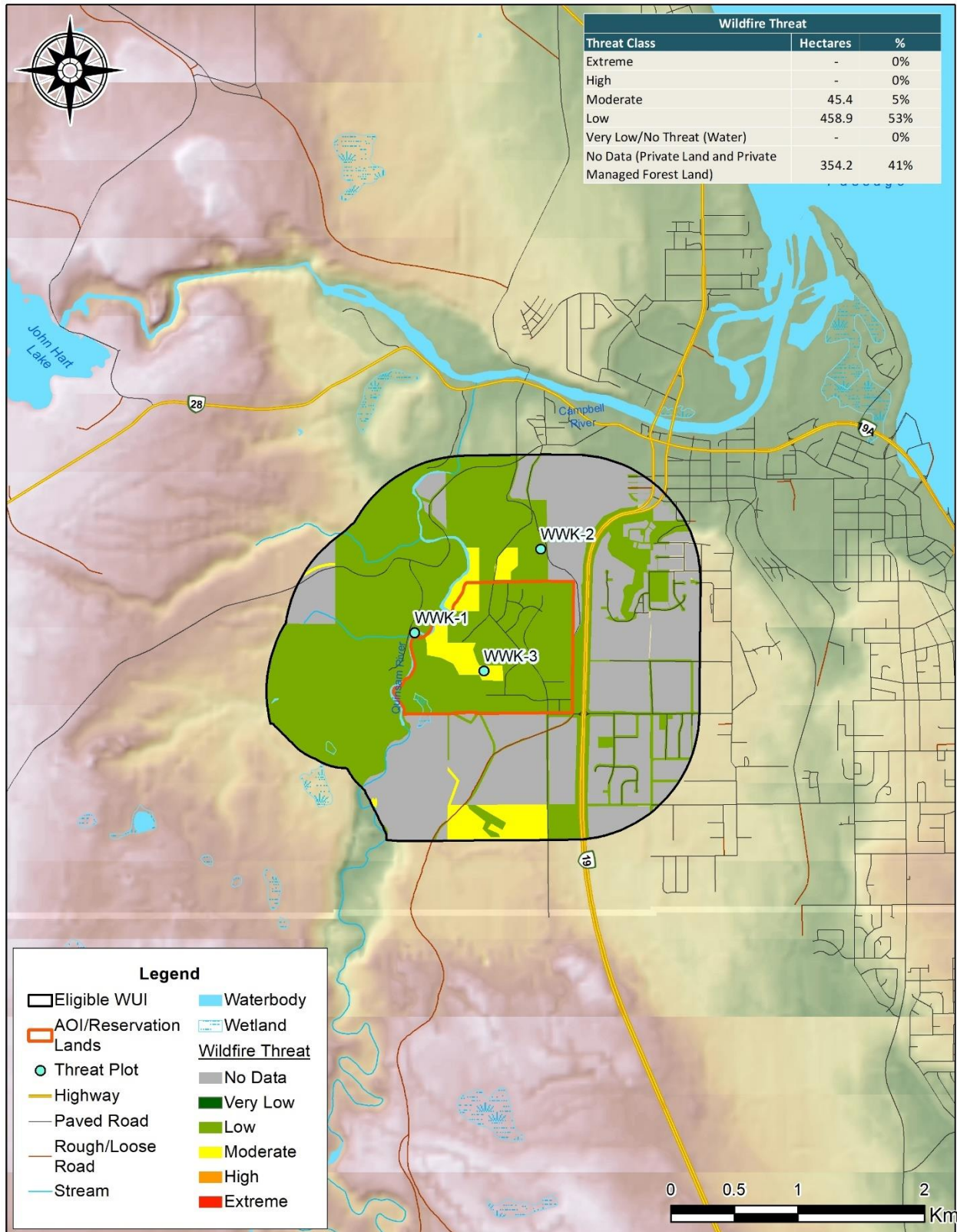
Since there is no high or extreme threat class in Quinsam Reserve’s WUI, there is no associated WUI Risk data for it. Table 15 below (and displayed on Map 8) summarizes the WUI risk class ratings within Cape Mudge Village’s WUI. Less than one percent of the WUI has an extreme threat class rating and one percent has a high threat class rating.

Table 15: Cape Mudge Village’s WUI risk class ratings

WUI Risk		
Risk Class	Hectares	% of Eligible WUI
Extreme	3.4	<1%
High	9.2	1%
Moderate	-	0%
Low	-	0%
N/A	1,150.9	67%
No Data (Private Land and Private Managed Forest Land)	546.9	32%



Map 8: Cape Mudge Village Wildfire Threat Class and WUI Risk Class Map



Map 9: Quinsam Reserve Wildfire Threat Class Map

4.4 WILDFIRE THREAT ASSESSMENT FIELD WORK

Wildfire Threat Assessments were completed over several days in July of 2021 in conjunction with verification of fuel types (see - Appendix B: Wildfire Risk Assessment – Worksheets and Photos) to support analyses and the development of priority treatment areas. Six WUI threat plots were completed and 71 other field stops (e.g., qualitative notes, fuel type verification, and/or photograph documentation) were made across the WUIs (see Appendix D: WUI Threat Plot Locations, along with Map 8 and Map 9) 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 prior to field work were visually identified as hazardous and assessed during the week.
- *Verifying provincial classification:* areas classified as high threat in the Provincial Strategic Threat Analysis 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.

4.5 HAZARD, RISK, AND VULNERABILITY ASSESSMENT

Hazard, Risk, and Vulnerability Analyses (HRVA) were completed as part of the emergency plan development for Cape Mudge Village and Quinsam Reserve. Information in this report should be made available to update the analyses as it may provide additional information, particularly regarding the Local Wildfire Threat Analysis conducted above in Section 4.3 and critical infrastructure in Section 3.2.

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, Emergency Planning, and Vegetation Management. These seven disciplines and the guiding principles behind FireSmart can be applied at a number of spatial scales and are not restricted to any type of land ownership, forest type, or property type.

Cape Mudge Village and Quinsam Reserve are both interface communities – the homes and structures are largely situated against the vegetated/forested landscape. With the Wildfire Risk Assessment (Section 4) showing that the most likely ignition cause of a wildfire is 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 WWKN to focus on to not only ensure structures and homes survive a wildfire event, but that they also do not ignite and spread one, *especially from home to home*.

FireSmart compliance on all the newly constructed homes and critical infrastructure in Cape Mudge Village and Quinsam Reserve is generally moderate to high considering building materials, landscaping, and maintaining a 10-metre defensible space (where possible). However, some structures (such as older homes) display low FireSmart compliance.

FireSmart activities should focus first on the most at-risk communities/areas within both of the WUIs. 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 both WUIs have been prioritized by those that would benefit the most from FireSmart planning and activities: 1) Critical Infrastructure; 2) Homes at forest interface edges; 3) Homes/structures away from interface edges (*i.e.*, surrounded by other homes).

This year, the Campbell River Fire Department applied to the FireSmart Community Funding & Supports (FCFS) program in partnership with We Wai Kai Nation to organize and implement FireSmart education and events, as well as FireSmart assessments of homes and critical infrastructure. An evaluation of the current level of FireSmart implementation in Cape Mudge Village and Quinsam Reserve is presented below in Table 16. All the activities listed are eligible for funding under the 2022 CRI FireSmart Community Funding and Supports program.

Table 16: FireSmart activities funded under the 2022 UBCM CRI program and their level of implementation in both WUIs

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).	Cape Mudge Village: <i>Partially achieved</i> Quinsam Reserve: <i>Partially achieved</i> Fire danger levels and local fire bans are communicated in the We Wai Kai Nation newsletter and on social media. Funds to support increased FireSmart signage for Quinsam Reserve is included in the 2022 Campbell River FD FCFS co-grant application.
	Organize and host public information meetings related to a proposed activity in categories 2-9 (below).	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Promote and distribute FireSmart educational materials and resources.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
	Encourage community participation in a Wildfire Community Preparedness Day.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
	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.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
	Support neighbourhoods to apply for FireSmart Canada Neighbourhood Recognition Program.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
2. Legislation and Planning	Develop or amend a CWRP/CWPP (to the 2020 template).	Cape Mudge Village: <i>Achieved</i> Quinsam Reserve: <i>Achieved</i> We Wai Nation CWRP 2022
	Develop FireSmart policies for the design and maintenance of public lands, such as regional parks, or buildings.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Conduct FireSmart Assessments for publicly owned buildings to support future FireSmart projects for critical infrastructure (see category 7).	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
3. Development Considerations	Amend CCPs or bylaws to incorporate FireSmart principles.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Revise landscaping requirements in zoning and development permit documents to require fire resistant landscaping or include other FireSmart considerations.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Establish Development Permit Areas for Wildfire Hazard.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>

CRI Funding Category	FireSmart Activities	Current Status
	Include wildfire prevention and suppression considerations in the design of subdivisions.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management personnel, are included.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
4. Interagency Cooperation	Develop, coordinate, and/or participate in a Community FireSmart Resiliency Committee or multi-agency fire and/or fuel management planning table.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Provide Indigenous cultural safety and humility training to emergency management personnel.	Not applicable to WWKN
	Attend the annual FireSmart BC Conference, to be hosted by the BC FireSmart Committee.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
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.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Assess community water delivery ability as required for suppression activities, limited to current water system evaluation and available flow analysis.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Assess structural protection capacity.	Not applicable to WWKN
	Use and/or promote EMBC Wildfire Preparedness Guide for community emergency preparedness events focused on wildfire.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
6. Cross-Training	Provide or attend training for Local FireSmart Representatives (LFR).	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Support LFRs to attend facilitator training.	Not yet applicable to WWKN
	Home Partners Program – Wildfire Mitigation Specialist training.	Not applicable to WWKN
	Support local government or First Nation staff that have completed Wildfire Mitigation Specialist training to qualify as facilitators.	Not applicable to WWKN
	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	Not applicable to WWKN
Cross-train emergency management personnel:	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>	

CRI Funding Category	FireSmart Activities	Current Status
	<ul style="list-style-type: none"> - ICS-100 - WRR Basics Course 	
7. FireSmart Projects for Critical Infrastructure	Completion of recommended mitigation activities identified in a FireSmart Home Ignition Zone or Critical Infrastructure Ignition Zone Assessment.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
	Completion of a FireSmart Home Ignition Zone or Critical Infrastructure Ignition Zone Assessment once mitigation work has been completed.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
8. FireSmart Activities for Residential Areas ²⁵	Conduct Home Ignition Zone Assessments for individual residential properties or homes.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i>
	Offer local rebate programs to residential property or homeowners that complete eligible FireSmart activities.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Planned completion in 2022</i> Rebate program for Quinsam Reserve residents is included in the 2022 CRI funding
	Undertake Neighbourhood Wildfire Hazard Assessments.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Support the development of preparedness and plans for specific areas.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Conduct Home Partners Program wildfire mitigation assessment for individual residential properties or homes.	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Provide off-site vegetative debris disposal for residential property or homeowners who have undertaken their own vegetation management, including: <ul style="list-style-type: none"> - Provide a dumpster, chipper, or other collection method. - Waive tipping fees. - Provide curbside debris pick-up. 	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
9. Fuel Management	Undertake planning and development for fuel management on reserve or publicly owned land (fuel management prescriptions, burn plans, demonstration projects).	Cape Mudge Village: <i>Not achieved</i> Quinsam Reserve: <i>Not achieved</i>
	Undertake new fuel management treatments on reserve or publicly owned land (including demonstration projects).	Not yet applicable to WWKN
	Undertake fuel management maintenance activities on reserve or publicly owned land.	Not yet applicable to WWKN

²⁵ 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 prescribed burns on publicly owned land or First Nations land when the primary objective is fuel management for community wildfire risk reduction.	Not yet applicable to WWKN

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 many other FireSmart disciplines by building awareness and understanding within both residents and visitors.

We Wai Kai Nation currently communicates fire danger and fire bans via newsletter and social media updates for Cape Mudge Village and Quinsam Reserve. Enhanced FireSmart education and community events are expected to be implemented as a result of the FireSmart Community Funding & Supports program partnership with the Campbell River Fire Department. To further FireSmart education, WWKN should consider actions that get the FireSmart message out to as many citizens as possible, such as through open houses and/or a FireSmart webpage with links on its website. Table 17 below details the full list of recommended FireSmart education actions that WWKN can implement.

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
<p><i>Objective: To provide information to We Wai Kai Nation citizens empowering them to adopt and conduct FireSmart practices to mitigate the negative impacts of wildfire to their homes, businesses, and communities.</i></p>							
1	High	This CWRP report and associated maps should be made publicly available by WWKN through its 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, or committees that WWKN becomes part of.	WWKN	1 year	Available for download or viewing on We Wai Kai Nation's webpage	We Wai Kai Nation (no cost)
2	High	Follow through with the planned education and community events for Quinsam Reserve led by the Campbell River FD FireSmart Coordinator. Promote FireSmart approaches for wildfire risk reduction to Cape Mudge Village citizens through FireSmart workshops, open houses, and/or presentations. Supply FireSmart resources to residents of both communities during these engagement campaigns and promote the FireSmart Begins at Home mobile app as well as the FireSmart 101 online course. ²⁶	Aim to conduct the engagement and promotion campaign before and during the fire season. Include education specific to Cape Mudge Village and Quinsam Reserve, such as emphasizing the importance of safe debris removal methods and FireSmart firewood storage. Provide information on FireSmart landscaping. Enacting an all-encompassing "Safety Day" (coast guard, BC Ambulance, RCMP, BC Wildfire Service, WWKN personnel) that incorporates the Wildfire Community Preparedness Day CRI initiative can be an effective way to draw participation from the greatest number of citizens.	WWKN & Campbell River FD FireSmart Coordinator	Yearly (pre-fire season)	Growing citizen participation each year.	UBCM CRI funding is available and covers the education and community events in Quinsam Reserve (~40 hours for planning, 1 day for Cape Mudge workshop, 1 day for Quinsam workshop)
3	High	Develop a FireSmart/Wildfire Preparedness page on We Wai Kai Nation's website (with a direct link from the opening webpage).	Additional consideration should be put towards adding the current wildfire risk level for both Cape Mudge and	WWKN (Consultant)	2 years	Webpage updated	UBCM CRI funding is available

²⁶ This and other FireSmart education and training courses can be accessed via: <https://firesmartbc.ca/events/category/course/>

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) or Person Hours
		Include links to FireSmart BC and other relevant wildfire resources.	Quinsam to the We Wai Kai opening webpage.				(~\$3000 contracted service. ~40 hours for set-up. Additional hours for updates as required)
4	High	Recommendation #15 speaks to developing FireSmart landscaping guidelines. When available, make these guidelines available on the We Wai Kai Nation FireSmart webpage and hand out pamphlets/literature relating to it to Cape Mudge and Quinsam residents.	To increase FireSmart vegetation management knowledge amongst residents of Cape Mudge and Quinsam. Landscaping standards that can be adopted include the FireSmart BC Landscaping Guide ²⁷ and the Campbell River FireSmart Guide to Gardening. ²⁸ Review and amend the guidelines taking into consideration We Wai Kai Nation's culturally valuable plant species.	WWKN (Local FireSmart Representatives)	1 year from when the guidelines are made available	Posted on We Wai Kai Nation's FireSmart webpage and materials given to Cape Mudge and Quinsam residents	UBCM CRI funding is available (~ 20 hours in-house; no cost)
5	Moderate	Follow through with the planned FireSmart initiatives amongst the residents in Quinsam Reserve and start promoting FireSmart amongst the private landowners in Cape Mudge Village. Supply FireSmart resources to residents via pamphlets left on their docks or at their cabin/home front doors. Promote the FireSmart Begins at Home mobile app as a method for them to conduct home assessments.	Fires started on private properties in both Cape Mudge and Quinsam can easily affect WWKN structures, property, and lives.	WWKN & Campbell River FD	2 years	FireSmart information provided to adjacent private landowners	We Wai Kai Nation (~ 16 hours) UBCM CRI funding is available
6	Low	Attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status as planned, which the Campbell River FD	Leverage the leadership of a Local FireSmart Representative.		5 years	Status achieved for Cape Mudge Village and	UBCM CRI funding is available

²⁷ <https://firesmartbc.ca/resource/landscaping-guide/>

²⁸ <https://srd.ca/wp-content/uploads/2020/10/final-cr-firesmart-guide-to-gardening-pdf-version-min-1.pdf>

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
		<p>FireSmart Coordinator will assist with, for Quinsam Reserve. WWKN and/or Local FireSmart Representatives should support and facilitate Cape Mudge Village to self-organize and also attain FireSmart Canada Neighbourhood Recognition Program (FSCNRP) status.</p>		<p>WWKN & Campbell River FD (Campbell River FD FireSmart coordinator and/or Local FireSmart Representatives)</p>		<p>Quinsam Reserve</p>	

5.2 LEGISLATION AND PLANNING

Legislation and planning regulation are effective tools for reducing wildfire risk, even more so in small, tight-knit communities versus large regional districts due to ease of communication and enforcement.

A review and summary of We Wai Kai Nation's current laws relevant to wildfire risk and emergency planning were provided earlier in Section 2.4. WWKN's laws should be reviewed with a goal to update them *through a wildfire lens* so that wildfire risk due to development and other practices is decreased. Examples include adopting laws tied to wildfire hazard levels and requiring minimum standards for access, water supply, construction materials and techniques, and vegetation management. By doing this, WWKN can help accomplish the goal of Cape Mudge Village and Quinsam Reserve becoming more wildfire resilient communities. If updating/creating laws regarding building forms regulation and landscaping and zoning are not a direction WWKN is wanting to take, the same goals can be reached via wildfire hazard Development Permit Areas, discussed below in Section 5.3.

Recommendations and action items WWKN can implement relating to legislation and planning are detailed below in Table 18. The laws recommended for updating should not be considered the complete list of laws that should be reviewed and updated, but rather a guide to how FireSmart principles can be viewed and actioned in We Wai Kai Nation's legislation and planning environment.

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
<i>Objective: To provide the means for WWKN to implement wildfire risk reduction actions through laws and legislation by outlining government responsibilities regarding wildfire.</i>							
7	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 is currently a requirement for further funding under the CRI Program.	WWKN (Consultant)	5-7 years from adopting this CWRP document	We Wai Kai Nation always has an up-to-date CWRP and action plan	UBCM CRI funding is available (~\$30,000 for full document / \$10,000 for update)
8	High	Update the WWKN 2015 Residential Zoning Law to include a Wildland-Urban Interface Zone for Cape Mudge Village and Quinsam Reserve and embed FireSmart principles (especially vegetation and fuel loading limit guidelines) within it.	Consider making this zone the FireSmart Home and CI Ignition Zones 1-3. Fuel loading limit guidelines would help limit the amount of vegetative debris left in a location following any vegetation management (i.e., yard pruning) or resource extraction (i.e., logging) activities.	WWKN (Consultant)	1 year	Law updated or created speaking to this requirement	UBCM CRI funding is available
9	High	Update the WWKN 2021-8 Clean Air Law to prohibit the burning of leaves, foliage, weeds, crops, or stubble for domestic or agricultural use during periods of moderate or higher fire danger risk ratings.	To limit the chance of fire escapement during times of hazardous fire danger, reducing wildfire risk within both of the WUIs. It has been recommended by the Campbell River FD that WWKN adopt the City of Campbell River's Clean Air Bylaw and provide the City enforcement abilities.	WWKN (Consultant)	1 year	Law updated or created speaking to this requirement	UBCM CRI funding is available
10	High	Create a building regulations law that recommends following FireSmart construction materials and landscaping guidelines.	FireSmart construction materials are discussed in the FireSmart Begins at Home – Home Development Guide. ²⁹ Landscaping: reference can be made to WWKN's FireSmart landscaping	WWKN (Consultant)	2 years	Law created speaking to this requirement	UBCM CRI funding is available

²⁹ Can be accessed via: https://firesmartcanada.ca/wp-content/uploads/2019/10/FS_Developer_Booklet.pdf

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) or Person Hours
			<p>guidelines (recommendation #4). It has been recommended by the Campbell River FD that the building regulations law is aligned with the designated Wildfire Hazard Development Permit Area and it's associated requirements.</p>				

5.3 DEVELOPMENT CONSIDERATIONS

Embedding FireSmart practices and considerations into development should be a leading priority of WWKN. Wildfire risk factors that can be planned for and regulated through the land use planning and development process include:³⁰

- Location of development in relation to vegetation, slope, and terrain features that either reduce or increase wildfire threat
- Access and traffic circulation patterns
- Availability and adequacy of water supply
- Type of construction materials on structures and projections
- Structure density
- Design guidelines and architectural standards

Cape Mudge Village and Quinsam Reserve both have sufficient fire hydrant coverage, but they are unmapped. The water supply for both communities is good, but there is potential for shortage issues during the dry summer months. Although many of the newer homes have been built following FireSmart materials and design principles, the majority of older homes in Cape Mudge Village and Quinsam Reserve have low FireSmart compliance. Shown below in Figure 4, some FireSmart non-compliance issues of older homes include wooden siding, wooden deck(s), combustible debris directly adjacent to the building, and combustible roofing materials.



Figure 4: Non-compliance FireSmart example of a private home in Quinsam Reserve

³⁰ CRI FCSF 2021 CWRP Supplemental Instruction Guide

The structures and sites that are considered ‘critical infrastructure’ in this document are divided into two categories: culturally significant structures and resources; and facilities that provide functional services to the community (water, sewage, communication, governance). Protection of functional 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 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 also a vector for fire spreading to surrounding homes and through the community. Some cultural critical infrastructure cannot be developed or retrofitted using FireSmart construction materials due to historical reasons; in these cases, diligent management and maintenance of vegetation surrounding them is vital.

WWKN’s newer constructed critical infrastructure in Cape Mudge Village and Quinsam Reserve have been built following FireSmart construction and materials principles (such as the Quinsam Centre in Quinsam Reserve shown below in Figure 5). However, critical infrastructures that don’t follow FireSmart guidelines are also present in both communities. In Cape Mudge Village and Quinsam Reserve, once the planned Home and Critical Infrastructure FireSmart assessments are completed to identify areas where FireSmart practices are lacking, recommendations from the assessments should be implemented.



Figure 5: FireSmart compliance of the Quinsam Centre

Although there are two separate access/egress routes for Cape Mudge Village, evacuation of the community from a fire is concerning as a ferry or boat is still required to reach more extensive emergency services on Vancouver Island. As such, the village dock has been included as critical infrastructure. During high and extreme fire danger, having immediate boat access to evacuate the community of Cape Mudge

Village should be included as a goal within We Wai Kai Nation's Comprehensive Community Plan (CCP). Access to/Egress from Quinsam Reserve is not of concern as there are two separate routes in and out of the community linking quickly to Highways 19 and 19A.

The objectives and policies within WWKN's CCP that are directly relevant to wildfire risk reduction, emergency response, and community resilience post-disaster were previously summarized in Table 2. In future CCP updates, much like with regulations, it is important that that the CCP adopts language and framework *through a wildfire lens* so that future land use and development are guided with wildfire preparedness in mind. A powerful tool that can be employed to accomplish this is through the development of a Wildfire Hazard Development Permit Area (DPA). The following aspects should be considered in the CCP review and wildfire hazard DPA development:

- 1) Establish DPA objectives (*e.g.*, minimize risk to structures and people from wildfires, minimize risk to forested areas surrounding communities, and conserve the visual and ecological assets of the forests surrounding communities, etc.).
- 2) Where possible, it is recommended to *mandate* FireSmart construction materials.
- 3) Engage residents 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.

The Campbell River FD currently has FireSmart principles that they recommend for the City of Campbell River's Wildfire Hazard DPAs. WWKN should consider incorporating these FireSmart principles into their Wildfire Hazard DPA to ensure that the principles are consistent between the City and WWKN.

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

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
<i>Objective: To embed FireSmart practices and considerations into all development within We Wai Kai Nation Lands.</i>							
11	High	<p>Develop a wildfire hazard DPA and update WWKN's CCP when completed. To meet objectives, consider including the following elements:</p> <ul style="list-style-type: none"> • 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. 	<p>Embed FireSmart values into all aspects of community development and planning.</p> <p>This can also be accomplished through updating and creating new laws/regulations regarding building and landscaping, as well as zoning (see recommendation #8 and #10).</p> <p>Campbell River FD recommends that FireSmart principles for Wildfire Hazard DPAs are consistent throughout different areas (i.e., City of Campbell River and We Wai Kai Nation).</p>	WWKN (Consultant)	5 years	Interface wildfire DPA created and adopted	UBCM CRI funding is available (~\$25,000 contracted service and 40 hours in-house)
12	High	After the planned Home FireSmart assessments for Cape Mudge Village and Quinsam Reserve are completed, the recommendations should be implemented.	All homes in both communities should be assessed.	WWKN & Campbell River FD	5 years	All homes upgraded to stated FireSmart standards	WWKN (\$ and time dependent on scope and scale of work completed) WWKN
13	High	After the planned Critical Infrastructure FireSmart assessments for Cape Mudge Village and Quinsam Reserve are completed, the recommendations should be implemented.	All critical infrastructure in both communities should be assessed.	WWKN & Campbell River FD	5 years	All CI upgraded to stated FireSmart standards	(\$ and time dependent on scope and scale of work completed)

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) or Person Hours
14	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). This could be regulated/mandated for future works via recommendation #10 and #11.	WWKN	Ongoing	New CI are FireSmart	WWKN (\$ variable: CI specific)
15	High	(If not accomplished through updates to laws/regulations or a Wildfire Hazard DPA) Develop or adopt a landscaping standard 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.	Landscaping standards that can be adopted include the FireSmart BC Landscaping Guide ³¹ and the Campbell River FireSmart Guide to Gardening. ³²	WWKN	3 years	Landscaping standard created (or adopted) and either built into the interface wildfire DPA or implemented through laws/regulations	WWKN; UBCM CRI funding is available (\$0 if using FireSmart Canada guidelines; ~20 hours in-house)
16	High	Update WWKN's CCP to ensure boat access and transportation capabilities are available during high and extreme fire danger to residents in Cape Mudge Village for evacuation purposes.	Secure egress route via marine transport for Cape Mudge Village in case roads are cut off.	WWKN	3 years	Marine transportation vessels easily accessible during high and extreme fire danger for residents of Cape Mudge Village	WWKN (~80 in-house hours)

³¹ <https://firesmartbc.ca/resource/landscaping-guide/>

³² <https://srd.ca/wp-content/uploads/2020/10/final-cr-firesmart-guide-to-gardening-pdf-version-min-1.pdf>

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 WWKN to obtain valuable local knowledge.

Community FireSmart Resiliency Committee (CFRC)

A CFRC reflects the key planners and responders most involved in local FireSmart, wildfire resiliency planning, and wildfire and emergency response. It is recommended that WWKN be a member of at least one local or regional CFRC, which can be accomplished by having one resident or government staff member from Cape Mudge Village join the Quadra CFRC.³³ Table 20 below details the recommended agencies involved, their current representatives and titles, and their anticipated role within the Quadra CFRC.

Table 20: Recommended agencies of the Quadra CFRC, including We Wai Kai Nation

Agency	Title	Person ³⁴	Role	Comments
Strathcona Regional District	Protective Services Coordinator	Shaun Koopman	<i>Primary:</i> 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	<i>Primary:</i> 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	<i>Advisory, support and approval, program development and monitoring:</i> 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	<i>Advisory/Engagement/Partner:</i> supports development of plan and may communicate support with other interest groups and public; reviews plan content; may provide some data and information or	The QIEP supports the emergency support services program on Quadra Island.

³³ As proposed in the recently developed Quadra Island 2021 CWRP.

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

Agency	Title	Person ³⁴	Role	Comments
			suggestions for resources; may provide input on specific actions relate to areas of interest.	
We Wai Kai Nation	Cape Mudge Village representative	To be determined ³⁵	<i>Advisory/Engagement/Partner:</i> 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 2022.

Ideally, WWKN would also have similar representation in a CFRC more local to Quinsam Reserve. There is currently no such committee for the City of Campbell River. However, the Campbell River FD is currently working on establishing a CFRC that would include First Nation communities and Strathcona Regional District Electoral Area D. WWKN should reach out to both the City of Campbell River and the SRD to voice its interest in joining this CFRC, when created.^{36,37}

Local Stakeholders and Land Managers

Forestry and other land management 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). The Federal Government owns a significant portion of land associated with the Quinsam River Hatchery within Quinsam Reserve’s WUI that borders the Quinsam River along the west edge of the Quinsam reservation boundary. Additionally, the eastern portion of Cape Mudge Village’s WUI overlaps with Crown land under the tenure of woodlot 0042. Communications with the woodlot 0042 license manager highlighted strategies currently employed to reduce/manage wildfire risk in the 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. The woodlot also owns fire tools, a water tank, and fire pumps that can be employed if required. WWKN should communicate with these stakeholders the importance of proper land management in regards to wildfire resiliency for its communities.

³⁵ During development of the CWRP, discussions with Murray Abercrombie in Cape Mudge Village identified his willingness to fill this role, if approved.

³⁶ As recommended in the Strathcona Regional District Electoral Area D 2021 CWRP.

³⁷ The Campbell River Fire Chief noted in communications his support of a regional CFRC (regional government, local governments, and First Nation governments) or expanding the proposed Strathcona Regional District Electoral Area D CFRC to include Campbell River and local First Nation governments.

Recommendations and action items WWKN can implement to continue growing interagency relationships and increase interagency cooperation are listed below in Table 21.

Table 21: 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
<i>Objective: To broaden from a department or agency single jurisdiction-based approach to a risk driven, multi-agency and multi-scalable approach.</i>							
17	High	At least one WWKN resident or government staff member from Cape Mudge Village should join the Quadra Island CFRC Community FireSmart Resiliency Committee (CFRC). For Quinsam Reserve, once the CFRC including First Nation communities and SRD Electoral Area D is created, WWKN should reach out to both the City of Campbell River and the SRD to voice its interest in joining it.	Creates opportunities for synergies and information sharing of wildfire risk reduction activities across jurisdictions.	WWKN (Quadra Island CFRC, City of Campbell River, SRD EA-D)	Ongoing	Continued participation	WWKN (cost to government ~\$300/yr)
18	High	Engage and work with surrounding forest licensees (i.e., Woodlot 0042) to:					
		1) Identify the parts of woodlot 0042 that are in the Cape Mudge Village 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) Ensure that high-risk activities, such as vegetation management, pile burning, and harvesting do not occur during high/extreme fire danger times. Lobby for adequate fire suppression tools being on-site during high-risk activities.	1) Reduce interface wildfire risk throughout managed forest lands that are closest to structures in the WUI. Consider involving BCWS North Island Mid Coast Fire Zone and FLNRORD personnel in discussions and planning. 2) Reduce the chance of fire ignitions and reduce spread potential during an ignition event.	1) WWKN (FLNRORD, Stakeholders, Consultant) 2) Stakeholders	5 years	1) Discussions and planning initiated 2) High-risk activities not conducted during high/extreme fire danger	1) WWKN (cost to government) 2) Cost of equipment paid by stakeholder
19	High	Continue to promote right-of-way best management practices (BMPs) for regular brushing and clearing of woody debris and shrubs in coordination with BC Hydro to help reduce fire risk, utility pole damage, and subsequent outages.	Tree failures adjacent to power lines are common occurrences and represent significant risks to ignition within the WUI.	WWKN (BC Hydro)	5 years	BMPs in use for the region	UBCM CRI funding is available (~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. There is no fire department nor formally trained structural or wildfire fighting personnel in Cape Mudge Village nor Quinsam Reserve.

Response training opportunities for WWKN staff and residents include:

- Incident Command System - Level 100
- Basic Fire Suppression and Safety - S100

Although there is currently no cross-training between BCWS and WWKN, in-person cross-training should be established so residents of Cape Mudge Village and Quinsam Reserve have knowledge of community water systems and suppression equipment that would likely be used by BCWS in an emergency. WWKN members should also consider participating in wildfire tabletop exercises hosted by local fire departments and associated regional partners as they create valuable cross-training opportunities across agencies, governments, and jurisdictions.

FireSmart specific training is an excellent way to promote and enhance FireSmart education and outreach amongst WWKN staff and its citizens. FireSmart training opportunities include:

- Local FireSmart Representative (LFR) Training:
 - Its purpose is to assist neighbourhood leaders and fire professionals to implement the FireSmart Canada Neighbourhood Recognition Program.
- FireSmart Community Champion Training:
 - Conducted by LFRs, its purpose is to prepare community champions (neighbourhood leaders) to take the initiative to begin the formal process of attaining FireSmart Community recognition status.
 - Half-day workshop with materials and a syllabus available through FireSmart Canada.

Recommendations and action items WWKN can implement to create and grow cross-training opportunities are listed below in Table 22.

Table 22: Cross-training recommendations and action items

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
<i>Objective: To support the development of comprehensive and effective wildfire risk reduction planning and activities, as well as a safe and effective response.</i>							
20	High	Provide Incident Command System Training to those WWKN personnel most directly involved in managing and coordinating emergency response.	Increase WWKN's ability to plan and provide appropriate and timely responses in emergency situations.	WWKN	2 years	At least one WWKN personnel trained in both Cape Mudge Village and Quinsam Reserve	WWKN (UBCM Emergency Management funding available)
21	High	WWKN should reach out to BCWS North Island Mid Coast Fire Zone, as well as Campbell River FD and Quadra FD, for cross-training opportunities to plan and conduct Basic Fire Suppression and Safety S100 training to WWKN personnel along with Cape Mudge Village and Quinsam Reserve residents.	Increase the wildfire emergency preparedness of WWKN personnel as well as Cape Mudge Village and Quinsam Reserve residents.	WWKN (BCWS, Campbell River FD, Quadra FD)	3 years, then ongoing	WWKN (Cape Mudge Village and Quinsam Reserve) has persons trained in S-100	UBCM CRI funding is available for wildfire courses (~\$2000/16 hrs per person)
22	High	WWKN should participate in local fire department (and regional partners) wildfire and emergency preparedness/response tabletop exercises.	Simulation exercises create valuable cross-training opportunities across agencies, governments, and jurisdictions. Reach out to Strathcona Regional District and the City of Campbell River to discuss and organize.	WWKN (participating agencies, governments, etc.)	Ongoing (yearly at minimum)	One wildfire (or other emergency) tabletop exercise participated in each year for both Cape Mudge Village and Quinsam Reserve	WWKN (cost to government ~\$1,000/yr)
23	1) High 2) High	WWKN should facilitate... 1) Local FireSmart Representative (LFR) Training, and 2) FireSmart Community Champion Training ... opportunities for applicable WWKN emergency management personnel along with Cape Mudge Village and Quinsam Reserve residents.	Increase WWKN as well as Cape Mudge Village and Quinsam Reserve residents' capabilities to provide FireSmart knowledge, programs, and resources to the communities.	WWKN (FireSmart Canada)	3 years	1 LFR for both Cape Mudge Village and Quinsam Reserve within 1 year	UBCM CRI funding is available (~\$2000/16 hrs per person)

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.³⁸ Therefore, government wildfire preparedness and resource availability are critical components of community wildfire resilience – individuals and agencies need to be ready to act. WWKN’s most recent emergency plans are from 2019 for both Cape Mudge Village and Quinsam Reserve.

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. Copies of the pre-incident plans should be provided to Quadra FD and Campbell River FD. These plans and maps (some of which are wholly or partially developed as part of this document) should consider at a minimum:³⁹

- **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 (Village structures, vegetation and fuel, hazards, critical infrastructure, archaeology and environmentally sensitive areas, water sources, access/egress, evacuation route plans, etc.)

Wildfire Preparedness Condition Level

As part of the pre-incident planning, WWKN should consider developing local daily action guidelines based on expected wildfire conditions. Table 23 below provides a template that can be tailored specifically to WWKN, outlining actions staff can take as fire danger levels change throughout the year (but mostly through the fire season).⁴⁰ One option to consider, to consolidate/streamline action guidelines used by adjacent jurisdictions (*i.e.*, Strathcona Regional District, City of Campbell River), is to reach out to them and see what they have in place and if they should be copied or referenced by WWKN. Year-round, the

³⁸ 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

³⁹ CRI FCSF 2021 CWRP supplemental instruction guide.

⁴⁰ CRI FCSF 2021 CWRP supplemental instruction guide.

fire danger signs posted at entrances to Cape Mudge Village and Quinsam Reserve should be updated to reflect the current fire danger.

Table 23: Example of a Wildfire Response Preparedness Condition Guide

FIRE DANGER LEVEL	ACTION GUIDELINES
LOW	<ul style="list-style-type: none"> • All WWKN staff on normal shifts. • Direct citizens to BCWS (or WWKN updated FireSmart/Wildfire webpage) for fire danger rating info.
MODERATE	<ul style="list-style-type: none"> • All WWKN staff on normal shifts. • Information gathering and dissemination through CFRC's. • Regional fire situation evaluated. • Rain profile for assessment after lightning storms. • Direct citizens to BCWS (or WWKN updated FireSmart/Wildfire webpage) for fire danger rating info.
HIGH	<ul style="list-style-type: none"> • All WWKN staff on normal shifts. • Regional fire situation evaluated. • Direct citizens to BCWS (or WWKN updated FireSmart/Wildfire webpage) for fire danger rating info. • WWKN and EOC staff notified of Fire Danger Level. • Establish weekly communications with CRFC's. • Rain profile for assessment after lightning storms.
EXTREME	<ul style="list-style-type: none"> • Rain profile for assessment after lightning storms. • Direct citizens to BCWS (or WWKN updated FireSmart/Wildfire webpage) for fire danger rating info. • Regional fire situation evaluated. • WWKN and EOC staff considered for level 1 activation standby. • Provide regular updates to WWKN media, websites, and Cape Mudge Village/Quinsam Reserve staff/residents on the fire situations. • Provide updates as information changes. • Emergency evacuation boats docked in Cape Mudge Village.
FIRE(S) ONGOING	<ul style="list-style-type: none"> • 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. • Implement Evacuation Alerts and Orders based on fire behaviour prediction and under the direction of the EOC or BCWS. • Provide regular updates to WWKN media, websites, and Cape Mudge Village/Quinsam Reserve staff/residents on the fire situations. • Emergency evacuation boats docked in Cape Mudge Village.

Mutual Aid Partners

Provincial wildfire response agreements are in place between the BC Office of the Fire Commissioner (OFC) and the Fire Chiefs Association of BC. There are currently no wildfire response agreements between BCWS and We Wai Kai Nation.

Firefighting Resources

Fire response for Cape Mudge Village is contracted to the Quadra Island Volunteer Fire Department (Quadra FD), and fire response for Quinsam Reserve is contracted to the Campbell River FD. Table 24 and Table 25 summarize the available structural and wildfire firefighting resources to Quadra FD and Campbell

River FD, respectively. Quadra FD and Campbell River FD have had their wildland and structural firefighting capabilities assessed in the 2021 Quadra Island CWRP⁴¹ and 2020 City of Campbell River CWPP⁴², respectively. We Wai Kai Nation should lobby for any recommendations in both of these reports that may improve the fire response from these fire departments in Cape Mudge Village and Quinsam Reserve to be actioned upon.

Table 24: Quadra Island Volunteer Fire Department (Quadra FD) firefighting resources

Fire Department	Number of Members	Firefighting Equipment Type	Apparatus Type	Description / Comment
Quadra FD	1 Fire Chief (full-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
	1 Assistant Fire Chief (part-time)	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
	38 Volunteer Members		Econoflow (3/4") Hose	1000 feet
			Wildfire: Hand tools	Pulaskis, Mcleods, Shovels, etc.

Table 25: Campbell River Fire Department (Campbell River FD) firefighting resources

Fire Department	Number of Members	Firefighting Equipment Type	Apparatus Type	Description / Comment
Campbell River FD	42 Career Staff (paid)	Structural	6 x Fire Engine (3 at both Fire Halls)	~2300-litre tanks ~7000-litre per minute pumps
			1 x Rescue Truck	For confined space and hazmat incidents
			1 x Water Tender	13,627 litre capacity; 1,135 litre/minute pump capacity
	40 Paid Volunteer On-Call	Wildfire	Type 2 SPU Unit	With 4 Wick 375 portable pumps 1,136 litre capacity; 38 litre foam;
			Wildland bush truck	719 litre/minute pump capacity; hand tools

⁴¹ B.A. Blackwell & Associates Ltd, 2021. Quadra Island CWRP.

⁴² Strategic Natural Resource Consultants, 2020. City of Campbell River CWPP.

Fire Department	Number of Members	Firefighting Equipment Type	Apparatus Type	Description / Comment
			UTV Side-by-side	(planned procurement 2022) for remote location access
			High-volume portable pump	11 HP Honda high volume portable water pump
			Portable pump	Mini-striker portable pump
			Portable water tanks	1 Bush truck and 1 on Tender truck; 2 Bladder Tanks; 1 steel frame dump tank; 1 4,000 gallon folding tank

Cape Mudge Village has several structural protection sprinkler units that can be attached to buildings as well as onto stakes planted in the ground. The sprinklers can be hooked up to any of the fire hydrants within the Village. WWKN should reach out to BCWS and ask for assistance in reviewing and checking the compatibility of all the individual sprinkler units. BCWS should also recommend other firefighting equipment that both Cape Mudge Village and Quinsam Reserve could purchase. WWKN should schedule training with BCWS for residents in both communities on any current or newly purchased firefighting equipment.

The UBCM CRI FCFS program has included yearly grant funding that can be applied towards governments hiring a FireSmart Coordinator, something that WWKN should consider for leading their FireSmart programs at both Quinsam Reserve and Cape Mudge Village. Alternatively, WWKN could reach out to local governments (City of Campbell River and SRD) to see if there is an opportunity to collaborate and cost share a full time FireSmart Coordinator position. Any grant funding that may be approved would offset the costs to each partner. This approach would ensure a sustainable long term solution to ongoing FireSmart initiatives.

Recommendations and action items to grow and support emergency planning for WWKN are detailed below in Table 26.

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
<p><i>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 WWKN's ability to respond to (during and after) a wildfire emergency.</i></p>							
24	High	<p>Recommendations that may improve fire response for Cape Mudge Village and Quinsam Reserve from the 2021 Quadra Island CWRP and 2020 City of Campbell River CWPP should be lobbied for by WWKN.</p> <p>Example: WWKN should lobby the City of Campbell River to increase the staffing at the No. 2 Fire Hall which is only staffed during the daytime hours 7 days a week. Response to the WWKN during evening would be greatly improved with the No. 2 Fire Hall fully staffed 24/7.</p>	<p>Since firefighting equipment and training is limited in both communities, advocating for increased fire response from the contracted fire departments is key to ensuring the safety of residents and structures.</p>	<p>WWKN</p> <p>(Quadra FD, City of Campbell River, and Campbell River FD)</p>	3 years	<p>Recommendations from both reports specific to increasing fire response for Cape Mudge Village and Quinsam Reserve were approved for Quadra FD and Campbell River FD</p>	<p>WWKN</p> <p>(time and cost amount of engagement)</p>
25	High	<p>Conduct yearly (pre-fire season is best) response exercises for Cape Mudge Village and Quinsam Reserve. Identify hazards, barriers to access (i.e., locked gates, tight or no turnarounds), and other response issues and develop measures to address them.</p>	<p>Consider adding this into an all-hazards response exercise day for maximum participation.</p> <p>Reach out to the Strathcona Regional District, Quadra FD, and Campbell River FD to plan and coordinate.</p>	<p>WWKN</p> <p>(BCWS, Local Fire Departments, etc.)</p>	Yearly (pre-fire season)	<p>Response exercises conducted at least once every two years</p>	<p>WWKN</p> <p>(80 planning hours; 8 person-hours per person per exercise)</p>
26	High	<p>Update WWKN's Hazard, Risk, and Vulnerability Analysis (HRVA) and 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</p>	<p>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</p>	<p>WWKN</p> <p>(Consultant, BCWS, regional partners, stakeholders)</p>	5 years	<p>Wildfire incident plans and associated maps were created and made available</p>	<p>WWKN</p> <p>(Cost to government. 12 planning hours and ~\$8,000 contracted service)</p>

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) or Person Hours
		information should be incorporated within the map. The map should be shared with fire suppression personnel and BCWS to support emergency response in the event of a wildfire. The map should be reviewed as needed to incorporate additions and/or changes.	need for using machinery to build cat guards in sensitive areas.				
27	High	Most critical infrastructures (CI) in Cape Mudge Village and Quinsam Reserve that require electricity don't have backup power sources (<i>i.e.</i> , gas- or diesel-powered generators). Invest in secondary power sources to continue the services of these critical infrastructures in the case of a prolonged or extensive power outage as a result of a wildfire (or another emergency). Upgrade or realign resources, as prioritized.	Ensure that backup gas or diesel generators have sufficient fuel supply for extensive power outages (3 + days) so that they can continue to function as required in the event of an emergency.	WWKN	5 years	All CI that require electricity have backup power sources	WWKN (~\$30,000 per CI - depending on requirements)
28	High	Consider consolidating/streamlining emergency action guidelines used by adjacent jurisdictions (<i>i.e.</i> , Strathcona Regional District, City of Campbell River). Reach out to them and see what they have in place and if they should be copied or referenced to by WWKN.	Emergency planning may be improved by implementing emergency guidelines that nearby jurisdictions use.	WWKN (Adjacent jurisdictions)	5 years	Nearby jurisdictions have been contacted and their emergency action guidelines have been reviewed	WWKN (~40 person-hours)
29	1) High 2) High	Reach out to BCWS and ask them to: 1) Assist in reviewing and checking the compatibility all of the sprinkler units in Cape Mudge Village. 2) Recommend other firefighting equipment Cape Mudge Village and Quinsam Reserve could purchase. Schedule training on newly purchased	Increase the emergency firefighting capabilities of Cape Mudge Village and Quinsam Reserve.	WWKN (BCWS)	5 years	All sprinklers in Cape Mudge Village have been reviewed and checked for compatibility. Residents are trained on any firefighting	WWKN (Time and cost dependent on level of effort)

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric for Success	Funding Source / Est. Cost (\$) or Person Hours
		and current firefighting equipment in both communities.				equipment in both communities.	
30	High	Hire a full-time FireSmart coordinator to lead WWKN's FireSmart programs in both Cape Mudge Village and Quinsam Reserve.	Alternatively, WWKN can reach out to to the City of Campbell River and SRD to see if there is an opportunity to collaborate and cost share a full time FireSmart Coordinator position. Any approved funding would offset the cost to each partner.	WWKN (City of Campbell River and SRD may be involved)	5 years	A full-time FireSmart coordinator for We Wai Kai Nation or a shared FireSmart coordinator with local governments	UBCM CRI funding is available

5.7 VEGETATION MANAGEMENT

As discussed in Section 4 (Wildfire Risk Assessment), 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 (HIZ/CIIZ),
- 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 Non-Combustible Zone and Priority Zones 1, 2 and 3. This is called the Home (or Structure) Ignition Zone (Figure 6).



Figure 6: FireSmart Home 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 embers. Firebrands can be transported long

distances ahead of the wildfire, across fire guards and fuel breaks, and accumulate within the Structure Ignition Zone (0 – 100 m) in densities that can exceed 600 embers per square meter. Combustible materials found within the 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 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.⁴³

It was noted during field visits that compliance to FireSmart vegetation management in all Priority Ignition Zones was generally poor and management actions should be considered. WWKN should assist Cape Mudge Village and Quinsam Reserve residents in conforming with FireSmart vegetation management principles at both the individual home and community level. This could be implemented by providing vegetation disposal for residents (pre-fire season is best), thus ensuring the work gets completed. This could be accomplished by initiating a community chipper program with funding from UBCM CRI – a program that has had success in many jurisdictions across the province.

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 communities and landscape should also be considered to further reduce wildfire risk to the communities as well as the potential for fire transmission into adjacent forested lands.

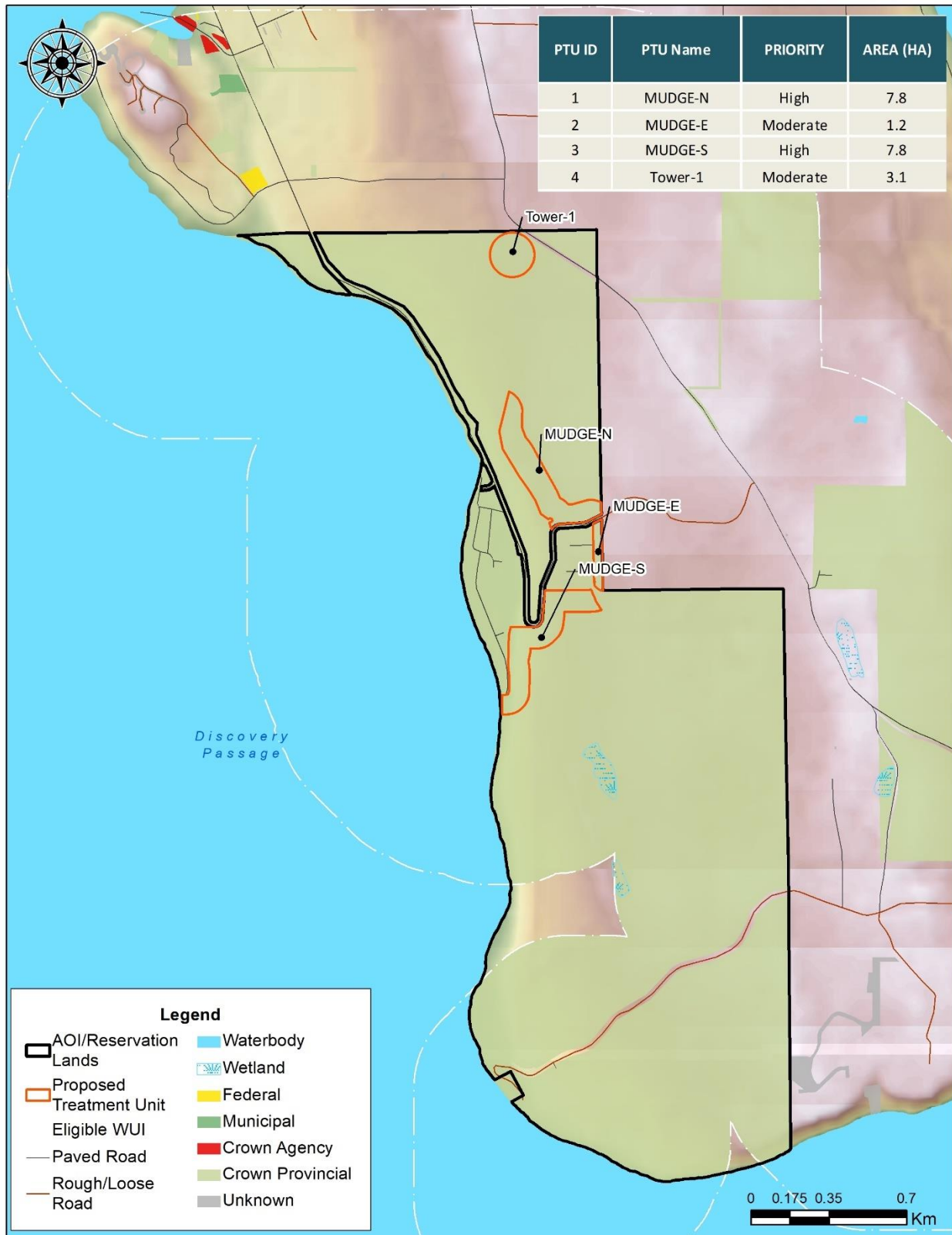
Fuel treatment opportunities may be a linear fuel break (minimum of 1 km) or polygon treatments for discrete areas. The intent of establishing fuel treatments is to modify fire behaviour. They should be designed to keep surface fires on the ground to avoid them becoming more dangerous crown fires. Fuel treatments also provide anchor points to fire-fighting crews for suppression activities.⁴⁴ 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.

Multiple proposed fuel treatment units (PTUs) have been proposed inside Cape Mudge Village reserve lands along interface edges of higher-risk conifer stands and homes. They double as a fire break that could stop or slow a structure/forest fire that originates within the residential area of the village travelling north

⁴³ 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/>.

⁴⁴ 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

and northeast through the surrounding forest via the dominant northerly fire season winds. No PTUs have been proposed for Quinsam Reserve due to the low hazard forest fuel conditions present in the mostly deciduous (fire-resistant) dominated forested land within its WUI. The PTUs for Cape Mudge Village are described below in Table 27 and shown on Map 10. Priority rankings have been given based on the Wildfire Risk Assessment completed in Section 4.



Map 10: We Wai Kai Nation CWRP Proposed Fuel Treatment Units

Table 27: Summary of Proposed Fuel Treatment Units

PTU Name (Location)	Total Area (ha)	Treatment Unit Location / Type	Priority	Wildfire Behavior Threat (ha)			Overlapping Values / Treatment Constraints	Treatment Rationale
				Extreme + High	Mod.	Low		
MUDGE-N (Cape Mudge Village)	7.8	Home Ignition Zone/ Community Zone Polygon Treatment Unit	High	0.6	0.0	7.2	South edge of the PTU borders the old water reservoir and is in close proximity to private homes.	This unit is composed almost entirely of C-5 fuel type and is a mature, multi-layered stand with a mixed deciduous and conifer understory, along with a dense herb layer. It is located north-east of the Village centre, and north of the up-slope neighbourhood. Moderate to high surface fuel loading present. Treatment should focus on thinning understory conifers, pruning remaining trees, and reducing surface fuel loads. This will reduce local fire threat, create a fuel break reducing the chance of a wildfire entering/exiting the community, and help restore natural disturbance fire event cycles and ecological habitat.
MUDGE-S (Cape Mudge Village)	7.8	Home Ignition Zone/ Community Zone Polygon Treatment Unit	High	0.0	7.8	0.0	West edge of the PTU borders Cape Mudge Village centre, north edge borders the up-slope neighbourhood, and east edge borders the water reservoir tower.	This unit is composed entirely of M-1/2 fuel type with approximately 75 percent conifer trees. It is located directly south of the Village centre and the up-slope neighbourhood. This unit is a mature, multi-layered stand with a mostly conifer understory, however, some deciduous trees are present. Moderate to high surface fuel loading and low crown base heights on some conifers (especially hemlocks) are concerns. Treatment should focus on thinning understory conifers except for the L1 layer, pruning conifers, and reducing surface fuel loads. This will reduce local fire threat, create a fuel break reducing the chance of a wildfire entering/exiting the community, and help restore natural disturbance fire event cycles and ecological habitat.
MUDGE-E	1.2	Home Ignition Zone/	Moderate	0.0	0.0	1.2	West edge of the PTU borders the up-slope neighbourhood and the southern tip of the PTU borders the water reservoir tower.	This unit is composed entirely of C-5 fuel type, and is a north to south fuel break located directly east of the up-slope neighbourhood. It is a mature, multi-layered stand with a mixed conifer

PTU Name (Location)	Total Area (ha)	Treatment Unit Location / Type	Priority	Wildfire Behavior Threat (ha)			Overlapping Values / Treatment Constraints	Treatment Rationale
				Extreme + High	Mod.	Low		
(Cape Mudge Village)		Community Zone Polygon Treatment Unit						and deciduous understory. Moderate surface fuel loading is a concern. Treatment should focus on thinning understory conifers, pruning remaining trees, and reducing surface fuel loads. This will reduce local fire threat, create a fuel break reducing the chance of a wildfire entering the community, and help restore natural disturbance fire event cycles and ecological habitat.
TOWER-1 ⁴⁵ (Cape Mudge Village)	3.1	Critical Infrastructure Ignition Zone Polygon Treatment Unit	Moderate	0.0	0.0	3.1	The radio communications tower is centrally located within the PTU.	This unit is composed almost entirely of D-1/2 fuel type, with a small M-1/2 portion, surrounding the radio communications tower. It is a multi-layered stand with a mixed deciduous and conifer understory. Moderate surface fuel loading present. Treatment should focus on thinning understory conifers, pruning remaining trees, and reducing surface fuel loads. This will reduce local fire threat, decrease the chance of a fire damaging the critical infrastructure, and help restore natural disturbance fire event cycles and ecological habitat.

⁴⁵ Also proposed in the Quadra Island 2021 CWRP. The communications tower is critical infrastructure for both Quadra Island and Cape Mudge Village.

Recommendations and action items for FireSmart vegetation management and practices within both WUIs as well as associated Home and Critical Infrastructure Ignition Zones and Community 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
<i>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.</i>							
31	High	Proceed with detailed assessment, prescription development, and treatment of fuel treatment units identified and prioritized in this CWRP.	High priority treatment units should be prescribed and implemented first.	WWKN (Consultant)	5 years	Prescriptions developed and treatments implemented for all units.	UBCM CRI funding is available (~\$700/ha prescription; ~\$9500/ha treatment)
32	High	Where operational fuel treatments are conducted, treatment monitoring 5-10 years afterwards should be completed by a qualified professional. This can be completed with a CWRP update or as a stand-alone exercise.	To assess the efficacy of the treatment and schedule maintenance activities. It is cheaper to perform maintenance early when conifer regeneration is small and fuel loading amounts are low.	WWKN (Consultant)	Maximum 10 years post-treatment	All completed fuel treatments are reassessed 5-10 years after treatment	UBCM CRI funding is available (~\$150/ha for assessment)
33	High	In the future, We Wai Kai Nation's trained Local FireSmart Representatives (LFRs) should assist Cape Mudge Village and Quinsam Reserve residents in complying with FireSmart vegetation management principles at both the home and community level.	Increase wildfire resiliency throughout Cape Mudge Village and Quinsam Reserve by collectively FireSmarting homes.	WWKN (LFR's – when completed training)	5 years, and then ongoing.	LFR's in Cape Mudge Village and Quinsam Reserve. LFR's are active in promoting FireSmart	WWKN (~\$500 per home)
34	High	Implement a yearly community/ neighbourhood chipping program in both Cape Mudge Village and Quinsam Reserve. Education of FireSmart yard and landscaping principles, including chipping specifications should be incorporated into the program.	To reduce wildfire hazard on private properties within the WUIs and promote FireSmart vegetation management knowledge and education.	WWKN	Yearly	Continued high amount of participation by WWKN residents in both communities	UBCM CRI funding is available (Costs/time in line with previous year)

Item #	Priority	Recommendation / Next Steps	Comments	Lead (Involved)	Timeframe	Metric Success for	Funding Source / Est. Cost (\$) or Person Hours
35	Moderate	As part of fuel treatment implementation, WWKN should develop interpretive signage to explain and describe pre- and post-fuel treatment forest stand conditions.	Increase citizen awareness and support of fuel management practices.	WWKN	1-year post-treatment of a MUDGE-# PTU	Signs placed in one MUDGE-# PTU	UBCM CRI funding is available (~\$750/sign)

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 Process. Wildfire Risk Assessment plot worksheets are provided in Appendix B: Wildfire Risk Assessment – Worksheets and Photos Appendix B: Wildfire Risk Assessment – Worksheets and Photos (in a separate package), 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 Process.

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.⁴⁶ 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.⁴⁷ It should be noted that there are significant limitations with the fuel typing system which should be recognized. Major limitations include a fuel typing

⁴⁶ Forestry Canada Fire Danger Group. 1992. Development and Structure of the Canadian Forest Fire Behavior Prediction System: Information Report ST-X-3.

⁴⁷ 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*.

system designed to describe fuels that sometimes do not occur within the WUI, fuel types which cannot accurately capture the natural variability within a polygon, and limitations in the data used to create initial fuel types.⁴⁷ 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 both WUIs 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.⁴⁷ 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-1a/b 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 both WUIs are provided (as such, other fuel types, i.e., C-1, C-2, C-4, C-7, S-1, S-2, and S-3 are not summarized below)

Fuel Type	FBP / CFDDRS Description	WUI 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.	Moderate
C-5	Ponderosa pine and Douglas-fir	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.	Moderate potential for active Crown fire in wind-driven conditions. Under drought conditions, fuel consumption and fire intensity can be higher due to dead woody fuels	Low
C-6				
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 mixed wood (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
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. They were:

- M-1/2 fuel types being incorrectly identified by the PSTA as D-1/2.

The resulting updated fuel types were shown previously on Map 4 and Map 5.

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).^{48,49} Both the HIZ and CIIZ include the structure itself and four concentric, progressively wider Priority Zones out to 100 m from the structure (Figure 7 below). More details on priority zones can be found in the FireSmart Manual.⁵⁰

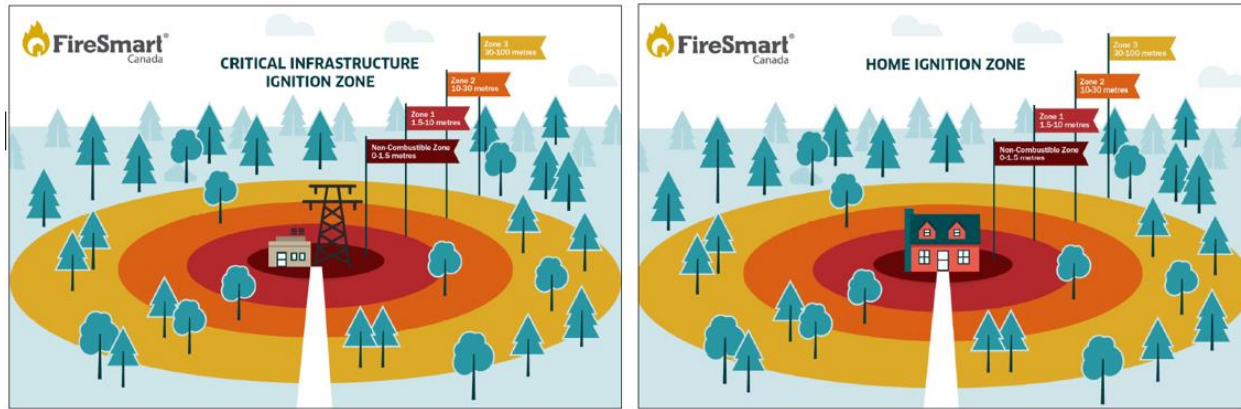


Figure 7: FireSmart Home and Critical Infrastructure Ignition Zone (HIZ, CIIZ)

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 ignitable homes may be destroyed during lower-intensity surface fire events.⁴⁹ Increasing ignition resistance would reduce the number of homes simultaneously on fire; extreme wildfire conditions do not necessarily result in WUI fire disasters.⁵¹ 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 residents. 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.

⁴⁸ 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.

⁴⁹ Cohen, J. Preventing Disaster Home Ignitability in the Wildland-urban Interface. *Journal of Forestry*. p 15 - 21.

⁵⁰ <https://firesmartcanada.ca/> and <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart>

⁵¹ 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/>.

Community Zone

Vegetation management in the Community Zone encompasses all We Wai Kai Nation reserve land typically beyond 30 metres from homes and structures. 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. Depending on the results of FireSmart Structure Ignition Zone assessments on individual structures, vegetation management may be required beyond 30 metres and up to 100 metres (FireSmart Priority Zone 3) on larger private parcels.⁵² Many Community Zone open spaces/lands are often associated with high use by citizens thus increasing accidental ignition potential and the wildfire risk to critical infrastructure and homes surrounding them.

Landscape Zone

The Landscape Zone encompasses provincial Crown lands that are located outside We Wai Kai Nation reserve lands. Vegetation (fuel) management planning and implementation is primarily the responsibility of the provincial government, working collaboratively to align landscape objectives with the CWRP objectives. 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.

Fire hazard classification in both WUIs 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 important consideration, which can be ensured by reducing fuels from the edge of the structures outward. Special consideration must be allocated to treatment locations to ensure continuity, as discontinuous fuel treatments in the WUIs 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.

⁵² CRI FCSF 2021 Supplemental Instruction Guide

Table 30: Proximity to the Interface

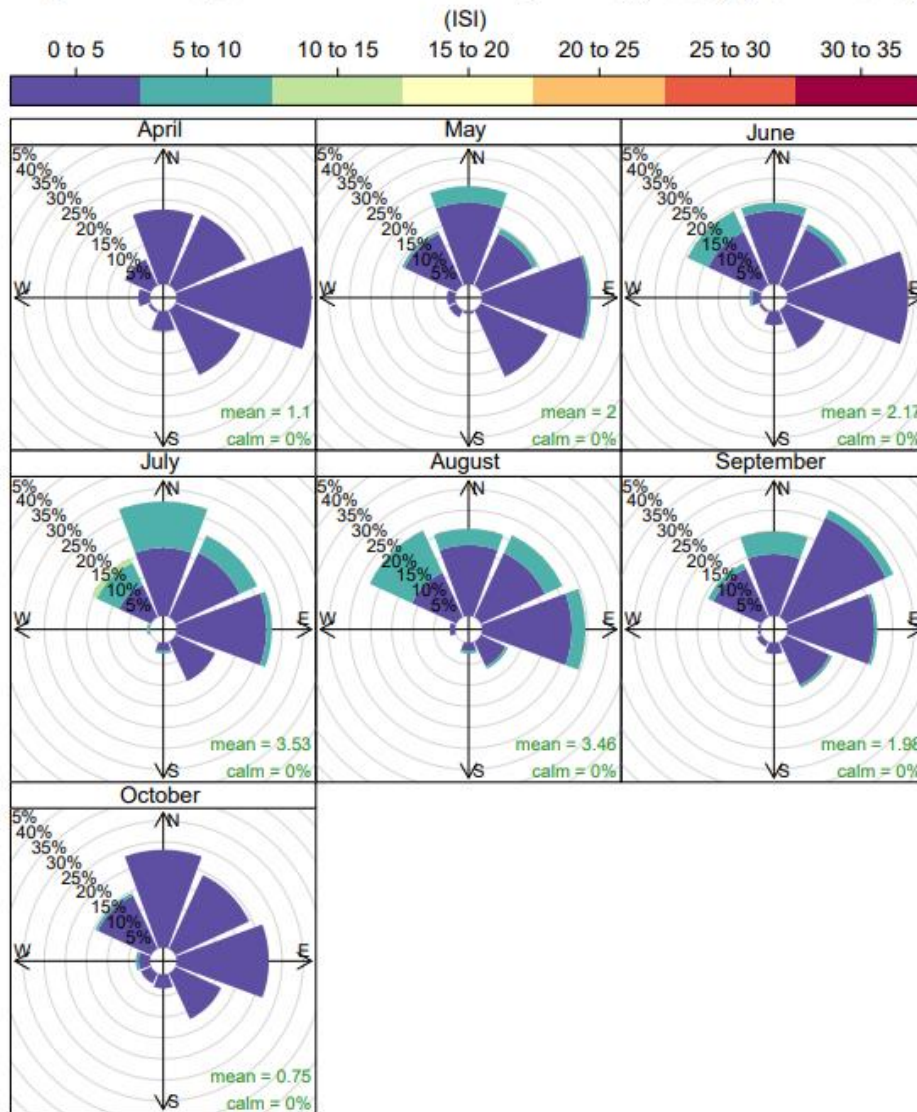
Proximity to the Interface	Descriptor*	Explanation
WUI 100 <i>HIZ/CIIZ and Community Zones</i>	(0-100 m)	This Zone is always located adjacent to the value at risk. Treatment would modify the wildfire behaviour near or adjacent to the value. Treatment effectiveness would be increased when the value is FireSmart.
WUI 500 <i>Community and Landscape Zones</i>	(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 <i>Landscape Zone</i>	(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.
<i>Landscape Zone</i>	>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

Figure 8 below displays the daily average ISI values for the Quinsam Base BCWS weather station, which represents wind speed and direction for Quinsam Reserve’s WUI. Figure 9 displays the daily average ISI values for the TS Maurelle BCWS weather station, which represents wind speed and direction for Cape Mudge Village’s WUI.

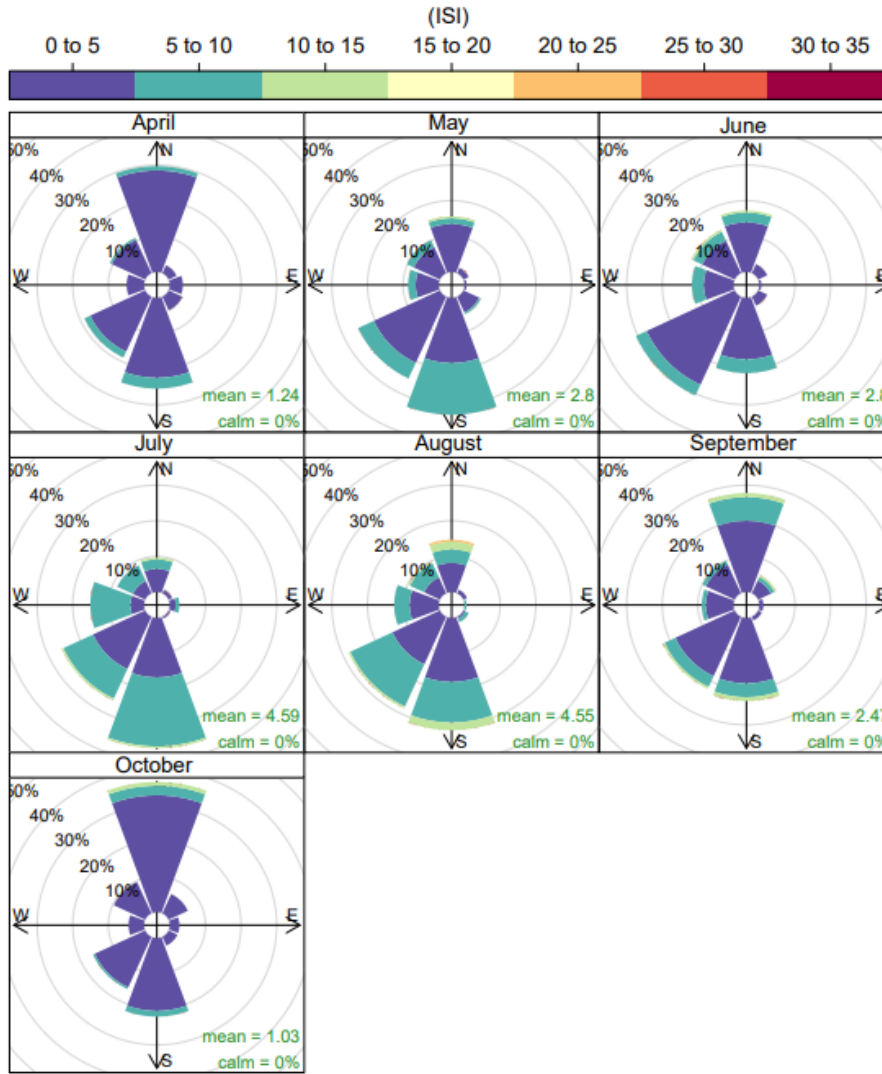
ISI_Rose for QUINSAM BASE FWX (TRIAL) (1093) (2011–2015)



Frequency of counts by wind direction (%)

Figure 8: 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 BCWS fire weather station 2011 – 2015

ISI_Rose for TS MAURELLE (1056) (2010–2015)



Frequency of counts by wind direction (%)

Figure 9: 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 TS 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 (and shown on Map 8 and Map 9) summarizes both of the WUIs threat plots that were completed during CWRP fieldwork in July of 2021. The original WUI threat plot forms and photos for both Cape Mudge Village and Quinsam Reserve will be submitted as a separate document. The following ratings are applied to applicable point ranges:

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

Table 31: Summary of WUI Threat Assessment Worksheets

WUI Plot ID	Geographic Location	Wildfire Behaviour Threat Class	WUI Threat Class
WWK-1	Quinsam Reserve	Moderate (56)	n/a
WWK-2	Quinsam Reserve	Moderate (68)	n/a
WWK-3	Quinsam Reserve	Moderate (74)	n/a
CAPE-1	Cape Mudge Village	Moderate (78)	n/a
CAPE-2	Cape Mudge Village	Moderate (74)	n/a
CAPE-3	Cape Mudge Village	High (96)	High (30)

6.5 APPENDIX E: FUEL TYPING METHODOLOGY AND LIMITATIONS

The initial starting point for fuel typing in both WUIs 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 both WUIs was not available. Fuel types within the WUIs 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 WUIs. 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, 2018.⁵³

⁵³ 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 PROCESS

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 than 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.

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 study area as possible (within time, budget, and access constraints). Threat Assessment plots are completed on the latest version (2013) form, and as per the Wildland Urban Interface Threat Assessment Guide.

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

1. Update fuel-typing using 2015 orthophotography provided by the client and field verification.
2. Update structural data using critical infrastructure data provided by the client and orthophotography.
3. Complete field work to ground-truth fuel typing and threat ratings (completed xx WUI threat plots and xx field stops).
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 Table 29 were used as the basis for building the analytical model. The features chosen are those that are spatially explicit, available from existing and reliable spatial data or field data, and able to be confidently extrapolated to large polygons.

Table 32: Description of variables used in spatial analysis for WUI wildfire risk assessment

WUI Threat Sheet Attribute		Used in analysis?	Explanation
Fuel			
1.	Duff depth and Moisture Regime	No	Many of these attributes assumed by using 'fuel type' as a component of the Fire Threat analysis. Most of these components are not easily extrapolated to a landscape or polygon scale, or the data available to estimate over large areas (VRI) is unreliable.
2.	Surface Fuel continuity	No	
3.	Vegetation Fuel Composition	No	
4.	Fine Woody Debris Continuity	No	
5.	Large Woody Debris Continuity	No	
6.	Live and Dead Coniferous Crown Closure	No	
7.	Live Deciduous Crown Closure	No	
8.	Live and Dead Conifer Crown Base height	No	
9.	Live and Dead suppressed and Understorey Conifers	No	

10.	Forest health	No	
11.	Continuous forest/slash cover within 2km	No	
Weather			
12.	BEC Zone	Yes	Although included, these are broad classifications, meaning most polygons in the Study Area will have the same value
13.	Historical Fire Weather Occurrence	Yes	
Topography			
14.	Aspect	Yes	
15.	Slope	Yes	Elevation model was used to determine slope.
16.	Terrain	No	
17.	Landscape/topographic Limitations to Wildfire Spread	No	
Structural			
18.	Position of Structure/Community on slope	No	Too difficult to quantify – this is a relative value.
19.	Type of development	No	Too difficult to analyze spatially.
20.	Position of assessment area relative to values	Yes	Only distance to structures is used in this analysis, being above, below or sidehill too difficult to analyze spatially.

The field data is used to correct the fuel type polygon attributes provided in the PSTA. This corrected fuel type layer is then used as part of the spatial analysis process. The other components are developed using spatial data (BEC zone, fire history zone) or spatial analysis (aspect, slope). A scoring system was developed to categorize resultant polygons as having relatively low, moderate, high or extreme Fire Threat, or Low, Moderate, High or Extreme WUI Threat. Table 33 below summarizes the components and scores to determine the Fire Behaviour Threat.

Table 33: Components of Fire Threat Analysis

Attribute	Indicator	Score
Fuel Type	C-1	35
	C-2	
	C-3	
	C-4	
	M-3/4, >50% dead fir	25
	C-6	
	M-1/2, >75% conifer	20
	C-7	
	M-3/4, <50% dead fir	
	M-1/2, 50-75% conifer	15

Attribute	Indicator	Score
	M-1/2, 25-50% conifer	10
	C-5	
	O-1a/b	
	S-1	
	S-2	
	S-3	
	M-1/2, <25% conifer	5
	D-1/2	0
	W	0
	N	0
Weather - BEC Zone	AT, irrigated	1
	CWH, CDF, MH	3
	ICH, SBS, ESSF	7
	IDF, MS, SBPS, CWHsds1 & ds2, BWBS, SWB	10
	PP, BG	15
Historical Fire Occurrence Zone	G5, R1, R2, G6, V5, R9, V9, V3, R5, R8, V7	1
	G3, G8, R3, R4, V6, G1, G9, V8	5
	G7, C5, G4, C4, V1, C1, N6	8
	K1, K5, K3, C2, C3, N5, K6, N4, K7, N2	10
	N7, K4	15
Slope	<16	1
	16-29 (max N slopes)	5
	30-44	10
	45-54	12
	>55	15
Aspect (>15% slope)	North	0
	East	5
	<16% slope, all aspect	10
	West	12
	South	15

WUI Risk Classes and their associated summed scores:

Very Low	0
Low	0-35
Moderate	35-55
High	55-65
Extreme	>65

These attributes are summed to produce polygons with a final WUI Risk Score. To determine the Fire Threat score, only the distance to structures is used. Buffer distance classes are determined; <200m, 200m-500m and >500m) but only for polygons that had a 'high' or 'extreme' Fire Threat score from

previous assessment. In order to determine WUI Risk; those aforementioned polygons within 200m are rated as 'extreme', within 500m are rated as 'high', within 2km are 'moderate', and distances over that are rated 'low'.

There are obvious limitations in this method, most notably that not all components of the threat assessment worksheet are scalable to a GIS model, generalizing the Fire Behaviour Threat score. The WUI Threat Score is greatly simplified, as determining the position of structures on a slope, the type of development and the relative position are difficult in an automated GIS process. Structures are considered, but there is no consideration for structure type (also not included on threat assessment worksheet). This method uses the best available information to produce accurate and useable threat assessment across the study area in a format which is required by the UBCM SWPI program.

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

Organization/Government	Contact Title	Email(s)	Phone #	Location
We Wai Kai Nation	Main Office		250-914-1890	Campbell River
Cowichan Tribes	Referrals Coordinator	candace.charlie@cowichantribes.com	250-748-3196	Duncan
Penelakut Tribe	Chief and Council	robert@penelakut.ca	250-246-2321	Chemainus
Lake Cowichan First Nation	Chief and Council	carole@lcfn.ca	250-749-3301	Lake Cowichan
Lyackson First Nation	Chief and Council	referrals@lyackson.bc.ca	1-888-592-5766	Chemainus
Stz'uminus First Nation	Chief and Council	referrals@coastsalishdevcorp.com	250-245-7155	Ladysmith
Halalt First Nation	Chief and Council	referrals@halalt.org	250-246-4736	Chemainus
Nanwakolas Council		referrals@nanwakolas.com	250-286-7200	Campbell River
Wei Wai Kum Nation	Chief and Council	referrals@weiwaikum.ca	250-286-6949	Campbell River
Homalco First Nation		referrals@homalco.com	250-923-4979	Campbell River
K'omoks First Nation	Chief and Council	reception@komoks.ca	250-339-4545	Courtenay
Tla'amin Nation	Chief and Council	john.hackett@tn-bc.ca	604-483-9646	Powell River
Klahoose First Nation	Economic Development and Treaty	kathyfrancis@klahoose.org & kevinpeacey@klahoose.org	250-935-6536	Cortes Island

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 smoldering 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.