

# Ka:'yu:'k't'h'/Che:k:tles7et'h First Nations Community Wildfire Protection Plan



**Submitted to:**

Shaun Koopman – Emergency Program Coordinator, Strathcona Regional District  
Elizabeth Jack – Emergency Coordinator, Ka:'yu:'k't'h'/Che:k:tles7et'h First Nations

**Submitted by:**

SuavAir Aerial Imaging  
info@suavair.com  
250-830-8849

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Ka:'yu:'k't'h'/Che:k:tles7et'h First Nations



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Shaun Koopman – Emergency Program Coordinator, Strathcona Regional District

Elizabeth Jack – Emergency Preparedness Coordinator, Ka:'yu:'k't'h'/Che:k'tles7et'h First Nations

Steinar Våge - Director of Community Services, Ka:'yu:'k't'h' / Che:k'tles7et'h' First Nations

Ben Boghean, Todd Flanagan, Raphael Jamin – North Island Fire Zone, BC Wildfire Service

Quentin Nelson – Forest Fuel Management Liaison, First Nations' Emergency Services Society of BC

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## REGISTERED PROFESSIONAL SIGN & SEAL

	
<p>Colin Filliter, RPF # SuavAir Aerial Imaging</p>	<p>Cynthia Lu, RPF #4923 SuavAir Aerial Imaging</p>
<p>Date Signed: June 25, 2020</p>	<p>Date Signed: June 25, 2020</p>

## EXECUTIVE SUMMARY

The Ka:'yu:'k't'h'/Che:k:tlles7et'h First Nations' Community Wildfire Protection Plan (CWPP) was completed under the framework established by the Community Resilience Investment program, administered by the Union of BC Municipalities. The area of interest is the wildland urban interface (WUI) surrounding the Ka:'yu:'k't'h'/Che:k:tlles7et'h First Nations' (KCFN) community at Kyuquot, on the west coast of Vancouver Island. Kyuquot is a remote community, accessible only by boat, float plane, or helicopter. Most of the area of interest is within KCFN treaty settlement lands. The purpose of this CWPP is to identify the wildfire risks surrounding the community, potential consequences of a wildfire to the community, and to recommend possible ways to reduce the risk.

Prior to 2019, the community has had limited engagement with wildfire protection planning. In October 2019, the First Nations' Emergency Services Society completed a Community FireSmart Hazard Assessment; and in April 2020 the updated community Emergency Plan was completed. Both the Hazard Assessment and Emergency Plan were used to prepare the recommendations within this CWPP.

The fuel type in the area is dominantly mature conifer forests. Previous fire history in the area indicates a low number of ignitions from both human and lightning causes. The local wildfire threat classification is Moderate. The local wildfire risk classification ranges from Low to High, with higher risk areas associated with fuels in close proximity (within 500m) of the community.

Although the wildfire threat is Moderate and wildfire risk is generally Moderate, the community's remote location, limited communication networks, and distance from other resources creates unique challenges. The recommendations in this report are summarized in the table below. The recommendations are based on a review of best practices from other jurisdictions, gaps identified through community engagement, the local wildfire risk analysis, actions to help prevent human-caused ignitions, and integration of FireSmart program principles. FireSmart is a national initiative to educate and empower the public on what can be done to protect their families, properties, and communities from wildfire.

Fuel management activities should be focused within the first 100 meters of forested areas near the community. FireSmart practices, starting with the first 10 meters around each structure, should be adopted by each household and by the KCFN for critical community infrastructure. Along with fuel management, community awareness and education play a critical role in reducing the wildfire risk. Community awareness focuses on FireSmart principles, understanding fire use restrictions, and regularly sharing fire safety related information with the community.

The BC Wildfire Service provides wildfire response services on treaty settlement lands and provincial crown land. The community is not served by a local fire department. Recommendations in this plan aim to improve the availability of local fire suppression equipment and community training in fire/emergency response. The initial step is to inventory the existing equipment and survey the community to understand individuals' level of training and interest in further training. A community specific equipment and training needs analysis should be conducted.

This plan makes 26 recommendations to the Ka:'yu:'k't'h'/Che:k:tlles7et'h First Nations and Strathcona Regional District. The recommendations should be further prioritized by the community depending on local strengths, opportunities, and the availability of human, financial, and physical resources. At minimum, the plan should be revisited every five years to assess the progress and relevance of previous recommendations and for the continual improvement of wildfire protection planning as more information becomes available.

## SUMMARY OF 2020 CWPP RECOMMENDATIONS

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
1.	Med	To reduce the likelihood of human-caused WUI fire events by regulating the use of fires and fireworks on KCFN lands.	Develop a local policy to regulate the use of fire and fireworks during periods of high/extreme fire danger on treaty lands.	KCFN
Rationale: Recommended best practice to reduce the risk of human-caused WUI fire events during high fire danger.				
2.	High	To complete FireSmart recommendations listed in the 2019 Community Hazard Assessment Report.	The next step is to sponsor a local FireSmart Board and work on clearing Priority Zone 1A (non-combustible) and Zone 1 (1.5-10m) around structures in the community.	KCFN
Rationale: The FireSmart program is a nationwide initiative. Several post-wildfire examples across the country show how FireSmart activities reduce the structure losses associated with WUI fires. FireSmart activities are a focus area for all CWPP's developed under the UBCM CRI funding program. FireSmart is implemented through best practices in 7 disciplines: education, emergency planning, vegetation management, legislation, development, interagency cooperation and cross-training. FNESS has completed a Community Hazard Assessment and outlined next steps for FireSmart program implementation within the community.				
3.	High	To conduct FireSmart activities around the identified Priority Areas listed in Table 7.	Encourage residents to start with clearing the non-combustible 0-1.5m zone around their homes, then Priority Zone 1. Public works department to work on areas surrounding community infrastructure.	KCFC
Rationale: As above.				
4.	Med	To improve community awareness of wildfire threat, risk to the community, and risk mitigation opportunities.	Contact a Local FireSmart Representative to deliver FireSmart awareness and Community Champion workshop.	KCFN
Rationale: As above.				
5.	Med	To reduce the risk of ignitions within the structural ignition zone.	Review the FireSmart Canada Home Development Guide and BC FireSmart Begins at Home	KCFN

			Manual, ensure new construction or structural upgrades to existing buildings use the FireSmart preferred materials.	
Rationale: As above. Development standards are a FireSmart discipline.				
6.	Med	To reduce the fuel hazard in the recommended treatment areas.	Work with a qualified registered professional to complete and implement site level prescriptions for the recommended treatment areas.	KCFN with FNESS support
Rationale: Recommended treatment areas based on local wildfire risk analysis. Moderate risk areas within 100m of the community prioritized for treatment.				
7.	High	To make this Plan and its associated maps available to the community.	Upload a digital copy of the CWPP to the KCFN and SRD Emergency Planning websites.	KCFN and SRD
Rationale: Recommended best practice for community education and awareness regarding wildfire protection planning and FireSmart program implementation.				
8.	High	To improve community awareness of wildfire threat and risk to the community.	Regular communications to community members (flyers, notice boards, emails, social media accounts). Recommend at least one fire related communication per month (more often during fire season if required).  Content of the communications include reminders on FireSmart guidelines, fire danger ratings, fire bans, fire prevention tips, air quality alerts etc. Share relevant social media posts made by SRD, BCWS, EMBC, FireSmart BC	KCFN and SRD
Rationale: Recommended best practice for community education and awareness regarding wildfire protection planning and FireSmart program implementation.				

9.	High	To improve community awareness of emergency preparedness, wildfire risk, and risk mitigation opportunities.	<p>Organize an annual Community Fire Safety day.</p> <p>Activities may include checking fire extinguishers and smoke alarms in homes, conducting FireSmart clearing of Priority 1 (up to 10m) zones around homes, fire extinguisher practice, water suppression system (fire hydrants) practice, evacuation drills</p> <p>The Safety day could be timed with Fire Prevention Week which takes place annually during the 2<sup>nd</sup> week of October each year. October 4 to 10, 2020 is the next Fire Prevention Week.</p>	KCFN
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Rationale: Recommended best practice for community education and awareness about wildfire protection planning and FireSmart program implementation. Addresses education and emergency planning FireSmart disciplines.

10.	High	To improve inter-agency communication regarding wildfire risk, emergency preparedness, response, and recovery.	SRD should arrange a regional meeting with community officials at the start of fire season to review communication, support, incident command structure, and emergency procedures. This meeting should involve community representatives, SRD, and Coastal Fire Centre – North Island Fire Zone staff.	SRD
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Rationale: Key contacts and individuals may change from year to year. Annual meetings recommended as a best practice to build relationships and improve communication in the event of a WUI event. Interagency cooperation and cross-training are FireSmart disciplines.

11.	Low	To improve communication of emergency preparedness activities to the community.	Develop an Emergency Preparedness Communication Plan that considers how to communicate with the community about emergency preparedness and evacuation for wildfires along with other natural events such as tsunamis, earthquakes, and landslides.	KCFN, with support from Emergency Plan contractor
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Rationale: Local emergency evacuation plan is now completed. Best practice is to have a plan to communicate its contents to the community.

12.	High	To improve community and public awareness of fire danger through signage.	Work with BCWS North Island Fire Zone to submit a proposal to install Wildfire Information signage at the Fair Harbour Marina.	KCFN and SRD
Rationale: Recommended best practice for community education and awareness about wildfire protection planning and FireSmart program implementation. Public awareness is a FireSmart discipline.				
13.	High	To improve community capacity in responding to structural and WUI fires.	Complete an inventory of fire suppression equipment available in the community.	c
Rationale: Based on CWPP engagement, a comprehensive inventory of available fire suppression equipment is not readily available. An inventory is recommended to identify gaps in equipment availability.				
14.	High	To improve community capacity in responding to structural and WUI fires.	Conduct a community specific fire suppression equipment needs analysis. Based on the analysis, work to procure additional equipment that may be required including water pumps, hoses, water storage, hand tools, etc.	KCFN, FNESS to support
Rationale: Based on CWPP engagement, a comprehensive inventory of available fire suppression equipment is not readily available. A community specific needs assessment, along with an inventory are recommended to address gaps in equipment availability. Self-sufficiency in equipment availability is critical due to the isolated and remote location of the community.				
15.	Low	To clear and maintain a helicopter staging area for emergency evacuations and/or wildfire response operations.	Maintain the existing helicopter landing/staging. Keep this area free of obstructions, loose debris and overhanging vegetation or obstacles. Maintain access control (i.e.: fencing) around the area. Clearly mark this location so it is visible from land and air.  A second helicopter landing area should be designated near the KESS/evacuation muster station.	KCFN
Rationale: Recommended best practice for emergency access and evacuation planning.				
16.	High	To ensure emergency evacuation of community members is possible on short notice.	Conduct an inventory of physical resources (vehicles/boats, licensed drivers, fuel) available to conduct emergency evacuation of all community members. Procure any additional resources that may be required.	KCFN

Rationale: Recommended best practice for emergency access and evacuation planning.				
17.	High	To engage the community in wildfire response planning and document what local skills and resources are available.	Survey the community to determine what formal training in emergency response, wildfire response (i.e.: S100), and other technical expertise (i.e.: chainsaw operation, danger tree assessment) is available.	KCFN
Rationale: Recommended best practice to assess skills and resources available within the community, especially important due to the isolated/remote location of the community.				
18.	High	To improve community capacity in emergency management and planning.	Conduct a community specific training needs analysis and training plan to improve capacity in wildfire response, emergency support services, incident command systems, and emergency operations center.	KCFN
Rationale: Recommended best practice to help ensure available human resources in the community to provide support services during an emergency, especially important due to the isolated/remote location of the community.				
19.	Med	To establish and maintain a working relationship with BCWS North Island Fire Zone.	Contact BCWS to explore opportunities for community training days, joining the Fire Warden program.	KCFN
Rationale: Potential employment opportunity and opportunity for cross-training.				
20.	High	To improve community capacity in responding to structural and WUI fires.	Host community training days to practice use of fire extinguishers, available fire tools, and the hydrant system.	KCFN
Rationale: Due to the isolated/remote location of the community, to improve community readiness to respond to fires with available local equipment. No formal procedures or training protocols are known to be in place.				
21.	Med	To establish a volunteer fire department for the community with trained emergency responders.	Recruit interested community members to join. Work with FNESS to identify training and equipment needs.	KCFN / FNESS to support
Rationale: Due to the isolated/remote location of the community, to improve community readiness to respond to fires with available local equipment. No formal procedures or training protocols are known to be in place. Community interest in this was indicated during CWPP engagement.				

<b>22.</b>	Med	To improve community awareness and capacity to respond to WUI fire incidents.	Make S100 (Basic Fire Suppression and Safety) & S185 (Fire Entrapment Avoidance and Safety) courses available annually or biennially within the community.	KCFN / FNESS to support
Rationale: From CWPP engagement, no formal procedures or training protocols are known to be in place. Due to the isolated/remote location of the community, formal training will improve community readiness to respond to fires with available local equipment.				
<b>23.</b>	Med	To improve capacity in fire protection leadership governance.	Work with FNESS to ensure administrative staff have Foundational Training, beginning with Tier 1 and progressing to Tier 3 over the next 5 years.	KCFN / FNESS to support
Rationale: Recommended best practice to help ensure available human resources in the community to provide support services during an emergency, especially important due to the isolated/remote location of the community.				
<b>24.</b>	High	To reduce the risk of structure fires negatively impacting human safety and reduce the risk of structure fires causing WUI incidents.	Annual checks for smoke alarms and fire extinguishers.  Purchase and install alarms and extinguishers for any structures without.	KCFN
Rationale: Recommended best practice to implement a formal protocol to ensure equipment in homes is up to date. Especially important due to the isolated/remote location of the community.				
<b>25.</b>	Low	To reduce the likelihood of structural ignitions during a WUI fire event.	Purchase exterior sprinkler kits for homes; provide training to the community for how to set up the kits  Consider the water availability for sprinkler systems, additional water storage reservoirs are likely required to ensure water pressure and availability.	KCFN
Rationale: Based on CWPP engagement, the equipment availability for structural protection in the region could be improved. Sprinkler kits are a relatively low cost option for the Village and residents.				
<b>26.</b>	High	To improve community capacity in responding to structural and WUI fires.	Practice the Fire Response procedures as outlined in the Emergency Plan.	KCFN
Rationale: A recommended best practice is to develop a regular practice schedule for fire response procedures can improve community readiness to response to a structure/WUI fire event.				

Table 1. Summary of known resources and funding supports for recommended activities.

<b>Resources</b>	<b>Land Jurisdiction</b>	<b>Types of Projects</b>
Local government taxation or other funds	Municipal Private	<ul style="list-style-type: none"> <li>• Various projects as directed by local governments including FireSmart assessments and activities, debris disposal, equipment purchases, training, etc.</li> </ul>
Regional District Grant-In-Aid	n/a	<ul style="list-style-type: none"> <li>• Non-profit community organizations eligible to apply for funding for projects that benefit the general community</li> </ul>
Forest Enhancement Society BC (FESBC)	Provincial Crown	<ul style="list-style-type: none"> <li>• Fuel management treatment prescriptions and prescription implementation</li> </ul>
UBCM Community Resiliency Investment Program (CRI)	Municipal First Nations Private	<ul style="list-style-type: none"> <li>• FireSmart hazard assessments, demonstration projects, off-site debris disposal (i.e.: chip trucks)</li> <li>• Community Education</li> <li>• Development planning</li> <li>• Emergency planning and cross training</li> </ul>
UBCM Community Emergency Preparedness Fund (CEPF)	n/a	<ul style="list-style-type: none"> <li>• Emergency support services training</li> <li>• Fire department training or equipment</li> <li>• Emergency evacuation planning</li> <li>• Emergency operations training</li> </ul>
First Nations Emergency Support Services – Indigenous Services Canada (FNESS/ISC)	First Nations lands	<ul style="list-style-type: none"> <li>• Fuel management prescriptions and treatments On-Reserve</li> <li>• Emergency planning and training</li> </ul>
BC Wildfire Service	Provincial Crown	<ul style="list-style-type: none"> <li>• Fuel management treatments (in coordination with local fire zone officer)</li> <li>• Public education and outreach</li> </ul>

## LIST OF ACRONYMS

Acronym	Full Name / Phrase
AOI	Area of Interest
BCWS	BC Wildfire Service
CFFBPS	Canadian Forest Fire Behaviour Prediction System
CRI	Community Resilience Initiative
CWPP	Community Wildfire Protection Plan
EMBC	Emergency Management BC
FBP	Fire Behaviour Prediction System
FNESS	First Nations' Emergency Services Society
FNHA	First Nations' Health Authority
FSR	Forest Service Road
FWI	Fire Weather Index
GIS	Geographical Information System
ISI	Initial Spread Index
KCFN	Ka:'yu:'k't'h'/Che:k:tl̓es7et'h First Nations
KESS	Kyuquot Elementary Secondary School
LIDAR	Light Detection and Ranging
LFR	Local FireSmart Representative
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
RESULTS	Reporting Silviculture Updates and Land Status Tracking System
PSTA	Provincial Strategic Threat Analysis
SRD	Strathcona Regional District
TFL	Tree Farm Licence
UBCM	Union of BC Municipalities
WUI	Wildland Urban Interface

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## **SECTION 1: INTRODUCTION**

The Community Resiliency Investment (CRI) program is a provincial program intended to reduce the risk and impact of wildfire to communities in BC through community funding and supports priority fuel management activities on provincial Crown land and private land. One of the primary components of the CRI program is to provide FireSmart Community Funding and Supports. The Union of BC Municipalities (UBCM), First Nations' Emergency Services Society (FNESS) and the Forest Enhancement Society of BC (FESBC) work with the Ministry of Forests, Lands, Natural Resource Operations & Rural Development (FLNRORD), represented by the BC Wildfire Service (BCWS), to administer this portion of the program for local government and First Nation applicants.

Wildfire is an integral part of British Columbia's ecosystems and landscapes, including areas where citizens settle and communities grow. Due to an increasing population with expanding rural development and the impacts of climate change, more communities in B.C. are located in areas of potentially increased wildfire risk. The Community Wildfire Protection Plan (CWPP) process helps communities develop plans to improve safety, lower the risk of damage to property, and reduce the impacts of wildfires to BC communities.

This CWPP is organized into the following major sections:

**SECTION 1: Introduction** - Explains the purpose of a CWPP and the CWPP planning process

**SECTION 2: Local Area Description**- Defines the Area of Interest (AOI) for the CWPP; provides a description of the community within the AOI

**SECTION 3: Values at Risk** - Introduces the extent to which wildfire has the potential to impact values within the community

**SECTION 4: Wildfire Threat and Risk** - Describes the process that was undertaken to identify and summarize the fuel hazard and other factors that contribute to the wildfire threat around the community

**SECTION 5: Risk Management and Mitigation Factors** - Outlines the strategies a community can put into practice to reduce the risk and the impact of a wildfire in four subsections

5.1 Fuel Management: identifies and prioritizes fuel management treatments

5.2 FireSmart Planning and Activities: summarizes the current level of FireSmart implementation and identifies priority areas for future FireSmart activities

5.3 Community Communication and Education: describes the key steps required to build engagement and support within the community for the CWPP. This includes education and outreach and local community prevention programs.

5.4 Other Preventative Measures: identifies local actions and strategies that reduce the threat of wildfires

**SECTION 6: Wildfire Response Resources** – provides a high-level overview of the resources that are available to local governments in the case of a wildfire.

## 1.1 Purpose

The purpose of this CWPP is to identify wildfire risks to the Ka:'yu:'k't'h'/Che:k:tlles7et'h First Nations (KCFN) community, describe potential consequences of a potential wildfire near the community, to examine options to reduce wildfire risk, and to create a detailed framework to implement specific actions that will reduce the negative impacts of wildfire to the community.

The goal of this CWPP is to identify threats to human life, property, and critical infrastructure from wildfires and identify specific measures to mitigate those threats in a clearly defined action plan supported by the community. KCFN has expressed concern for its readiness and preparedness for community fires and wildfires. This community specific CWPP considers the unique remote location of the community, limited egress routes and external resource availability.

The CWPP planning process will provide the community with a detailed framework to inform the implementation of specific actions that will result in:

- Reduced likelihood of a wildfire entering the community
- Reduced impacts and losses to property and critical infrastructure
- Reduced negative economic and social impacts to the community

## 1.2 CWPP Planning Process

The CRI program is a provincial grant program administered by the Union of BC Municipalities (UBCM) to help fund costs associated with preparing CWPPs. Since the CRI program was founded in 2018, over 120 First Nations and local governments have received funding for CWPP development.<sup>1</sup> The Strathcona Regional District (SRD) obtained a CRI grant to develop community wildfire protection plans for Electoral Area A including participating communities of the Village of Sayward, Village of Gold River, Village of Tahsis, Village of Zeballos, Nuchatlaht First Nation, Ka:'yu:'k't'h'/Che:k:tlles7et'h First Nations; and for Read Island within Electoral Area C. In Fall 2019, SuavAir Aerial Imaging Inc. was contracted by the SRD to carry out the project in collaboration with municipal governments, First Nations, regional stakeholders, provincial government agencies, and residents.

The CWPP planning process consists of the following phases:

1. Background research – general community characteristics, economic profiles, demographics, community plans, emergency planning, critical infrastructure, fire history, fire weather, property values, environmental values, cultural values, land jurisdiction, and relevant legislation.
2. Consultation with local governments, First Nations, regional district, provincial agencies – to identify values at risk, existing fire suppression capacity, and understand current community engagement with respect to wildfire risk mitigation
3. GIS Analyses – review Provincial Strategic Threat Analysis (PSTA) data, using best available information including LiDAR data, updated forest cover and ortho imagery, adjust data for fuel typing errors, modify threat and risk classification where necessary

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<sup>1</sup> Union of BC Municipalities. Community Resiliency Investment.  
(<https://www.ubcm.ca/EN/main/funding/lgps/community-resiliency-investment.html>)

4. Field Work – verification of critical infrastructure, fuel types, identification of community specific values at risk
5. Draft report and mapping development – identification of measures to mitigate risks, make recommendations for action
6. Report review – professional peer review, regional district and community review
7. Community engagement and education – community presentations, follow-up

Understanding the relationship of the community to its surrounding environment, and what that means in terms of the wildfire hazard, threat and risk of loss, is critical to help the community plan for mitigation activities and respond to wildfire events. To support this understanding, the BCWS has conducted a Provincial Strategic Threat Analysis (PSTA) for the identification of wildfire threat and potential fire behaviour. The outputs of the PSTA were made available to SuavAir for the study and analysis of this CWPP including: WUI Risk Class Polygons, Fuel Type layers, Wildfire Threat, Head Fire Intensity, Spotting, Fire History, WUI structure density classes, proposed and completed fuel treatments post-2013, and Initial Spread Index (ISI) Roses. Other relevant data was gathered through field visits to the communities, stakeholder engagement, and publicly accessible data from the BC Government Data Catalogue.

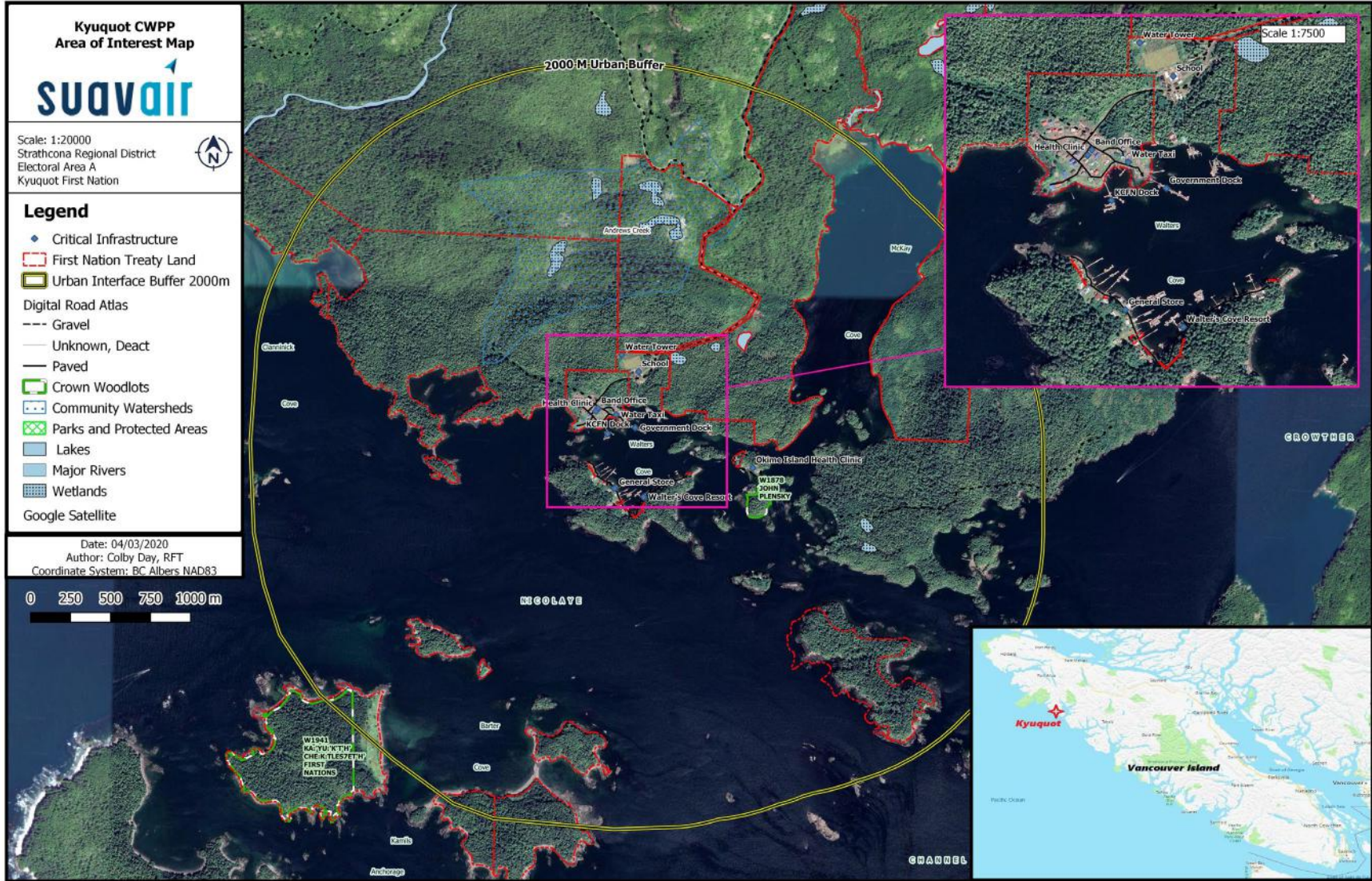
## **SECTION 2: LOCAL AREA DESCRIPTION**

The intent of this section is to define the Area of Interest (AOI) for the CWPP, provide a description of the community (or communities) within the AOI, summarize current community engagement, and identify linkages to other plans that provide valuable information to reduce the threat of wildfires.

### **2.1 CWPP Area of Interest**

The area of interest (AOI) is the Ka:'yu:'k't'h'/Che:k:tlles7et'h First Nations community of Kyuquot and its surrounding wildland urban interface (WUI). The AOI includes a 2km buffer around Kyuquot where structure density is greater than 6 to 25 structures per km<sup>2</sup>. Map 1 shows the AOI.

Kyuquot is a remote community on the west coast of Kyuquot Sound accessible only by water, it has no road connectivity to populated communities on Vancouver Island. The main access route is by the Zeballos Forest Service Road (FSR) approximately 150km north of Campbell River on Highway 19. Follow Zeballos FSR for about 42km to the Village of Zeballos, then turn onto Fair Harbour FSR to travel another 32km to reach Fair Harbour. From Fair Harbour, Kyuquot is accessible by boat/water taxi. Alternatively, some visitors fly to Kyuquot from Gold River, BC on chartered float planes. The nearest cellular phone service is in Woss, 20km to the south of the Zeballos FSR and Highway 19 junction. Chamiss Mainline is a gravel forestry road that connects Kyuquot to Chamiss Bay where there is a land-based logging camp currently operated by Interfor Corporation. Access to Chamiss Bay is also by boat or float plane.



Map 1. KCFN CWPP area of interest.

## 2.2 Community Description

The AOI includes KCFN Maa-nulth First Nations treaty settlement lands<sup>2</sup>, private lots, and provincial crown forest land. Land ownership classes are summarized in Table 2 and Map 2. Walter's Island is 300m to the south and is addressed in a separate Strathcona Regional District Electoral Area A CWPP. KCFN owned businesses Purple Palace Hostel and Walter's Cove Resort are located on Walter's Island. Economic drivers of the area include seasonal sport-fishing, kayak/water-based tourism, aquaculture, and forestry.

Kyuquot does not have a local fire department or formalized first responder services. Community services include the Kyuquot Elementary Secondary School (School District #84), Kyuquot Health Centre, water and sewage services (large infrastructure upgrades planned 2020-24). Kyuquot is connected to the BC Hydro power grid, with utility infrastructure managed by Kyuquot Power Ltd.

Table 2. Summary of land ownership within the AOI.

Land Ownership	Area (ha)
KCFN Treaty Settlement Areas	256
Private	79
Provincial crown land	501
Municipal	7
Water	1073
<b>TOTAL</b>	<b>1915</b>

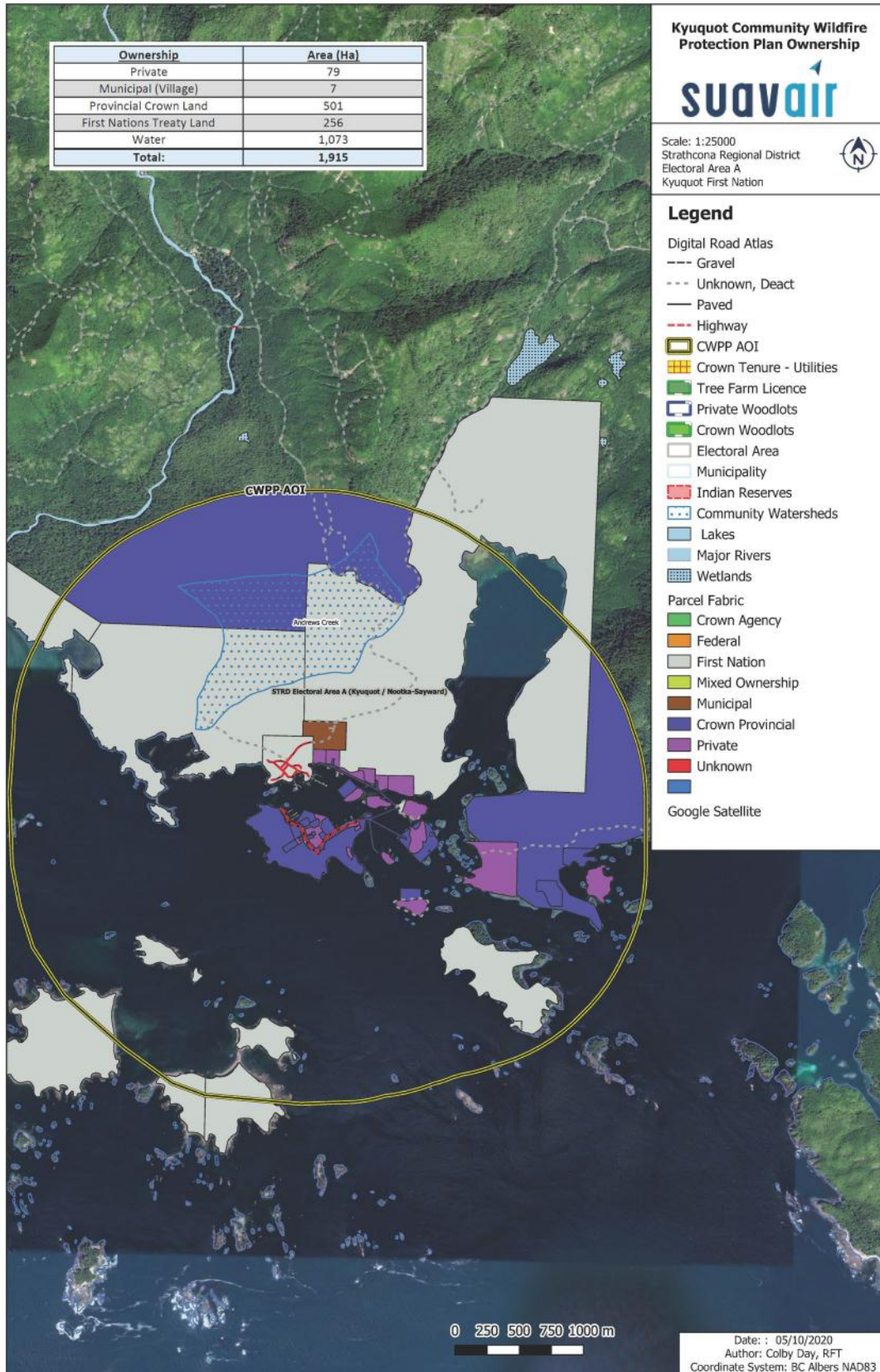
## 2.3 Past Wildfires, Evacuation, and Impacts

The Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD) and BC Wildfire Service (BCWS) manage a provincial database of historical fire ignitions and fire perimeters. This data was reviewed as part of the CWPP planning process. According to this provincial database, there have been no previously recorded fires within the AOI. KCFN administration has indicated that no structural fires have occurred within the community in recent memory.

A severe thunderstorm in August 2018 caused numerous lightning-initiated wildfires on northern Vancouver Island. Heavy smoke from the 2018 Zeballos and Chamiss Bay fires significantly impacted the community. The 2018 Zeballos Wildfire threatened the Zeballos Forest Service Road (FSR), the only road access to Fair Harbour, where most KCFN community members travel to by boat in order to reach larger communities on Vancouver Island for services.

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<sup>2</sup> Maa-nulth First Nations Final Agreement. 2009. [https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-BC/STAGING/texte-text/mna\\_fa\\_mnafa\\_1335899212893\\_eng.pdf](https://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-BC/STAGING/texte-text/mna_fa_mnafa_1335899212893_eng.pdf)



Map 2. Land ownership classification within the AOI.

## 2.4 Current Community Engagement

This CWPP is the first plan of its kind to be completed for the community. Related engagement in wildfire protection planning occurred in September 2019, when the First Nations' Emergency Services Society of BC (FNESS) completed a community level Fire Hazard Assessment Report consistent with FireSmart guidelines. The complete report is included in Appendix 4: FireSmart Community Hazard Assessment (2019), and recommendations are summarized in Section 5.2. No previous fuel treatments have been completed in the AOI.

## 2.5 Linkages to Other Plans and Polices

The intent of this sub-section is to identify the sources and linkages to other documents in order to minimize duplication while identifying other plans or legal requirements that are relevant to the CWPP planning process. It also discusses the relevance of objectives, strategies and polices that will influence the development of the CWPP.

### 2.5.1 Local Authority Emergency Plan

Under the legislated authority of the Maa-nulth Final Treaty Agreement and KCFN Constitution<sup>3</sup>, the KCFN government has the authority to make laws pertaining to emergency preparedness. The KCFN's Draft Emergency Plan was completed in April 2020 and is awaiting adoption through the KCFN Legislature. The Draft Emergency Plan was used as input for the sections of this report related to emergency response.

### 2.5.2 Affiliated CWPPs

Affiliated CWPPs include the Strathcona Regional District Electoral Area A CWPP, covering Walter's Island, completed concurrently with this plan.

### 2.5.3 Local Government and First Nation Plans and Policies

The KCFN are governed by KCFN laws<sup>4</sup> established under the authority of the KCFN Constitution and the Maa-nulth First Nations Final Treaty Agreement. In general, the use of fire is not specifically regulated. The KCFN *Environmental Protection Act*<sup>5</sup> does not prohibit the "the burning of leaves, foliage, weeds, crops or stubble for domestic or agricultural purposes;" and fires set or controlled by a person (A) acting under an order of the director if the director orders the fires for training purposes, (B) carrying out fire control under section 9 of the Wildfire Act (British Columbia), or (C) if the fires are resource management open fires under the Wildfire Act (British Columbia) and are lit, fuelled or used in accordance with that Act." On provincial crown lands within the AOI, provincial legislation and regulations apply.

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<sup>3</sup> Ka:'yu:'k't'h'/Che:k:tl'es7et'h' First Nations. Constitution.

[https://www.maanulth.ca/downloads/Constitution\\_Kyuquot\\_Checlesaht.pdf](https://www.maanulth.ca/downloads/Constitution_Kyuquot_Checlesaht.pdf)

<sup>4</sup> Ka:'yu:'k't'h'/Chek'tles7et'h' First Nations Laws. [https://www.maanulth.ca/laws\\_kyuquot\\_checlseht.asp](https://www.maanulth.ca/laws_kyuquot_checlseht.asp)

<sup>5</sup> KCFN. Environmental Protection Act.

[https://www.maanulth.ca/laws/kyuquot\\_checlseht/kcfn\\_environmental\\_protection\\_act\\_\(00308119\).pdf](https://www.maanulth.ca/laws/kyuquot_checlseht/kcfn_environmental_protection_act_(00308119).pdf)

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
1.	Med	To reduce the likelihood of human-caused WUI fire events by regulating the use of fires and fireworks on KCFN lands.	Develop a local policy to regulate the use of fire and fireworks during periods of high/extreme fire danger on treaty lands.	KCFN

## 2.5.4 Higher Level Plans and Relevant Legislation

The AOI encompasses areas of the Maa-nulth First Nations Final Treaty Agreement treaty settlement lands. For portions occupying provincial crown land, the AOI is within Vancouver Island Land Use Plan (VILUP) Special Management Zone 5 – South Brooks-Bunsby. The AOI is within the Kashutl Landscape Unit, at this time there is no approved Landscape Unit Plan. Provincial forestry legislation applicable to provincial Crown Land includes the *Forest and Range Practices Act* and its associated regulations, and the *Wildfire Act* and its associated regulations. Other relevant legislation includes the *Heritage Conservation Act*, *Land Act*, *Environmental Management Act*, and *Open Burning Smoke Control Regulation*.

### **BC Wildfire Act and Wildfire Regulation**

Under the *Wildfire Act*, the government may order open fire bans, create restricted areas, restrict certain activities, and recover fire control costs amongst other activities and actions laid out in the *Act*. The *Wildfire Act* pertains to all “forest land” and “grass land” and lands within 1km of “forest land” and “grass land” regardless of public or private ownership. The *Wildfire Act* and *Wildfire Regulation* require those carrying out industrial activities to conduct fire hazard assessments and to abate hazards that are identified.

For industrial activities inside or within 2km of a fire protection district: fire hazard assessments are required to be conducted at 3 month intervals during which industrial activities are taking place (*Wildfire Regulation*, Section 11(2)(a)). For non-forest tenure holders conducting industrial activities: hazard abatement is required within 6 months of the hazard assessment (*Wildfire Regulation*, Section 12 (1)). Forest tenure holders are required to abate hazards within 24 months of the beginning date of the industrial activity (i.e.: forest harvesting) (*Wildfire Regulation*, Section 12.1(2)(a)).

Kyuquot is outside of a Fire Protection District. For industrial activities outside 2km of a fire protection district, fire hazard assessments are required to be conducted at 6 month intervals during the period of industrial activities (*Wildfire Regulation* Section 11(3)). The required hazard abatement must occur within 30 months of the beginning date of the activity in the area.

For utility transmission operations, the *Wildfire Regulation* Section 10, requires that utility transmission equipment operating on or within 300m of forest land or grass land must be maintained in a manner that reduces the likelihood of producing an ignition source, and the site maintained in a manner that prevents fire spreading from the site.

## 2.5.5 Ministry or Industry Plans

The AOI is within the Campbell River Natural Resource District and North Island Fire Zone. No fuel treatment plans, forest health plans, ecological restoration plans, parks/protected area plans are known to apply at this time. Interfor Corporation’s North Island Replacement Forest

Stewardship Plan (FSP) overlaps portions of provincial crown forest within the AOI. The FSP does not address fire management or fuel treatment opportunities.

The AOI is within the Low risk polygon according to the BCWS Fuel Hazard Assessment and Abatement Fire Risk Map.<sup>6</sup> The risk class determines the threshold for fuel abatement, for industrial and prescribed activities, as recommended in the Guide to Fuel Hazard Assessment and Abatement in British Columbia.<sup>7</sup>

The MFLRNORD Vancouver Island Central Coast Response Fire Management Plan, a framework for wildfire suppression and response, applies to the area. BCWS/FLNRORD guidance on wildfire management and fuel management is updated periodically and posted online.<sup>8</sup> MFLRNORD guidance includes the 2019 Fuel Management Prescription Guidance<sup>9</sup> and 2019 Tactical Fuel Management Planning Standard.<sup>10</sup>

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<sup>6</sup> BCWS Post Harvest Hazard Abatement Map.

<https://governmentofbc.maps.arcgis.com/apps/webappviewer/index.html?id=9bb5372c65464f0bab178907a5c39947>

<sup>7</sup> Wildfire Management Branch. A Guide to Fuel Hazard Assessment and Abatement in British Columbia.

[https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/hazard-assessment-abatement/bcws\\_hazard\\_assessment\\_abatement\\_guide.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/hazard-assessment-abatement/bcws_hazard_assessment_abatement_guide.pdf)

<sup>8</sup> BCWS. Wildfire Prevention. <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/vegetation-and-fuel-management/fire-fuel-management/fuel-management>

<sup>9</sup> [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2019\\_fuel\\_management\\_prescription\\_guidance.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2019_fuel_management_prescription_guidance.pdf)

<sup>10</sup> [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2019\\_tactical\\_fuel\\_management\\_planning\\_standard.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2019_tactical_fuel_management_planning_standard.pdf)

## SECTION 3: VALUES AT RISK

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

### 3.1 Human Life and Safety

The 2016 census data shows the population of Kyuquot at 181.<sup>11</sup> The estimated population in the surrounding area (Walter's Island and other islands) is about 35 full-time residents. Several fishing lodges and accommodation providers operate in the area during the summer months including Walter's Cove Resort and Purple Palace Surf & Paddle Hostel operated by KCFN. The influx of seasonal visitors significantly increases the local population during fire season months.

### 3.2 Critical Infrastructure

The intent of this sub-section is to clearly identify and understand where critical infrastructure is located in order to effectively determine the wildfire risk and identify mitigation activities.

- **Publicly and provincially owned critical infrastructure (CI)** are assets owned by the Provincial government, local government, public institution (such as health authority or school district), First Nation or Treaty First Nation that are essential to the health, safety, security or economic wellbeing of the community and the effective functioning of government, or assets identified in a Local Authority Emergency Plan Hazard, Risk & Vulnerability and Critical Infrastructure assessment.

Critical community infrastructure includes the Kyuquot Elementary Secondary School (KESS), Kyuquot Health Centre, KCFN office, KCFN Community Centre, back-up power generator, KCFN dock, community water tower, and the federal Government of Canada dock.

#### 3.2.1 Electrical Power

Kyuquot is connected to the BC Hydro grid through wooden pole distribution lines from Zeballos, across Kyuquot Sound from Fair Harbour to Chamiss Bay and south to Kyuquot. Kyuquot Power Ltd. operates the distribution utility lines from Fair Harbour to Kyuquot. Wooden poles are particularly vulnerable to fire. Additionally, the distribution line travels along forested rights-of-way vulnerable to fire and storm damage. The community is connected to a back-up diesel powered generator that can support a reduced demand throughout the community.

#### 3.2.2 Communications, Pipelines and Publicly Owned Buildings

The AOI is not serviced by natural gas pipelines. There are no known communications towers or repeater sites within the AOI. The nearest communications tower is outside of the AOI at the height of land above McKay Cove. Currently, cellular phone service is unavailable in the

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<sup>11</sup> Statistics Canada. <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=5924806&Geo2=CD&Code2=5924&SearchText=housitas&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0>

community. Satellite internet, land line phone, and television services are available. First Responder coverage is accessed via VHF radio on Channels 10 and 14.

### 3.2.3 Water and Sewage Infrastructure

Water and sewage services in Kyuquot will be undergoing a major upgrade starting in 2020. Infrastructure upgrades will include replacing and relocating water storage takes, upgrading water treatment capabilities, replacing water distribution pipes, and replacing sewer pipes. Following the upgrades, regular tests should be done on the water hydrant system to ensure functionality. Any upgrades or construction of new critical infrastructure such as water tanks or treatment facilities should follow the FireSmart Canada Home Development Guide.<sup>12</sup>



Photo 1. An aerial view of critical infrastructure within the Kyuquot Community.

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<sup>12</sup> FireSmart Canada. FireSmart Begins at Home – Home Development Guide. [https://firesmartcanada.ca/wp-content/uploads/2019/10/FS\\_Developer\\_Booklet.pdf](https://firesmartcanada.ca/wp-content/uploads/2019/10/FS_Developer_Booklet.pdf)

### 3.3 High Environmental and Cultural Values

The intent of this sub-section is to clearly identify and understand where high environmental and cultural values are located within the AOI in order to effectively determine wildfire risk and identify mitigation activities.

#### 3.3.1 Drinking Water Supply Area and Community Watersheds

Community drinking water is sourced from Clanninick Creek. Clanninick Creek is not within a designated Community Watershed. Andrews Community Watershed is adjacent to the community but does not appear to be the source of Kyuquot's water. Water is drawn to two water storage reservoir tanks located above the community near the school field. Communities that depend on surface water should be aware that wildfire has the potential to cause significant damage to soils, high rates of sedimentation and/or landslides that can degrade water quality. Topography within the community watershed is moderately sloped, there are no existing landslides.

#### 3.3.2 Cultural Values

Indigenous cultural heritage resources include archaeological sites, traditional use sites, historic buildings and artifacts, and heritage trails, or any other objects or places of "historical, cultural or archaeological significance to British Columbia, a community or an aboriginal people."<sup>13</sup> The AOI is within the traditional territories of the Ka:'yu:'k't'h'/Che:k:tles7et'h First Nations, member of the Maa-nulth First Nations. A significant portion of the AOI is within KCFN treaty lands. The KCFN is completing detailed inventory of cultural heritage resources within its lands. Several cultural heritage resources such as culturally modified trees occur within the AOI. The locations of highly significant cultural sites should be identified and fuel management or FireSmart principles applied around those sites to protect them from potential wildfire damage. Additionally, a community carving shed is planned for construction a couple hundred metres up the road from the school.

Archaeological sites in British Columbia that date to 1846 or earlier are protected from alteration of any kind by the *Heritage Conservation Act* (HCA) (1996). The provisions of the HCA apply to archaeological sites located on both public and private land, known and unknown, and are binding on government. The Archaeology Branch of FLNRORD administers the provisions of the HCA and are responsible for making final decisions concerning the management of archaeological resources. Day-to-day planning, research and fieldwork are conducted by professional consulting archaeologists. Due to site sensitivity, the locations of archaeological sites are not made publicly available. Access to the Remote Access to Archaeological Data (RAAD) is required to view archaeological site information. Fuel treatment activities will require a treatment prescription completed by a Qualified Professional. The Qualified Professional should conduct the required reconnaissance surveys and review the presence and location of cultural heritage resources with the identified First Nations

Non-archaeological cultural heritage in BC is generally not protected by statute, but the use of and access to these resources is enshrined as a constitutionally protected Aboriginal right.

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<sup>13</sup> Archer, CRM. 2009. Cultural Heritage Resource Identification and Management in Forestry Developments: A Supplement to the FREP Protocol. Ministry of Forest Lands and Natural Resource Operations.

Locally identified cultural heritage values that may be impacted by wildfire or suppression efforts can be included, if agreed to by the KCFN.

### **3.3.3 High Environmental Values**

Established legal objectives and orders within the AOI on provincial crown land include a Wildlife Habitat Area for Marbled Murrelet (WHA ID#1-129) and visual quality objectives.

### **3.4 Other Resource Values**

A portion of the AOI is within the provincial timber harvesting land base, with valuable commercial species of western red cedar, western hemlock, amabilis fir, and sitka spruce.

### **3.5 Hazardous Values**

A large fuel tank is located on Chamiss Main Line about 500m past the school. Diesel fuel for the back-up generator is stored next to the generator. Homes are heated with electricity and wood stoves; however, propane is used in most homes to run appliances including stoves and dryers.

## SECTION 4: WILDFIRE THREAT AND RISK

The intent of this section is to summarize the factors that help determine the wildfire risk around the community. These factors include natural fire regime and ecology, Provincial Strategic Threat Analysis, and a local wildfire risk analysis.

A risk-based framework consists of the consideration of the likelihood of an unwanted wildfire event and the consequences to communities and high value resources and assets as the measure of risk, as follows:

- Likelihood is the probability of the unwanted wildfire event occurring
- Consequence is the amount of damage occurring as a result
- Risk is measured as the product of likelihood and consequence but multiple inputs are also required in order to effectively quantify risk, including severity, value type, and vulnerability

### 4.1 Fire Regime, Fire Weather and Climate Change

The intent of this sub-section is to provide the ecological context of wildfire for the community and to describe the role of fire (frequency and intensity) in the local ecosystem under historical conditions, and the potential implications of future conditions, caused by the interruption of the natural fire cycle and/or climate change.

#### 4.1.1 Fire Regime and Fire Weather

##### *Natural Disturbance Regime*

The AOI is within the Coastal Western Hemlock (CWH) zone, very moist hypermaritime (vh) subzone, as defined in the BC Biogeoclimatic (BEC) classification system.<sup>14</sup> CWHvh1 is characterized by a cool climate where fog, cloud, and drizzle are common throughout the year. The natural disturbance regime (NDT) of the CWHvh1 is NDT1 – rare stand initiating events.<sup>15</sup> The mean return interval for stand replacing disturbances in NDT1 variants is generally 250 years, the longest return interval of all NDT's in the province. When disturbances such as fire occur, they are usually small and result in irregular edge configurations and patterns. However, it is more likely that natural disturbances are caused by wind, terrain instability, or isolated forest health issues.

##### *Fire Weather*

The Canadian Forest Fire Danger Rating System<sup>16</sup> (CFFDRS) is a computer-based model used to assess fire danger and potential fire behaviour. The two main parts of the CFFDRS are: the

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<sup>14</sup> A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region, 1994. Available from <https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh28.htm>.

<sup>15</sup> BC Forest Practices Code Biodiversity Guidebook September 1995. Available from <https://www.for.gov.bc.ca/hfd/library/documents/bib19715.pdf>.

<sup>16</sup> Natural Resources Canada. Forest fire danger rating tool. 2016. <https://www.nrcan.gc.ca/our-natural-resources/forests-forestry/wildland-fires-insects-disturban/forest-fire-danger-rating-tool/14470>.

fire weather index system<sup>17</sup> (FWI) and fire behaviour prediction system (FBP).<sup>18</sup> Hourly weather data is collected throughout fire season (April to October) at automated fire weather stations throughout British Columbia to support the CFFDRS. Fire danger classes are described in the table below.

Table 3. Summary and description of fire danger classes.

<b>Fire Danger Classes<sup>19</sup></b>	<b>Definition / Fire Behaviour Summary</b>
<b>Class I/II – Very Low/Low</b>	Fires may start easily and spread quickly but there will be minimal involvement of deeper fuel layers or larger fuels.
<b>Class III – Moderate</b>	Forest fuels are drying and there is an increased risk of surface fires starting. Carry out any forest activities with caution.
<b>Class IV – High</b>	Forest fuels are very dry and the fire risk is serious. New fires may start easily, burn vigorously, and challenge fire suppression efforts. Extreme caution must be used in any forest activities. Open burning and industrial activities may be restricted.
<b>Class V – Extreme</b>	Extremely dry forest fuels and the fire risk is very serious. New fires will start easily, spread rapidly, and challenge fire suppression efforts. General forest activities may be restricted, including open burning, industrial activities and campfires.

Wildfire threat exposure to the community will vary throughout the fire season based on the fuels present, the moisture content of fuels, and fire weather conditions. Consequences of a threat may be realized when an ignition occurs during high or extreme wildfire conditions, as represented by Fire Danger Rating. “High Fire Danger” is considered as danger class ratings IV or V (high or extreme). High fire danger occurs mostly in July and August; however, it can begin as early as May and extend through September on the west coast of BC.

### **Regional Weather Stations**

The nearest BCWS weather station is TS Artlish, about 25km east of Kyuquot. Fire Danger Class Ratings for the TS Artlish weather station are available for years 2007-2019. The weather station data suggests that July and August are the most critical months for fire danger. Early season fire weather in May and June is more severe than later season weather in September. TS Artlish is located at a relatively inland position compared to Kyuquot. Therefore, the fire danger ratings have limited applicability to the AOI.

<sup>17</sup> Natural Resources Canada. Background Information: Canadian Forest Fire Weather Index (FWI) System. <https://cwfis.cfs.nrcan.gc.ca/background/summary/fwi>

<sup>18</sup> Natural Resources Canada. Background Information: Canadian Forest Fire Behaviour Prediction (FBP) System. <https://cwfis.cfs.nrcan.gc.ca/background/summary/fbp>

<sup>19</sup> BC Wildfire Service. Fire Danger. <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/wildfire-situation/fire-danger?keyword=danger&keyword=rating>

The AOI is in an area described by the BCWS as the “west coast fog zone” that was previously exempt from BCWS open fire prohibitions. Following the 2018 fire season, BCWS conducted a review of the effectiveness of the “fog zone” designation and has determined that the fog zone is no longer exempt from open fire and campfire prohibitions.<sup>20</sup>

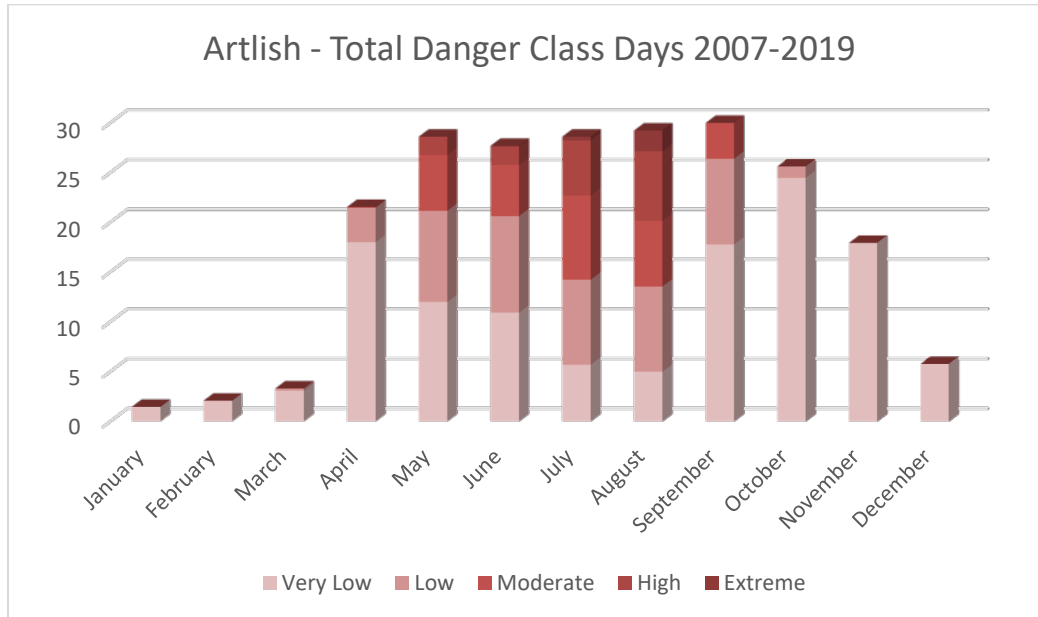


Figure 1. Summary of fire danger class days TS Artlish 2007-2019.

### **Forest Health Issues**

There are no known landscape level forest health issues that contribute to large scale changes in fire regime or forest attributes. Forest harvesting is the main driver of forest cover changes within the AOI.

### **Human Development and Natural Events**

Portions of the AOI are within the provincial timber harvesting land base. The most significant human development in the AOI is forest harvesting which has altered the fuel type and hazard around the community. Future KCFN development on their treaty settlement lands may also result in some fuel type changes.

### **4.1.2 Climate Change**

Climate change actively impacts coastal forests, weather patterns, soils, hydrology, and seasonal water availability. For Vancouver Island, climate change has resulted in a 0.8°C increase in annual temperature from 1900-2013.<sup>21</sup> Climate change will continue to impact

<sup>20</sup> MFLNRORD. News Release. 8 April 2019. <https://news.gov.bc.ca/releases/2019FLNR0062-000601>

<sup>21</sup> Lewis, J. April 2019. Climate Change and Vancouver Island. Available from [https://srd.ca/wp-content/uploads/2018/10/Climate\\_Change\\_Campbell\\_Riv\\_2018\\_Lewis.pdf](https://srd.ca/wp-content/uploads/2018/10/Climate_Change_Campbell_Riv_2018_Lewis.pdf)

Vancouver Island by increasing the frequency of relatively warm years, increased intensity of heavy precipitation events, increased flood events, increased summer drought conditions, and increased forest fire frequency and severity due to dry conditions.

In addition to warming temperatures, climate projections for the West Coast region to the 2050s indicates significantly less (-51%) spring snowfall, increased seasonal moisture variability, increased frost-free days, and lengthened dry seasons.<sup>22</sup> Reduced snow-pack and moisture variability suggest that watersheds may transition to be rainfall-dominated, requiring greater need for water conservation and storage. The expected impacts of climate change on the Strathcona Regional District area include decrease in snowpack, high intensity precipitation, increase in hot/dry conditions, increase in temperature, longer dry season, and reduced water supply.<sup>23</sup> Figure 2 shows the 30-year regional averages for cumulative seasonal precipitation and temperature projections for the west coast of BC for the 2020s, 2050s, and 2080s. The width of the bands indicate the range of the projections. Note the trend toward warmer temperatures in all seasons, and greater variability in seasonal precipitation with less precipitation in the summer months. This figure is directly sourced from the Pacific Climate Impacts Consortium.<sup>24</sup>

The scale and scope of climate change impacts are constantly evolving. Climate projections describe the inevitability of longer dry seasons, reduced spring/summer moisture availability, and warmer temperatures – which lead to greater numbers of high/extreme fire danger class days. Climate change contributes to the likelihood of more intense wildfire seasons on Vancouver Island moving forward. Climate change impacts emphasize the importance of risk and mitigation actions recommended in this CWPP.

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<sup>22</sup> Pacific Climate Impacts Consortium. November 2013. Climate Summary for West Coast Region. Available from <https://www.pacificclimate.org/analysis/publications/climate-summary-west-coast>.

<sup>23</sup> Pacific Climate Impacts Consortium. 2012. Summary of Climate Change for Strathcona in the 2050s. Available from <http://www.plan2adapt.ca/tools/planners?pr=27&ts=8&toy=14>.

<sup>24</sup> Pacific Climate Impacts Consortium. November 2013. Climate Summary for West Coast Region. Available from <https://www.pacificclimate.org/analysis/publications/climate-summary-west-coast>.

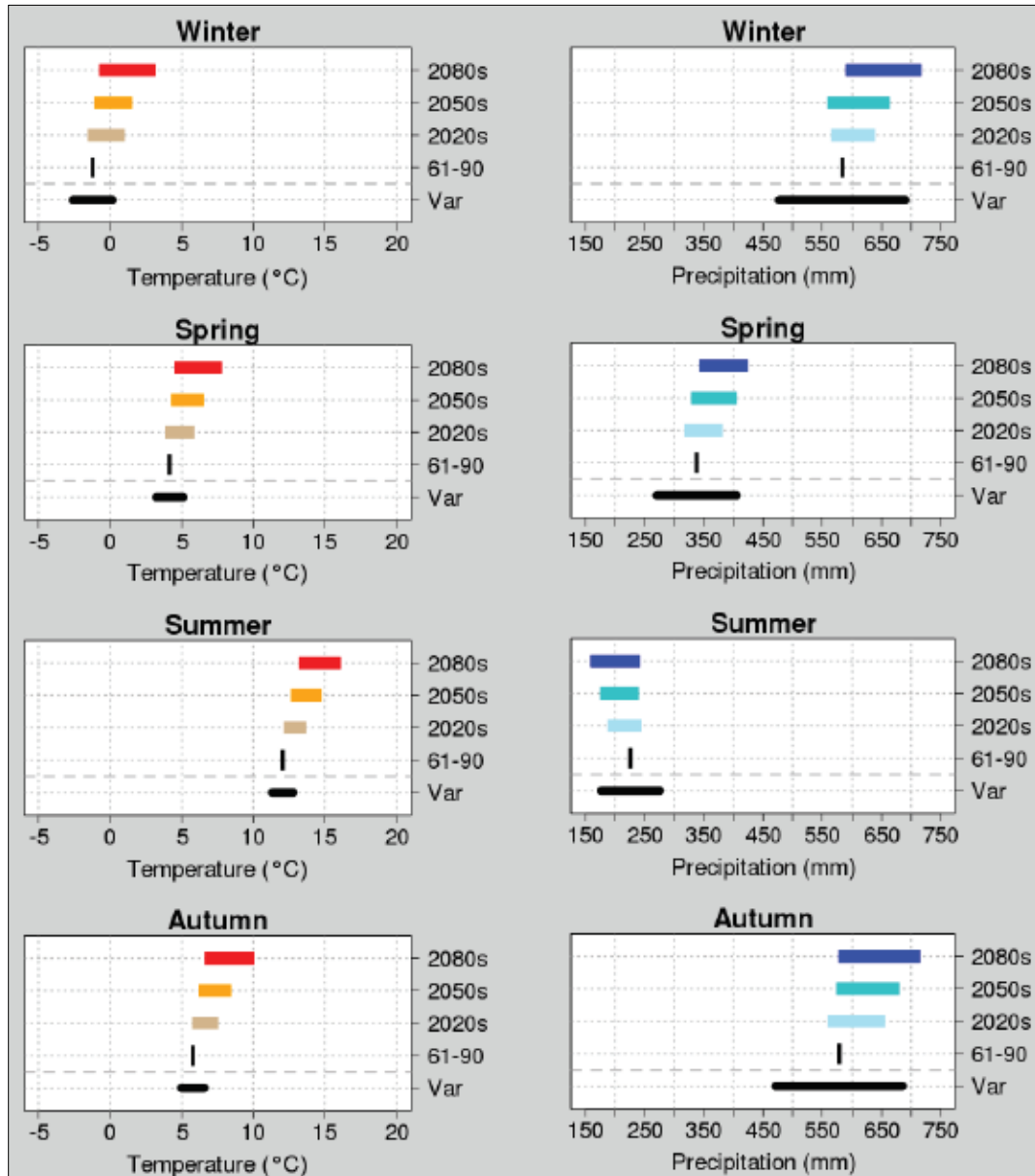


Figure 2. Cumulative seasonal precipitation and mean seasonal temperature projections for 2020s, 2050s, and 2080s. The width of the bands indicates the range of projections. The thing, upper black line and the lower band indicated the average and the variability, respectively, over the 1961-1990 reference period.

## 4.2 Provincial Strategic Threat Analysis (PSTA)

The PSTA<sup>25</sup> is a provincial level geographic information system (GIS) spatial analysis and risk framework that provides a starting point to assess the local wildfire threat. The PSTA utilizes and interprets provincial fuel type mapping, historical fire occurrences, topography, and historical weather station data.

The PSTA assesses wildfire threat within wildland urban interface (WUI) polygons at a provincial level. The WUI, or interface, is the area where human development and wildland vegetation mix; where human developments intermingle with forests and other vegetative fuel types.<sup>26</sup> The threat analysis output is a wildfire threat rating classification of No threat, Low, Moderate, High, or Extreme.

Wildfire threat is directly related to the likelihood of hazardous fuel igniting and fire spreading into the community either directly or through ember transport. The PSTA provides information to help evaluate the three conditions necessary for a wildfire to threaten a community:

1. an ignition occurs (Fire History)
2. the resulting fire generates sufficient intensity (Head Fire Intensity) and spreads rapidly, and
3. the fire spreads into and/or transports embers into the community (Spotting Impact)

The Wildfire Threat classification is weighted based on 30% fire density, 60% head fire intensity, and 10% spotting impact.

### Fire Density

Fire density is the ignition and spread potential based on historic fire patterns. There are 10 fire density classes (1 being the lowest and 10 the highest), based on the approximated weighted fire frequency within a 10km radius. The fire density rating within the AOI is 1 (lowest).

### Head Fire Intensity

Head fire intensity (HFI) is the intensity of the flaming fire front during 90<sup>th</sup> percentile weather conditions (highest 10% temperatures, and lowest 10% of relative humidity values). Head fire intensity is related to the rate of spread and fuel consumption of the leading edge of a fire. This factor is important to know for fire suppression effort and safety.

### Spotting Impact

Spotting impact is the ability of burning embers to be sent into the air for some distance and start new fires. Embers cause most of the structural losses in the event of interface wildfires. The spotting impact within the AOI is Low.

The 2019 PSTA data classifies the wildfire threat as Moderate with pockets of Low. The AOI is within the BCWS WUI Risk Class Polygon Kyuquot Risk Class 5 (Moderate).

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<sup>25</sup> BC Ministry of Forest, Lands, Natural Resource Operations and Rural Development. 2019. Provincial Strategic Threat Analysis: 2019 Update <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/vegetation-and-fuel-management/fire-fuel-management/psta>

<sup>26</sup> BC Ministry of Forest, Lands, Natural Resource Operations and Rural Development. 2017. Provincial Strategic Threat Analysis: 2017 Update. Available from <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/vegetation-and-fuel-management/fire-fuel-management/psta/download-psta-historic>.

### **4.2.1 Fire History**

Historical fire ignitions and perimeters data records show just 1 human-caused fire ignition point having occurred within the AOI since record keeping began in 1950. This information may be a positive indication of responsible human fire use within the AOI and the relatively low fire risk in the area. This information may also be the result of incomplete reporting.

There have been three historical fires recorded within 10km of the community (Map 3). The most recent wildfire in the general area occurred in 2018, over 7km outside of the AOI, where a lightning strike caused a wildfire to burn 9 hectares (mostly a previously harvested cut block) north of Chamiss Point (Fire V92704). Other fires to note that are outside the AOI but within 10km of the community are V88014, a 92 Ha fire from 1984 and V00596, a 214ha fire from 1965. The cause of these fires is unknown.



Map 3. Historical fires recorded within 25km of Kyuquot.

## **4.3 Local Wildfire Threat Assessment**

The intent of this sub-section is to provide a detailed assessment of the local wildfire threat, including field reviewed fuel characteristics, proximity of fuel to the community, local fire spread patterns, topographical considerations and local factors. The local wildfire threat assessment process is described in further detail in Appendix 1.

### **4.3.1 Fuel Type Assessment**

Fuels in the area are generally mature conifer forests (C-5) or young and dense conifer forests (C-3). A detailed description of fuel types is provided in Appendix A1.1 Fuel Type Attribute Assessment.

The available spatial information from Data Catalogue BC, VRI data, RESULTS; updated Google Earth imagery, were analyzed for fuel type verification and adjustments. The major changes to the fuel type layer that resulted within the AOI included:

- water areas were corrected with more accurate spatial data sources,
- coniferous mapped as deciduous fuel types corrected
- harvested blocks older than 5 years, coniferous, dense pole sized stands over 4m tall, less than 60 years old, were updated to C-3 fuel type

The changes in fuel type areas are summarized in Appendix A1.1 Fuel Type Attribute Assessment, and shown on the Existing Fuel Type Map (Map 8) and Updated Fuel Type Map (Map 9).

### **4.3.1 Proximity of Fuel to the Community**

Fuel closest to the community usually represents the highest hazard. The recommended approach is to treat fuels to achieve a desired level of hazard reduction, from the value or structure outward, ensuring mitigation continuity. Fuels adjacent to the values and/or structures at risk receive the highest rating followed by progressively lower ratings moving out.

The local wildfire threat assessment process subdivides the WUI into 3 areas – the first 100 meters (WUI 100), 101 to 500 meters (the WUI 500), and 501 to 2000 meters (the WUI 2000). These zones provide guidance for classifying threat levels and subsequent priorities of treatments. The first 100m (WUI 100) is further broken down into Priority Zones 1, 2, and 3 in Section 5.2 FireSmart Planning and Activities below.

### **4.3.1 Fire Spread Patterns**

Wind speed, wind direction, and fine fuel moisture condition influences wildfire trajectory and rate of spread. Wildfire that occurs upwind of a value poses a much more significant threat to that value than a fire that occurs downwind.

Dominant wind directions on the coast vary with the seasons. Strong southeast winds are characteristic of winter low-pressure systems. Northerly winds recorded in the summer months are characteristic of summer frontal systems approaching from the north. The Canadian Weather Atlas shows dominant winds in the Kyuquot area during summer months (June, July & August) to come from both the north and south east. Given Kyuquot's location near the water, the fuels to the north of the community are most significant. More detailed information regarding wind directions is found in Appendix A1.3 Fire Spread Patterns.

### 4.3.4 Topography

Topography is the arrangement of natural and physical features in an area; it influences fire behavior and wildfire risk to values. Slope percentage influence a fire's trajectory and rate of spread. Slope position of the value relates to the ability of a wildfire to gain momentum during an uphill run and affects the potential impact to the value.

#### ***Slope Percentage Class***

The community is on slopes <20%. Slopes within the AOI are generally 45% or less. Generally, slopes will cause preheating of fuel in a direction away from the community rather than towards it. The fire behaviour implications of slope classes are summarized in Appendix A1.4 Topography.

#### ***Slope Position of the Value***

Kyuquot is located at the bottom of the slope where normal rates of fire spread apply. Slope position of a value relates to the ability of a wildfire to gain momentum during an uphill run. A value at the bottom of the slope is equivalent to a value on flat ground; a value on the upper 1/3 of the slope would be impacted by high preheating and faster rates of spread than a value on flat ground. The fire behaviour implications of slope positions are summarized in Appendix A1.4 Topography.

### 4.3.5 Local Wildfire Threat Classification

A local wildfire threat classification was completed; process of this threat classification is summarized in Appendix 1: Local Wildfire Threat Process. An updated wildfire threat classification map was created as a result of this process (Map 4), a summary of the threat classification is provided in Table 4. Generally, the wildfire threat around Kyuquot is Moderate.

Table 4. Summary of the local wildfire threat classification within the AOI.

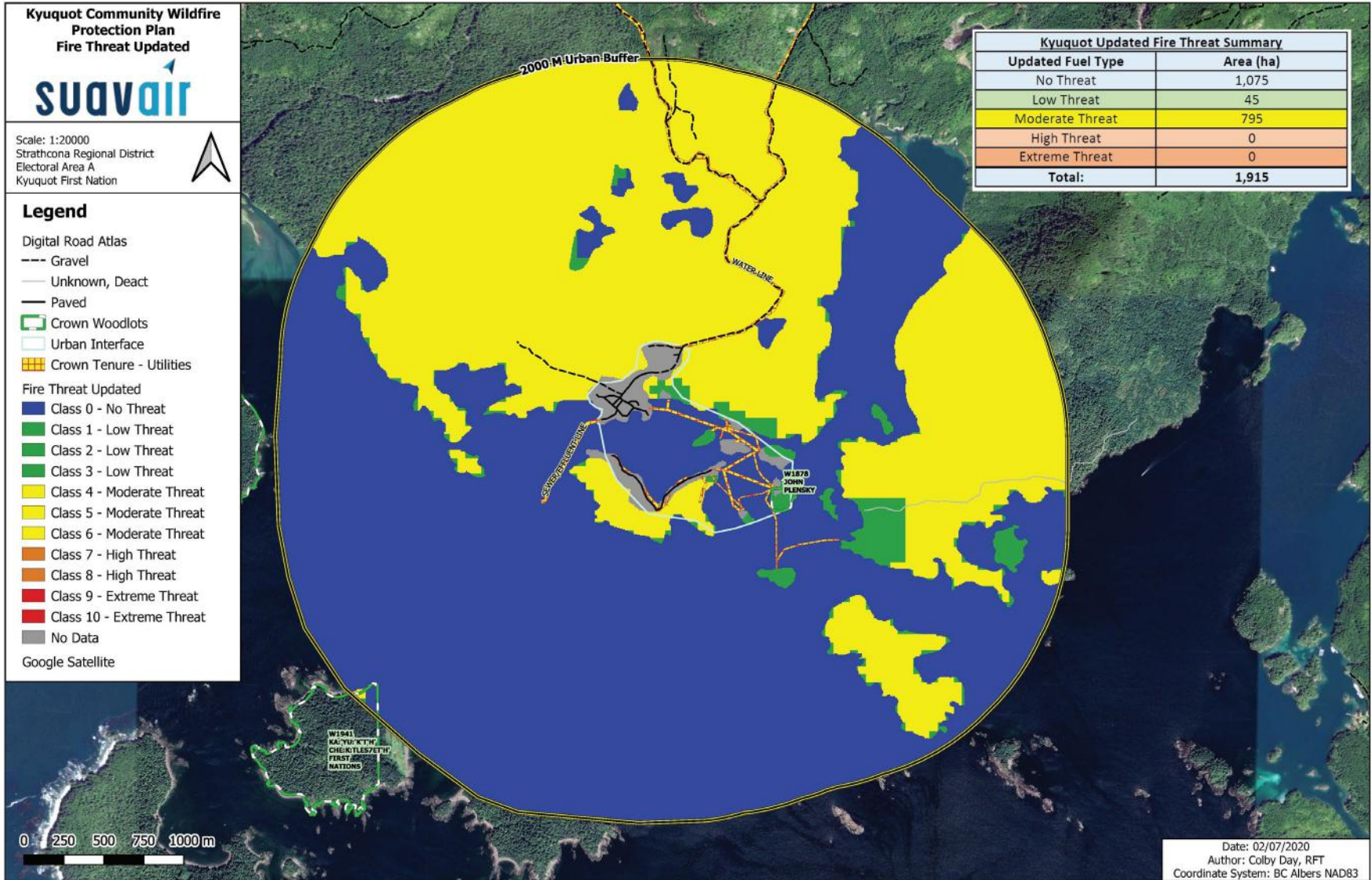
Wildfire Threat Class	2019 PSTA Data		2020 CWPP	
	Area (ha)	% of AOI	Area (ha)	% of AOI
Extreme	0	0%	0	0%
High	0	0%	0	0%
Moderate	741	39%	795	42%
Low	102	5%	45	2%
Very Low / No Threat (Water)	1041	54%	1075	56%
No Data / Private Land	31	2%	0	0%
TOTALS	1915		1915	

### 4.3.6 Local Wildfire Risk Classification

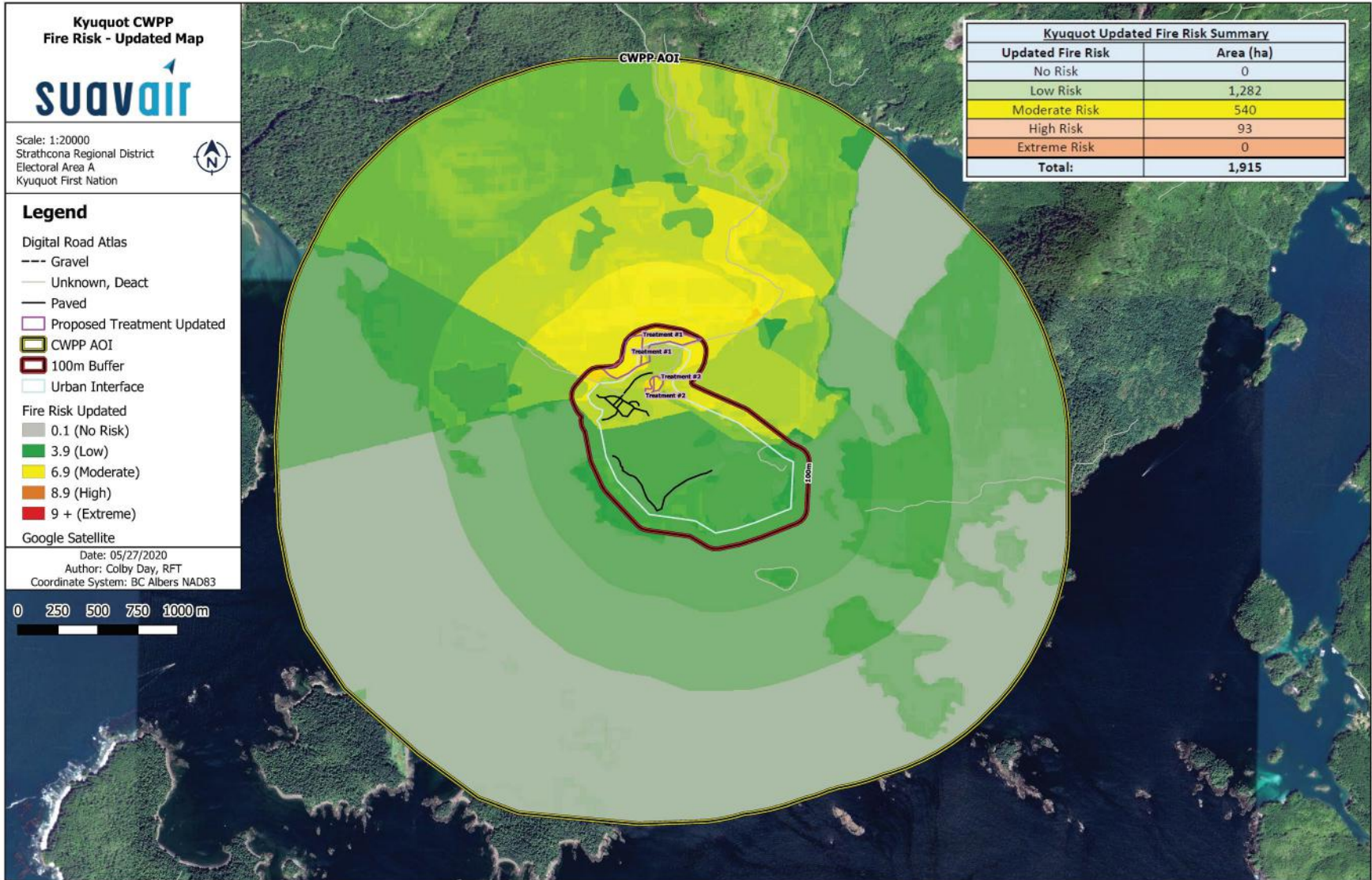
A local wildfire risk classification was completed based on the updates to the fuel type layer and local wildfire threat classification. Proximity to structures/values, fire spread patterns, and topography are the other key determinants of wildfire risk. The detailed wildfire risk assessment process is found in A1.6 Local Wildfire Risk Classification. Generally, the wildfire risk is Low to Moderate (Map 5 and Table 5). Fuels closer to the community are higher risk due to proximity.

Table 5. Summary of the local wildfire risk classification within the AOI.

Wildfire Risk Class	Area (ha)	AOI %
Extreme	0	0%
High	93	5%
Moderate	540	28%
Low	1282	67%
No Risk	0	0
TOTALS	1915	



Map 4. Updated local wildfire threat classification.



Map 5. Updated local wildfire risk classification and recommended treatment areas.

## SECTION 5: RISK MANAGEMENT AND MITIGATION FACTORS

The intent of this section is to outline the strategies the community can put into practice to reduce the risk and the impact of a wildfire. Risk mitigation choices can vary by community, fuel type, ecology, hazard, terrain factors, land ownership, other unique local risk factors, local government and First Nation capacity, and/or public acceptance.

Mitigating wildfire risk is a proactive approach to reducing potential impacts and subsequent losses from devastating wildfires and is best conducted in a coordinated fashion amongst applicable land managers/owners that may include provincial and federal governments, local governments, First Nations, and private landowners. Understanding and assessing all of the risks that apply to a given community is a key consideration when determining actions that local governments or First Nations can undertake to mitigate and manage the wildfire risk within and adjacent to their respective jurisdictions.

There are many different risk mitigation options available. Three have been identified for this section:

1. Fuel Management – reduce fire behaviour potential
2. FireSmart – reduce fire spread into community and impacts to values
3. Communication and Education – reduce fire occurrence

### 5.1 Fuel Management

In general, fuel treatment activities create post-treatment stand conditions that will result in reduced fire behaviour.<sup>27</sup> Treatment strategies should prioritize surface and ladder fuel changes over canopy changes.<sup>28</sup> Fuel treatments should aim to reduce surface fuel loading, increase the height to live crown through reduction of ladder fuels, and reduce crown closure as necessary.

Crown fires in mature coastal forests require support from heat generated by burning of surface fuels and understory (ladder fuels). Understory thinning of surface fuels and ladder fuels are the main consideration for fuel treatments in moist coastal forests. The vertical arrangement of fuels is an important consideration for fuel treatment prescriptions. In mature coastal forests, the natural canopy crown height is elevated from the forest floor. Without significant surface and ladder fuels, it is less likely that crown fires will occur. Figure 3 and Figure 4 illustrate the role of understory thinning and how ladder fuels can contribute to crown fires.

Surface fuels that remain in harvested cut blocks (slash, distributed or piled) are another hazard. Harvested areas dry out faster, dead and down material does not retain moisture and is more susceptible to ignitions. Fires in slash tend to spread quickly and can build up heat and intensity, spreading into adjacent mature stands as surface and crown fires. Therefore, fire hazard abatement in harvested cut blocks is critical, especially within the WUI. Fuel hazard and hazard abatement associated with forest harvesting on provincial crown land is regulated by the *Wildfire Act* and *Wildfire Regulation*. The tenure holder is responsible for conducting hazard

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<sup>27</sup> BCWS Fuel Management Prescription Guidance 2019. [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2019\\_fuel\\_management\\_prescription\\_guidance.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2019_fuel_management_prescription_guidance.pdf)

<sup>28</sup> Ibid.

assessments and conducting hazard abatement activities within the timeframes required by legislation.

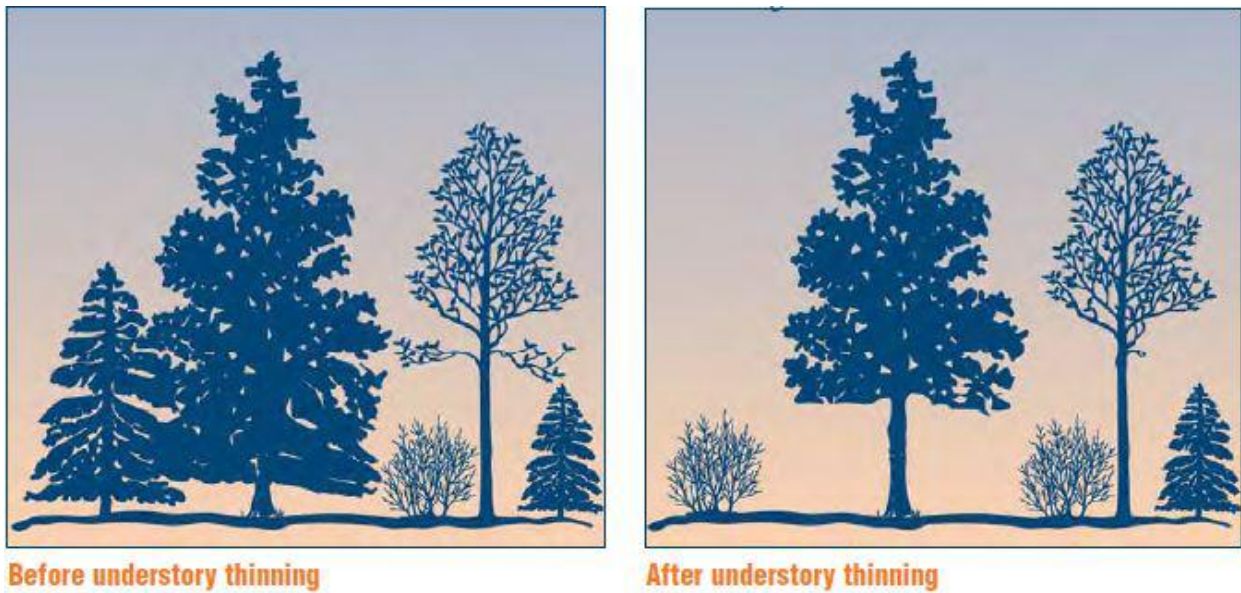


Figure 3. Understory thinning can reduce surface and ladder fuels.<sup>29</sup>



Figure 4. Vertical arrangement of ladder fuels can carry a fire from the surface into the forest canopy.<sup>30</sup>

<sup>29</sup> Partners in Protection. FireSmart Protecting Your Community from Wildfire. <https://firesmartcanada.ca/wp-content/uploads/2018/10/FireSmart-Protecting-Your-Community.pdf>.

<sup>30</sup> Ibid.

### 5.1.1 Fuel Treatment Areas

The focal point of fuel management recommendations in this CWPP are within the first 100m, the wildland urban interface (WUI100). The WUI100 is also known as the FireSmart Structure Ignition Zone (Figure 7). Table 6, Map 6, and Photo 2 show the recommended treatment areas.

Recommended treatment areas are addressed separately from the FireSmart planning activities because the work could be planned by a qualified registered professional and contracted out. Fuel treatments should focus on areas within the WUI100 for the initial 5-year period of this CWPP.

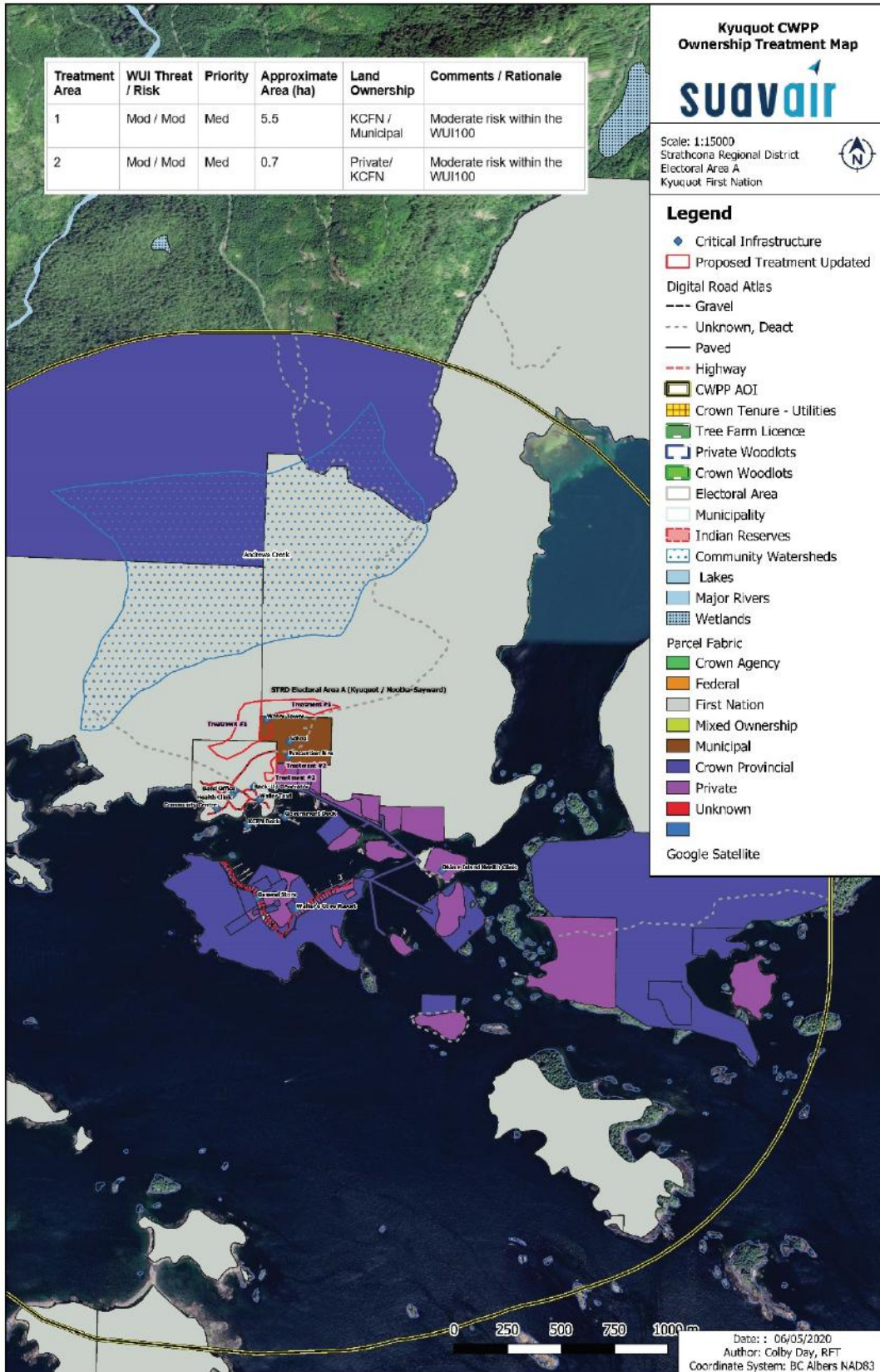
Table 6. Summary of recommended treatment areas.

Treatment Area	WUI Threat / Risk	Priority	Approx. Area (ha)	Land Ownership	Comments / Rationale
1	Mod / Mod	Med	5.5	KCFN / Municipal	Moderate risk within the WUI100
2	Mod / Mod	Med	0.7	Private/ KCFN	Moderate risk within the WUI100



Photo 2. Aerial view of the recommended treatment areas.

CWPP's should be re-visited every 5 years to determine progress on recommended actions, at which time additional fuel treatment areas in the WUI500 to WUI1000m areas may be recommended. The local fire threat and fire risk, combined with remoteness and access constraints make larger scale fuel treatments a low priority relative to FireSmart fuel management activities, communication and education, training, infrastructure improvements and other recommended actions.



Map 6. Recommended treatment areas and land ownership classes.

## 5.2 FireSmart Planning & Activities

The intent of this section is to summarize the current level of FireSmart that has been completed, is under implementation, and to identify areas that are FireSmart, or have received FireSmart recognition through the FireSmart Canada Recognition Program<sup>31</sup>, and to identify future FireSmart activities within the AOI. FNESS administers the FireSmart program for First Nations communities. FNESS also administers the On-Reserve Operational Fuel Treatment Program.

FireSmart is a planning tool to help communities living in the wildland urban interface (near forests) reduce the likelihood of disaster and catastrophic loss in the event of a wildfire near their community. The 7 disciplines of FireSmart are: vegetation management, public education, legislation, development, planning, cross-training, and interagency cooperation. The BC FireSmart Begins at Home Manual provides detailed information on how residents can work towards protecting their homes from wildfire.<sup>32</sup>

WUI fires are complex incidents involving both structures and forests. Wildland fires can spread towards the community and structural fires can spread from the community towards the forest. Due to Kyuquot's remote location and limited access to fire protection services, it is critically important to consider the impacts of WUI fires both from the forest to structures, and from structures to the forest. In the event of WUI fires, fire fighting resources (local or provincial) should not be solely relied on to save properties. Figure 5 shows the WUI disaster sequence where citizens and landowners can act to break the sequence.

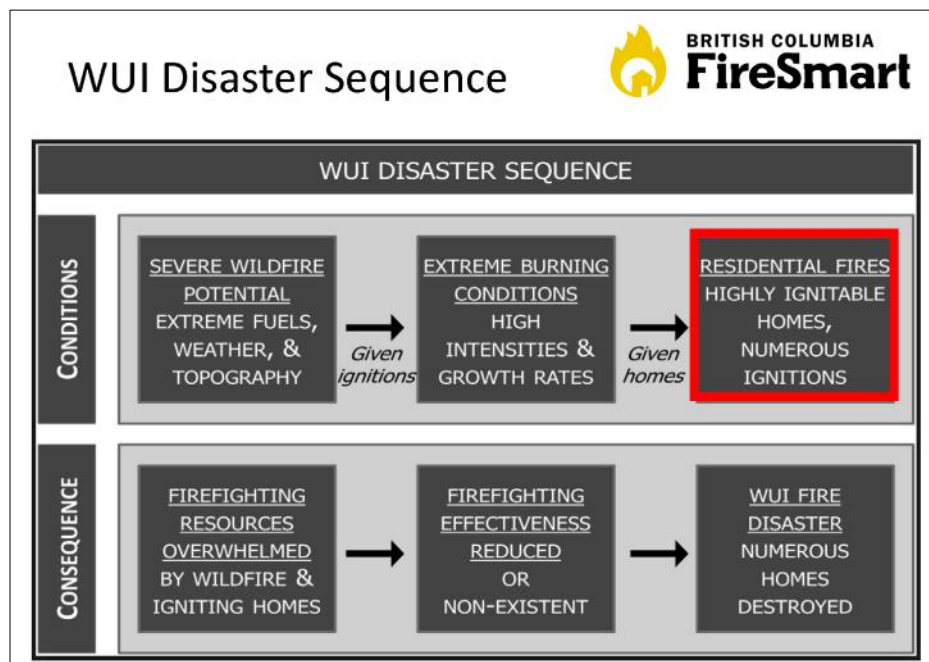


Figure 5. Wildland urban interface (WUI) disaster sequence and where residents can break the disaster sequence.

<sup>31</sup> FireSmart Canada. Community Recognition Program. <https://firesmartcanada.ca/programs-and-education/community-recognition-program/>

<sup>32</sup> BC FireSmart Begins at Home Manual. [https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/prevention-home-community/bcws\\_homeowner\\_firesmart\\_manual.pdf](https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/prevention-home-community/bcws_homeowner_firesmart_manual.pdf)

## 5.2.1 FireSmart Goals & Objectives

The general goal of FireSmart is to encourage communities and citizens to adopt and conduct FireSmart practices to mitigate the negative impacts of wildfire to assets on public and private property. Findings from a study of the 2016 Horse River wildfire in Fort McMurray indicate that FireSmart principles were one of the main reasons why individual homes survived, regardless of the broader wildfire threat surrounding them.<sup>33</sup> This was true in both the urban and rural areas. Figure 6 provides an overview graphic of why homes burn during WUI incidents.

Wildfires have the potential to impact communities in many ways. Structure losses and evacuations are the main impacts of wildfire and both can cause significant emotional, financial, and physical stress. Structure and home losses due to wildfire are a result of fire ignitions caused by radiant heat, convective flames, and wind driven embers. Embers (small flaming or glowing particles) are associated with more than 50% of home losses from wildfires. Embers can be carried up to 2km's under specific fire weather conditions. 85-90% of homes without combustible roofs and with 10m of clearance from combustible materials will likely survive a major wildfire.

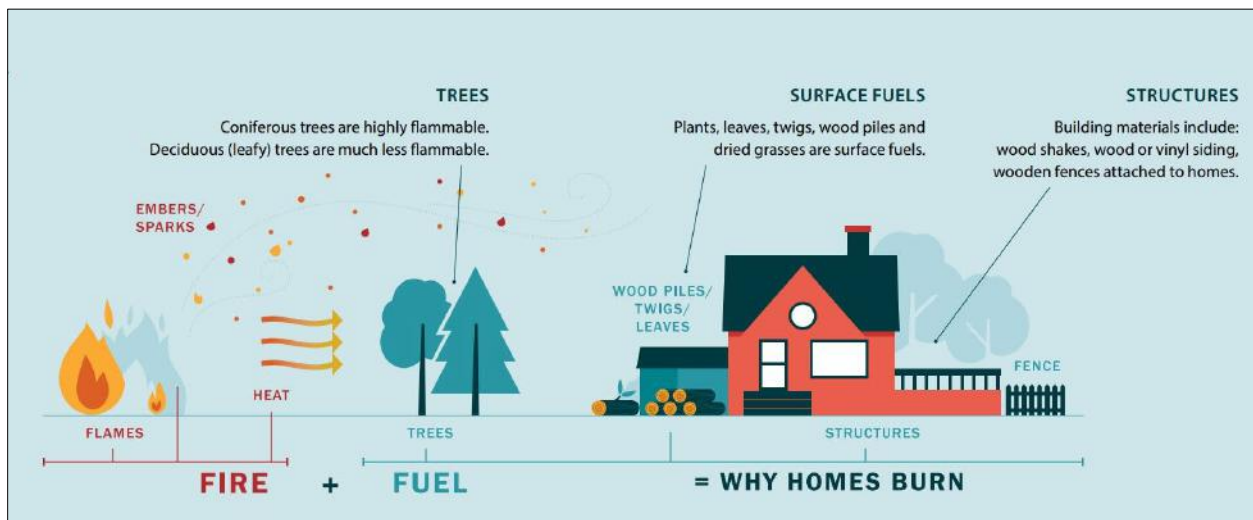


Figure 6. Why homes burn during WUI fire incidents.<sup>34</sup>

<sup>33</sup> Al Westhaver, Why some homes survived: Learning from the Fort McMurray wildfire disaster (Toronto: Institute for Catastrophic Loss Reduction, 2016). [https://issuu.com/iclr/docs/westhaver\\_fort\\_mcmurray\\_final\\_2017](https://issuu.com/iclr/docs/westhaver_fort_mcmurray_final_2017)

<sup>34</sup> FireSmart – Why Homes burn in WUI Fire Incidents <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart>

## Goals of FireSmart

The goal of FireSmart is to encourage homeowners to conduct FireSmart practices on their property to reduce damages and minimize the hazards associated with wildfire. These practices should aim to:

- Reduce the potential for an active crown fire to move through private land
- Reduce the potential for ember transport through private land and structures
- Create landscape conditions around properties where fire suppression efforts can be effective and safe for responders and resources
- Treat fuel adjacent and nearby to structures to reduce the probability of ignition from radiant heat, direct flame contact and ember transport
- Implement measures to structures and assets that reduce the probability of ignition and loss

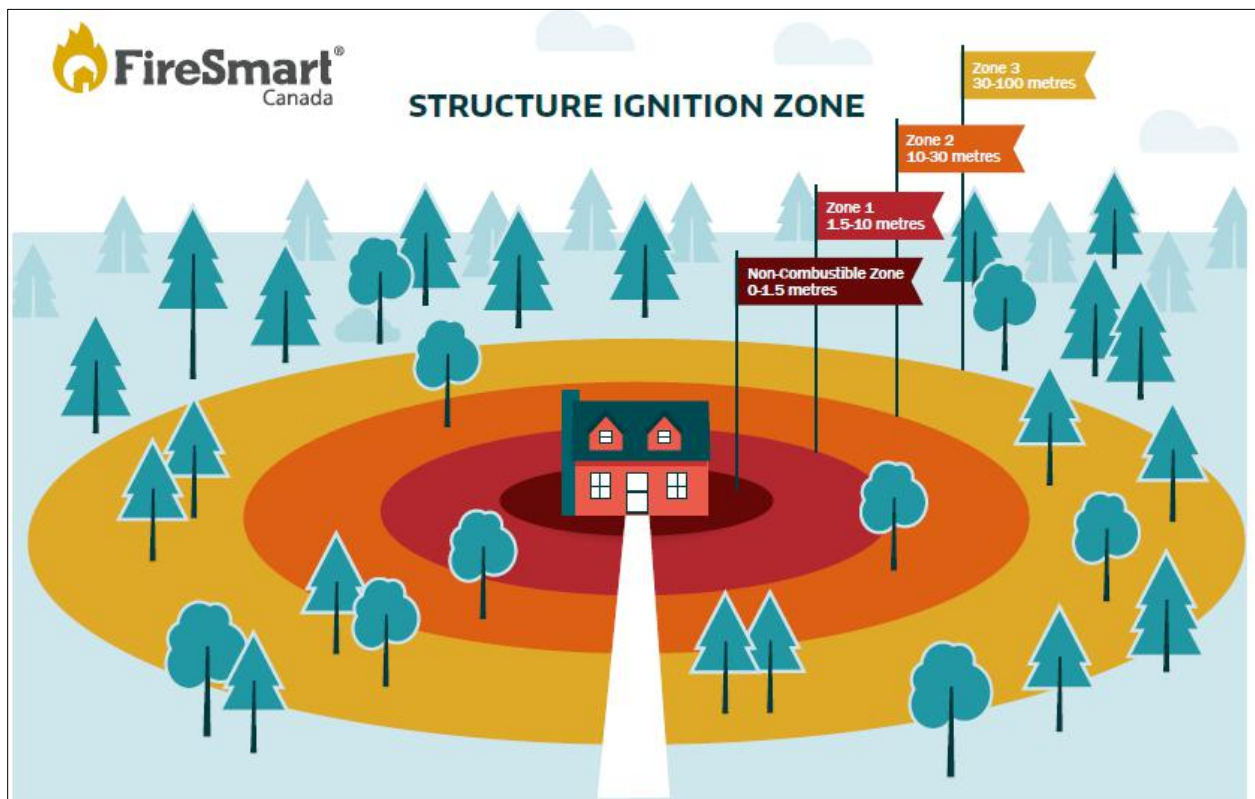


Figure 7. FireSmart structure ignition zone breakdown.

General guidance for FireSmart activities<sup>35, 36</sup> within the structure ignition zones includes:

- Regularly clear roofs of debris build up (moss, leaves, branches)
- Remove all combustible materials within 1.5m of the structure
- Remove all vegetation and flammables 3m from gas/propane tanks. Gravel/rock fill materials should be used directly below the tanks.
- Remove all dead/down materials (branches, leaves, etc.) from within 10m of the structure
- Store firewood piles at least 10m from the home
- The areas around fire pits and burn barrels should be free of flammable materials for at least 3m
- Cover burn barrels with fine (6mm) mesh
- Close in eaves with fascia and screen soffits (3mm mesh)
- Clean out flammable items from below decks/balconies; and close in the areas below decks/balconies to prevent the accumulation of embers
- Maintain 3m tree spacing in Zone 2 (10-30m from structure)
- Prune all branches to a height of at least 2m within Zone 2

If structural upgrades or new construction is planned within the community, it is recommended that FireSmart guideline for materials are followed:

- Preferred roofing materials: clay/tile, fibreglass/asphalt composite shingles, metal, fibrous cement, tar/gravel.
- Preferred exterior siding: stucco, concrete, metal. Logs or heavy timber are better than wooden siding or vinyl.
- Use fire resistant materials for decks, close in the areas below balconies and decks

More information regarding FireSmart guidelines is available in the FireSmart Canada Home Development Guide<sup>37</sup>, BC FireSmart Begins at Home Manual<sup>38</sup> and/or contacting a Local FireSmart Representative.<sup>39</sup>

## 5.2.2 Key Aspects of FireSmart for First Nations Governments

A Community FireSmart Hazard Assessment was conducted by FNESS in September 2019. The final report is attached in Appendix 4: FireSmart Community Hazard Assessment (2019). The final report made the following recommendations for next steps:

### 1. Contact Local FireSmart Representative (LFR) – Completed

- FNESS has several LFR's on staff that would be more than willing to assist your community with FireSmart. It may also be beneficial to communicate with LFR's

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<sup>35</sup> FireSmart BC. Vegetation Management. <https://firesmartbc.ca/resource/vegetation-management/>

<sup>36</sup> FireSmart BC. Development Considerations. <https://firesmartbc.ca/resource/development-considerations/>

<sup>37</sup> FireSmart Canada. Home Development Guide. [https://firesmartcanada.ca/wp-content/uploads/2019/10/FireSmart\\_Canada\\_Home\\_Development\\_Guide.pdf](https://firesmartcanada.ca/wp-content/uploads/2019/10/FireSmart_Canada_Home_Development_Guide.pdf)

<sup>38</sup> BC FireSmart. FireSmart Begins at Home Manual. <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart>

<sup>39</sup> Local FireSmart Representative look-up. <https://firesmartbc.ca/local-firesmart-representatives/>

in your local area and get training for your community members when the LFR course is offered.

2. Have LFR complete a Community FireSmart Hazard Assessment – Completed

- The community FireSmart hazard assessment was completed by Quentin Nelson, FFML - LFR. Individual structure and site assessments can still be completed for each resident that will identify concerns specific to that structure.

3. Local FireSmart Rep to complete a detailed report to provide recommendations to help start the FireSmart Program – Completed

- The FireSmart report was developed by Quentin Nelson, FFML - LFR from First Nations' Emergency Services Society (FNESS).

4. Start a FireSmart Board – In Progress

- Sponsor a Local FireSmart Board that is in charge of maintaining the FireSmart community program and recognition status. The board can include anyone who wants to participate including residents, fire chiefs, chief & council, maintenance workers, etc.

5. Complete FireSmart Community Action Plan – In Progress

- The FireSmart board should look at developing a community plan which essentially identifies several FireSmart related activities that the board would like to accomplish and provides a tentative completion date for each activity. Please refer to appendix 3 for additional information on how to develop a community plan.

6. Host a FireSmart Event/Cleanup day – In Progress

- Invest a minimum of \$2.00 annually per capita in local FireSmart events and activities (work completed by municipal employees or volunteers, using municipal or other equipment, can be included as can provincial/territorial grants dedicated to that purpose).

7. Apply for National FireSmart Recognition Status – In Progress

- Submit an application form with the supporting documentation to FireSmart Canada. This application documents participation in the FireSmart communities' program with respect to the above criteria.

8. Renew on an Annual Basis – In Progress

- Complete another education or event day, compile the supporting documentation and then submit a renewal application to FireSmart Canada. All the forms can be found online at the FireSmart Canada website.

### **5.2.3 Identify Priority Areas within the Area of Interest for FireSmart**

The FireSmart Hazard Assessment Report identified the following priorities for Kyuquot:

- Organize a FireSmart board led by community members who are aware of the dangers of fire and want to help their community. The FireSmart board can access a lot of useful information on the FireSmart Canada or <https://firesmartbc.ca/> website to share with the community.

- Continue working on creating a combustible-free Priority Zone 1A and 1 to start, and then work your way out into the other priority zones, building that defensible space.
- Where appropriate, establish adequate roadside buffers throughout the community that are free of overgrown vegetation to help act as a fire break and increase the overall road width for evacuation or emergency response purposes.
- Educate the residents of Kyuquot about the realities of wildfire potential in the area and the steps that can be taken to FireSmart homes. This can be accomplished by hosting FireSmart education days and inviting local fire chiefs, FNESS or BC Wildfire Service representatives to come share their knowledge and experiences with the community. Each homeowner should be encouraged to use the FireSmart Home Assessment to critically evaluate their home.
- Organize a FireSmart event day for local residents. The event day can include the volunteer portion of the FireSmart recognition process by having people complete an agreed upon task prior to the event day.
- Encourage FireSmart landscaping practices over time by removing highly flammable fuels adjacent to the house. Refer to the FireSmart Guide to Landscaping.
- Develop and or maintain a good working relationship with local fire departments along with fire officials from other areas to ensure good support for FireSmart activities.
- When completed, use the results of the Community Wildfire Protection Plan and this FireSmart Report to determine which areas in/around the community require attention to mitigate the risks to wildfires.
- The Union of B.C. Municipalities (UBCM) along with FNESS and the BC Wildfire Service can assist communities with accessing funding to complete FireSmart activities. This FireSmart funding is currently available through the Community Resiliency Investment (CRI) Program.
- The National Fire Protection Association (NFPA) has a lot of good information on how to develop new fire protection bylaws and building codes in your community. This information is certainly worth looking at and potentially implementing in your community. The hyperlinks below are some of the standards worth reviewing.
  - o [NFPA 1141](#) - Standard for Fire Protection Infrastructure for Land Development in Wildland, Rural, and Suburban Areas
  - o [NFPA 1142](#) - Standard on Water Supplies for Suburban and Rural Fire Fighting
  - o [NFPA 1144](#) - Standard for Reducing Structure Ignition Hazards from Wildland Fire
- The FireSmart board should look at developing a community plan which essentially identifies several FireSmart related activities that the board would like to accomplish and provides a tentative completion date for each activity. Please refer to appendix 3 for additional information on how to develop a community plan.

Priority areas for initial FireSmart fuel management around the community are recommended in Table 7 below.

Table 7: Summary of priority areas for FireSmart activities.

Area ID	Wildfire Risk Rating (E/H/M/L)	Recommended FireSmart Activities
Around all homes and structures in the community.	Moderate.	<ul style="list-style-type: none"> <li>• Create a non-combustible zone that is 0-1.5m from each structure (remove all combustible materials)</li> <li>• Remove scotch broom, Himalayan blackberry from the area</li> <li>• Clear/clean-up Priority Zone 1 1.5-10m from structures (remove dead branches, ladder fuels, prune branches up to a height of at least 2m)</li> </ul>

All fuel management related recommendations are listed below.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
2.	High	To complete FireSmart recommendations listed in the 2019 Community Hazard Assessment Report.	The next step is to sponsor a local FireSmart Board and work on clearing Priority Zone 1A (non-combustible) and Zone 1 (1.5-10m) around structures in the community.	KCFN
3.	High	To conduct FireSmart activities around the identified Priority Areas listed in Table 7.	Encourage residents to start with clearing the non-combustible 0-1.5m zone around their homes, then Priority Zone 1. Public works department to work on areas surrounding community infrastructure.	KCFN
4.	Med	To improve community awareness of wildfire threat, risk to the community, and risk mitigation opportunities.	Contact a Local FireSmart Representative to deliver FireSmart awareness and Community Champion workshop.	KCFN
5.	Med	To reduce the risk of ignitions within the structural ignition zone.	Review the FireSmart Canada Home Development Guide and BC FireSmart Begins at Home Manual, ensure new construction or structural upgrades to existing buildings use the FireSmart preferred materials.	KCFN

6.	Med	To reduce the fuel hazard in the recommended treatment areas.	Work with a qualified registered professional to complete and implement site level prescriptions for the recommended treatment areas.	KCFN with FNESS support
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### 5.3 Community Communication and Education

The intent of this section is to describe the key steps required to build engagement and support within the community for the CWPP in a concise format. This includes education on fire prevention practices, outreach and community programs.

Following the 2018 wildfire season, wildfire risk was at the forefront of public awareness within the community and more generally on northern Vancouver Island. The challenge is to maintain this level of awareness, interest, and orientation towards action outside of major wildfire events. Education plays a critical role in shaping public perception around WUI fires, and the steps that can be taken to reduce risks to human safety and property. Lack of understanding can lead to inaccurate assumptions of the fire hazard, risk, and responsibility for risk reduction.

Communication is also critical part of emergency planning and response in the event of a WUI fire. Moving from the planning phase to implementation of specific activities requires that the community be well informed of the reasons for, and the benefits of, specific mitigation activities. The following recommendations are made to address Community Communication and Education.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
7.	High	To make this Plan and its associated maps available to the community.	Upload a digital copy of the CWPP to the KCFN and SRD Emergency Planning websites.	KCFN and SRD
8.	High	To improve community awareness of wildfire threat and risk to the community.	Regular communications to community members (flyers, notice boards, emails, social media accounts). Recommend at least one fire related communication per month (more often during fire season if required).  Content of the communications include reminders on FireSmart guidelines, fire danger ratings, fire bans, fire prevention tips, air quality alerts etc. Share relevant social media posts made by SRD, BCWS, EMBC, FireSmart BC	KCFN and SRD
9.	High	To improve community	Organize an annual Community	KCFN

		awareness of emergency preparedness, wildfire risk, and risk mitigation opportunities.	<p>Fire Safety day.</p> <p>Activities may include checking fire extinguishers and smoke alarms in homes, conducting FireSmart clearing of Priority 1 (up to 10m) zones around homes, fire extinguisher practice, water suppression system (fire hydrants) practice, evacuation drills.</p> <p>The Safety day could be timed with Fire Prevention Week which takes place annually during the 2<sup>nd</sup> week of October each year. October 4 to 10, 2020 is the next Fire Prevention Week.</p>	
10.	High	To improve inter-agency communication regarding wildfire risk, emergency preparedness, response, and recovery.	SRD should arrange a regional meeting with community officials at the start of fire season to review communication, support, incident command structure, and emergency procedures. This meeting should involve community representatives, SRD, and Coastal Fire Centre – North Island Fire Zone staff.	SRD
11.	Low	To improve communication of emergency preparedness activities to the community.	Develop an Emergency Preparedness Communication Plan that considers how to communicate with the community about emergency preparedness and evacuation for wildfires along with other natural events such as tsunamis, earthquakes, and landslides.	KCFN with support from Emergency Plan contractor

## 5.4 Other Prevention Measures

Fire prevention can be achieved through communication and education initiatives, as well as through the development and implementation of policies and regulations, including operational guidelines and restrictions. Fire prevention can be addressed at the community level through various avenues. Danger class rating signs within fire protection zones, public communication, industrial work restrictions and fire bans are examples of public fire prevention measures.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
12.	High	To improve community and public awareness of fire danger through signage.	Work with BCWS North Island Fire Zone to submit a proposal to install Wildfire Information signage at the Fair Harbour Marina.	KCFN and SRD

## SECTION 6: WILDFIRE RESPONSE RESOURCES

Interface fires are complex incidents that typically involve both wildland and structural fires. During times when many fires are burning in the Province and threatening multiple communities at the same time, resource requests can exceed the resources available. In B.C., these resources are deployed according to B.C. Provincial Coordination Plan for Wildland Urban Interface Fires (revised July 2016<sup>40</sup>). KCFN and the Province of British Columbia have signed a Wildfire Suppression Agreement (WSA) (2011). BCWS provides fire control services for wildfires originating on KCFN lands and the WSA provides for cost recovery for these services.

### 6.1 Local Government and First Nation Firefighting Resources

The intent of this sub-section is to identify implications of wildfire that impact firefighting efforts (e.g. loss of electrical power and water pressure and supply), the contingencies that have been put in place, and any recommended measures that would help to make community firefighting more effective. Include a high level summary of mutual aid agreements.

#### 6.1.1 Fire Departments and Equipment

Kyuquot does not have a fire department. Fire hydrants are located throughout the Village with fire tool sheds nearby containing hoses and nozzles. A complete inventory of fire suppression equipment including fire extinguishers, hoses, pumps, nozzles, fittings, personal protective equipment, safety gear, and hand tools is recommended.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
13.	High	To improve community capacity in responding to structural and WUI fires	Complete an inventory of fire suppression equipment available in the community	KCFN / FNESS to support
14.	High	To improve community capacity in responding to structural and WUI fires	Conduct a community specific fire suppression equipment needs analysis. Based on the analysis, work to procure additional equipment that may be required including water pumps, hoses, water storage, hand tools, etc.	KCFN / FNESS to support

<sup>40</sup> BC Provincial Coordination Plan for Wildland Urban Interface Fires. [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](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)

### **6.1.2 Water Availability for Wildfire Suppression**

The fire hydrants are connected to the community's water system. The water storage tanks have a capacity of 80,000 gallons. Infrastructure upgrades planned in 2020-2022 will increase the water storage capacity. Alternative water sources for fire suppression are limited but include ocean water and a small wetland about 500m past the school. Using these water sources would require additional hoses, water pumps, and temporary water storage tanks/bladders.

### **6.1.3 Access and Evacuation**

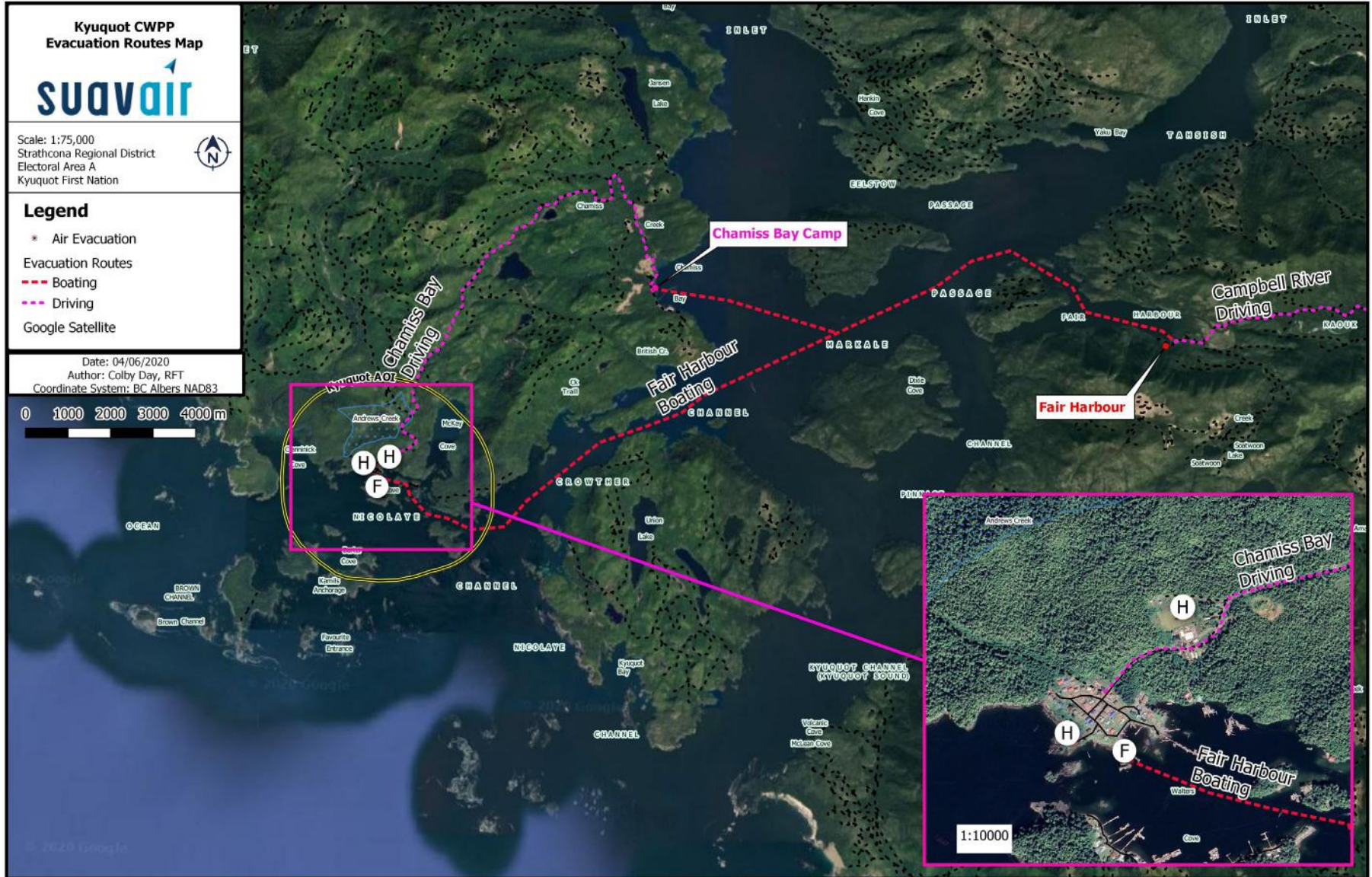
The community is in a remote area on the west coast of Vancouver Island. Access to the community is by water and the primary evacuation route is also by water. The Emergency Plan (draft, as of April 2020) details evacuation procedures and a wildfire/WUI incident hazard response. The Emergency Plan also outlines the response plan for a house fire within the community.

Two possible evacuation routes exist (Map 7) – by boat to Walter's Cove or Fair Harbour or other location determined at the time of an event; or by land to KESS or further onto Chamiss Bay. From Chamiss Bay, water-based egress is the only option. The evacuation muster station is at the school. A helicopter landing area is located near the water by the community center. Since the muster station is at the school, the community should work on designating, marking and maintaining a second helicopter landing/staging area near the school. A helicopter staging area should be free of obstructions, loose debris, and overhanging vegetation.

Community emergency supplies are stored in shipping containers across from the school. Community members have already been encouraged to have "grab-and-go" bags in place.<sup>41</sup> This practice should be continued.

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<sup>41</sup> PreparedBC. How to build a household emergency kit and grab-and-go bag.  
<https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/preparedbc/build-an-emergency-kit-and-grab-and-go-bag>



Map 7. Access and evacuation routes by water and land. "H" indicates helicopter landing areas, "F" indicates float plane loading areas.

The following recommendations are made regarding access and evacuation.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
15.	Low	To clear and maintain a helicopter staging area for emergency evacuations and/or wildfire response operations.	Maintain the existing helicopter landing/staging. Keep this area free of obstructions, loose debris and overhanging vegetation or obstacles. Maintain access control (i.e.: fencing) around the area. Clearly mark this location so it is visible from land and air.  A second helicopter landing area should be designated near the KESS/evacuation muster station.	KCFN
16.	High	To ensure emergency evacuation of community members is possible on short notice.	Conduct an inventory of physical resources (vehicles/boats, licensed drivers, fuel) available to conduct emergency evacuation of all community members. Procure any additional resources that may be required.	KCFN

#### 6.1.4. Training

FNESS works closely with Emergency Management BC (EMBC) and Indigenous Services Canada (ISC) to support successful emergency management for First Nations communities in BC. FNESS delivers training for First Nations communities on topics including emergency preparedness, community fire safety, fire department services, wildland fire fighting, and provides other emergency planning support services.<sup>42</sup> In BC, FNESS also administers the FireSmart program for all First Nations communities.<sup>43</sup>

FNESS should support KCFN in completing a community specific needs analysis for personnel training and fire suppression equipment. Following the needs analysis, a training plan should be developed and implemented. Appendix 3: Wildfire and Emergency Response Training Courses lists relevant training courses that KCFN may consider for their community members and staff.

Emergency first aid and wildfire response training is often provided by employers in the forestry and aquaculture industries. A community survey would help determine how many community members have active or expired training credentials, and interest in maintaining their training and certification. The following recommendations address training needs.

<sup>42</sup> FNESS. Emergency Management. Training and Exercise. <https://www.fness.bc.ca/core-programs/emergency-management/training-and-exercise>

<sup>43</sup> FNESS. FireSmart. <https://www.fness.bc.ca/core-programs/forest-fuel-management/firesmart-home-ignition-zone>

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
17.	High	To engage the community in wildfire response planning and document what local skills and resources are available.	Survey the community to determine what formal training in emergency response, wildfire response (i.e.: S100), and other technical expertise (i.e.: chainsaw operation, danger tree assessment) is available.	KCFN
18.	High	To improve community capacity in emergency management and planning.	Conduct a community specific training needs analysis and training plan to improve capacity in wildfire response, emergency support services, incident command systems, and emergency operations center.	KCFN
19.	Med	To establish and maintain a working relationship with BCWS North Island Fire Zone.	Contact BCWS to explore opportunities for community training days, joining the Fire Warden program.	KCFN
20.	High	To improve community capacity in responding to structural and WUI fires.	Host community training days to practice use of fire extinguishers, available fire tools, and the hydrant system.	KCFN
21.	Med	To establish a volunteer fire department for the community with trained emergency responders.	Recruit interested community members to join. Work with FNESS to identify training and equipment needs.	KCFN / FNESS to support
22.	Med	To improve community awareness and capacity to respond to WUI fire incidents.	Make S100 (Basic Fire Suppression and Safety) & S185 (Fire Entrapment Avoidance and Safety) courses available annually or biennially within the community	KCFN / FNESS to support
23.	Med	To improve capacity in fire protection leadership governance.	Work with FNESS to ensure administrative staff have Foundational Training, beginning with Tier 1 and progressing to Tier 3 over the next 5 years. <sup>44</sup>	KCFN / FNESS to support

<sup>44</sup> <https://www.fness.bc.ca/core-programs/fire-services>

## 6.2 Structure Protection

Currently, KCFN does not have access to or the capacity to deploy sprinkler systems or a structural protection unit (SPU). The community's remote location and access constraints make it unreasonable to rely on sprinkler systems or SPU's to be brought in from other locations in the event of an emergency. The following recommendations are made to improve the community's capacity for structure protection:

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
24.	High	To reduce the risk of structure fires negatively impacting human safety and reduce the risk of structure fires causing WUI incidents.	Assess each home/structure in the Village for working smoke alarms and fire extinguishers.  Purchase and install alarms and extinguishers for any homes without. FNESS order forms for smoke alarms <sup>45</sup> and fire extinguishers. <sup>46</sup>	KCFN
25.	Low	To reduce the likelihood of structure ignitions during a WUI fire event.	Purchase exterior sprinkler kits for homes; provide training to the community for how to set up the kits  Consider the water availability for sprinkler systems, additional water storage reservoirs are likely required to ensure water pressure and availability. Costs vary by supplier. One example is the "Complete Wildfire Protection Kit" <sup>47</sup>	KCFN
26.	High	To improve community capacity in responding to structural and WUI fires.	Practice the Fire Response procedures as outlined in the Emergency Plan.	KCFN

<sup>45</sup> FNESS. Smoke/Carbon Monoxide Alarm. Guidelines for Expression of Interest.

<https://www.fness.bc.ca/downloads/smoke-carbon-monoxide-alarm-guidelines.pdf>

<sup>46</sup> FNESS. Fire Extinguishers Expression of Interest. <https://www.fness.bc.ca/downloads/fire-extinguishers-expression-of-interest-2.pdf>

<sup>47</sup> <https://www.shop.waspswildfire.com/collections/wildfire-protection-kit/products/complete-wildfire-protection-kit>

## APPENDIX 1: LOCAL WILDFIRE THREAT PROCESS

This section is only required for local government land or First Nations land and is optional for provincial Crown land

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

1. Develop local fuel type map
2. Consider the proximity of fuel to the community
3. Consider fire spread patterns (i.e. ISI Roses)
4. Consider topography
5. Stratify the WUI based on relative wildfire threat
6. Consider other local factors
7. Identify priority wildfire risk areas for field assessment as outlined in the document below

### A1.1 Fuel Type Attribute Assessment

The primary forest fire modelling system applied in Canada is the Canadian Forest Fire Danger Rating System (CFFDRS) which uses fuel types described in the Fire Behaviour Prediction (FBP) system. The diversity of ecosystems and biogeoclimatic zones in BC makes fuel typing a complex endeavour. The CFFDRS/FBP system is based largely on fire-prone forest types across Canada. Coastal forest types, including all the forest types within the AOI of this CWPP, are not as thoroughly researched or modelled to understand forest fire behaviour. Coastal forest types have different tree species, shrubs/herbs species, and stand structure when compared to the fuel types classified in the CFFDRS/FBP system.

Perrakis, Eade & Hinks<sup>48</sup> have applied the CFFDRS/FBP fuel types to the BC context and these fuel type descriptions are used as a reference for this CWPP. Regarding coastal forests, Perrakis et al. note the following:

*“Coastal forests dominated by coastal Douglas-fir, redcedar and western hemlock at low elevations; and Amabilis fir and mountain hemlock at higher elevations, represent a unique challenge. These stands are very different in structure and vegetation composition than the boreal or sub-boreal vegetation that is addressed by most FBP fuel types. Older low elevation stands, with high canopies and low light and wind penetration, are typed as C-5, as described above. For varying ages of younger stands, research studies have suggested a U-shaped model for surface fuel hazard, where fine surface fuel loading is highest in younger (<20 years) and old-growth stages, and lower in pole-sized and mature stands (100-200 years) (Agee and Huff 1987); however, crown fire hazard was not considered. A similar pattern was also found by Feller and Pollock (2006), who examined different stand ages following harvesting in southwestern BC; however, that study also included a model of crown fire hazard, which showed a very different pattern, with crown fire hazard highest in dense pole-sized regenerating stands (20-90 years).*

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<sup>48</sup> Perrakis, D., Eade, G., & Hicks, D. 2018. British Columbia Wildfire Typing and Fuel Type Layer Description. <https://cfs.nrcan.gc.ca/publications?id=39432>

*These findings have been incorporated into the present fuel typing scheme by classifying dense pole-sized stands as C-3 (see above). Amabilis fir stands have been typed as M-2 40%conifer, representing predicted ROS and HFI values somewhere between C-5 and C-3 outputs (Figure 5). In most fire weather conditions, M-2 40%C produces ROS near the C-3 prediction, although at high and extreme fire danger conditions (ISI > 25 or so), the predicted spread rate is lower, representing more canopy openings and discontinuities which are believed to occur in these stands.” (p. 26)*

Regarding plantations:

*“Coastal conifer plantations represent a specific case of uncertainty – species such as Douglas-fir and western redcedar growing on productive sites, with abundant herbaceous and shrub species in the understory; sometimes these blocks are planted directly through untreated slash; other times, slash is burned before planting; currently, these stands sometimes type out as C-5, sometimes as D-1/2, sometimes as slash (S-3), depending on the time since harvest, tree height and tree age of the dominant cohort; in the authors’ opinion none of these is a particularly good fit, and more research is needed to represent managed stands in coastal areas.” (p. 32)<sup>49</sup>*

Generally, fuel types are defined by overall vegetation structure, dominant species, understory/ladder, and forest floor characteristics. Wildfire fuel types referred to in this CWPP are summarized in the table below.

Table 8. Description of fuel type layers.

<b>Fuel Type</b>	<b>CFFDRS/FBP Description<sup>50</sup></b>	<b>BC PSTA Description<sup>51</sup></b>	<b>Local Description</b>	<b>Expected Wildfire Behaviour Under High Wildfire Danger</b>
<b>C-1</b>	Spruce-lichen Woodland (open, parkland).	Pure black spruce stands with sparse vegetation density.	Does not occur within the AOI.	Similar to C-3
<b>C-2</b>	Boreal black and white spruce. Continuous feather moss, compacted organic layer.	Mid-elevation hybrid spruce stands.	Does not occur within the AOI.	Crown fire, high to very high fire intensity and rate of spread.

<sup>49</sup> Perrakis, D., Eade, G., & Hicks, D. 2018. *British Columbia Wildfire Fuel Typing and Fuel Type Layer Description*. Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, Victoria, BC. Retrieved from <https://cfs.nrcan.gc.ca/publications?id=39432>.

<sup>50</sup> FBP Fuel Type Descriptions. <https://cwfis.cfs.nrcan.gc.ca/background/fueltypes/c1>

<sup>51</sup>Perrakis, D., Eade, G., & Hicks, D. 2018. *British Columbia Wildfire Fuel Typing and Fuel Type Layer Description*. Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, Victoria, BC. Retrieved from <https://cfs.nrcan.gc.ca/publications?id=39432>.

	Continuous shrub, low to moderate down woody fuel, tree crowns extend nearly to the ground. Moderately well stocked black spruce stands, bogs excluded.			
<b>C-3</b>	Mature jack or lodgepole pine.  Continuous feather moss, sparse conifer understory, sparse down woody fuels. Fully stocked.  Ladder fuels absent.	Pure and mixed Fd stands 4-12m tall; dense pure or mixed (100% conifer) dominated by Cw, Yc, Hw and 4-15m in height or >15m and <60 years old.  Dense pole sized stands. <sup>52</sup>	Dense Second or third growth douglas-fir/ western hemlock/ western red cedar forests over 4m tall and less than 60 years old. Clean/open understory.	Surface and crown fire, low to very high fire intensity and rate of spread.
<b>C-5</b>	Red and white pine.  Continuous needle litter; moderate herb and shrub layer, tree crowns separated from the ground. Moderately well stocked stands.	Used to approximate fire behaviour in mature stands of low-mid elevation coastal Fd/Hw/Cw.	Mature Douglas-fir/ western hemlock/ western red cedar forests.	Burn rarely and typically with low intensity. Surface fuel loading can be high in older coastal stands, as a result fire intensity can be higher under drought conditions.
<b>M-1/2</b>	Boreal Mixed wood.  Continuous leaf litter in deciduous portions, feathermoss and needles in conifer portions. Moderate shrub and continuous herb layers, down woody fuels, conifer crowns	Amabilis fir stands typed as M-2 40% conifer to represent fire behaviour between C-3 and C-5 fuel types.  Mixed deciduous/coniferous stands.	Mature forests dominated by amabilis fir/mountain hemlock.  Higher elevation stands over 800-900m.	Surface fire spread, torching of individual trees and intermittent crowning.

<sup>52</sup> Poles are defined as “a tree between a sapling and small sawtimber size. Size varies by region, e.g. for boreal and eastern forests 12-20cm dbh. Retrieved from <https://cfs.nrcan.gc.ca/terms/category/21>.

	extend near the ground. Moderately well stocked mixed wood stands.			
<b>D-1/2</b>	Aspen. Continuous leaf litter, moderate shrubs and herbs, conifer understory absent. Moderately well stocked, semi-mature.	D-1 leafless; D-2 green Broadleaf species Conifer forest, 2-6 years Post-wildfire (low to moderate fire severity, open to very open stand structure).	Alder, cottonwood, or big leaf maple dominated stands, often along streams.	Surface fire, low to moderate rate of spread and intensity.
<b>S-3</b>	Coastal Cedar-Hemlock-Douglas-fir Slash.	Slash types may over predict hazard in areas where slash hazard reduction has occurred (burning, piling, or site preparation).	Recently harvested cut blocks less than 5 years old.	Moderate to high rate of spread and high to very high intensity surface fire.
<b>W</b>	Water	n/a	n/a	n/a
<b>ND</b>	No Data / Private Land.	n/a	n/a	n/a
<b>NF</b>	Non-fuel.	Conifer forest – dense (low fire severity; overstorey mostly unchanged), 1-3 years post-wildfire.		

The following table shows the fire behaviour potential of the FBP fuel types grouped into 4 categories based on their relevance to a wildfire threat assessment.

Table 9. Fuel type categories and crown fire spotting potential.

Fuel Type Categories	Fuel Type - Crown Fire/ Spot Potential
1: C1, C2, C4, M3-M4 (>50% C/DF)	High
2: C3, C7, M3-M4 (<50% C/DF) M1-M2 >50% Conifer	Moderate
3: C5, C6, O1a/b, S1- S3 <sup>1</sup> M1-M2 (26-49% Conifer)	Low
4: D1, D2, M1-M2 (<26% Conifer)	Very Low

The accuracy of the local fire threat determination and fuel treatment design is directly linked to the accuracy of the fuel type information. If the fuel typing is incorrect based on significant disturbance such as harvesting or major fire, to the degree that the associated fire behaviour will drastically change the corresponding threat information will also be incorrect. BCWS annually produces a comprehensive fuel type layer for fire behaviour prediction using the Vegetation Resources Inventory (VRI) data, this layer is made available in the PSTA dataset. The BCWS fuel type layer attribute information should be verified using current data sources including imagery, new treatments, new developments or updated disturbance data.

As part of this process all changes should be documented and rationale provided, using the Wildfire Threat Assessment\_FPB Fuel Type Change Rationale worksheet. This worksheet must be submitted to [BCWSPrevention@gov.bc.ca](mailto:BCWSPrevention@gov.bc.ca) for review and when approved incorporated into the CWPP.

PSTA fuel types have been updated through spatial analysis to determine any areas where fuel type mapping appears to be potentially inaccurate and a quality assurance process to validate. This process focused on areas that present the greatest potential inaccuracy, such as those listed below:

1. Areas with fuel management treatments (including Prescribed Fire) that are not mapped.
2. Recent silviculture treatments such as spacing and pruning.
3. Coniferous mapped as deciduous.
4. Grasses or shrubs mapped as forest.
5. Areas of non-fuel mapped as a fuel type.
6. Major disturbances (harvesting, wildfires, or land clearing for industrial purposes).
7. C7 fuel types with high Crown Closure.

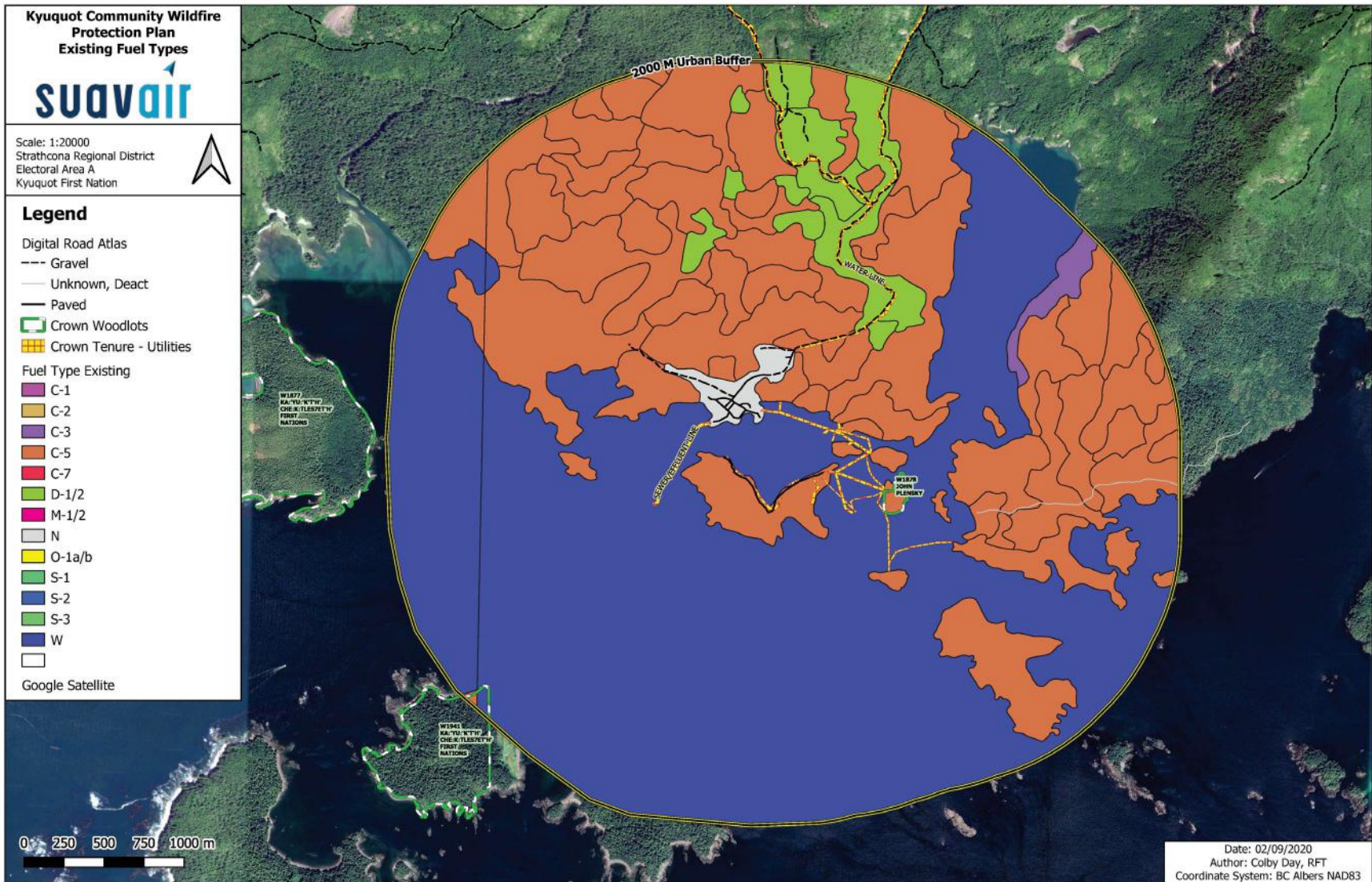
Fuels in the area are generally mature conifer forests (C-5) or young and dense conifer forests (C-3). The available spatial information from Data Catalogue BC, VRI data, RESULTS; updated Google Earth imagery, were analyzed for fuel type verification and adjustments. The major changes to the fuel type layer that resulted within the AOI included:

- water areas were corrected with more accurate spatial data sources,
- coniferous mapped as deciduous fuel types corrected
- harvested blocks older than 5 years, coniferous, dense pole sized stands over 4m tall, less than 60 years old, were updated to C-3 fuel type

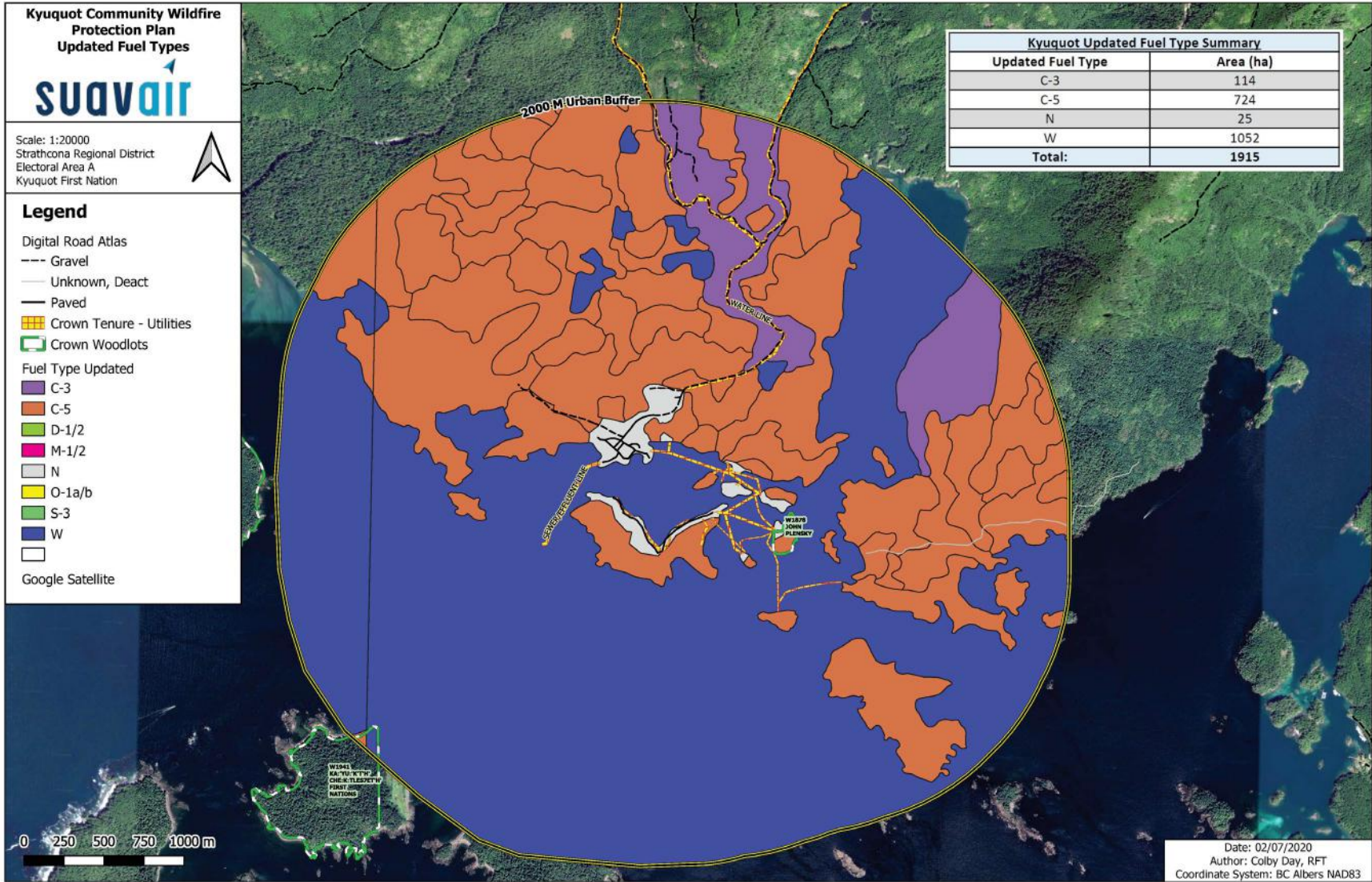
The changes in fuel type areas are summarized in the Table 10 below. Existing PSTA and updated fuel types are shown on the maps below.

Table 10. Summary of fuel type layer changes.

<b>Fuel Type Class</b>	<b>2019 PSTA Original Area (ha)</b>	<b>2020 CWPP Updated Area (ha)</b>	<b>Net Change (ha)</b>
<b>C-3 (dense, pole sized forests)</b>	12	114	+102
<b>C-5 (mature coniferous)</b>	762	724	-38
<b>D-1/2 (deciduous)</b>	88	0	-88
<b>Non-fuel</b>	16	25	+9
<b>Water</b>	1037	1052	+15
<b>Total Area</b>	1915	1915	



Map 8. 2019 PSTA existing fuel types within the AOI.



Map 9. Updated fuel types within the AOI.

## A1.2 Proximity of Fuel to the Community

Fuel closest to the community usually represents the highest hazard. The recommended approach is to treat fuels to achieve a desired level of hazard reduction, from the value or structure outward, ensuring mitigation continuity. Untreated areas between treatment areas and the value or structure may allow a wildfire to build in intensity and rate of spread, which can increase the risk to the value. To capture the importance of fuel proximity in the local wildfire threat assessment, the WUI is weighted more heavily from the value or structure outwards. Fuels adjacent to the values and/or structures at risk receive the highest rating followed by progressively lower ratings moving out.

The local wildfire threat assessment process subdivides the WUI into 3 areas – the first 100 meters (WUI 100), 101 to 500 meters (the WUI 500), and 501 to 2000 meters (the WUI 2000). These zones provide guidance for classifying threat levels and subsequent priorities of treatments.

Table 11: Proximity to the Interface

Proximity to the Interface	Descriptor*	Explanation
<b>WUI 100</b>	<b>(0-100 m)</b>	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.
<b>WUI 500</b>	<b>(101-500m)</b>	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.
<b>WUI 2000</b>	<b>(501-2000 m)</b>	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.
	<b>&gt;2000 m</b>	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.

### **A1.3 Fire Spread Patterns**

Wind speed, wind direction, and fine fuel moisture condition influences wildfire trajectory and rate of spread. Wind data is summarized in the ISI Rose(s) from the local representative BCWS weather station – TS Artlish from 2007-2015 (Figure 8). Wildfire that occurs upwind of a value poses a much more significant threat to that value than a fire that occurs downwind.

Other available wind data includes the Canadian Wind Atlas (CWA). The CWA models wind speeds and direction from large scale and long-term atmospheric data. The Wind Atlas data for the AOI shows dominant winds from the southeast, except for summer months (June, July, August) where the winds also come from the north. Figure 9 below represents Wind Roses at 50m, the frequency distribution of wind by sector for the Kyuquot area, Latitude = 50.09N, longitude = 127.56W. Available from <http://www.windatlas.ca/maps-en.php>.

Strong southeast winds are characteristic of winter low-pressure systems along the coast of BC. The northerly winds recorded in the summer months are characteristic of summer frontal systems approaching from the north.

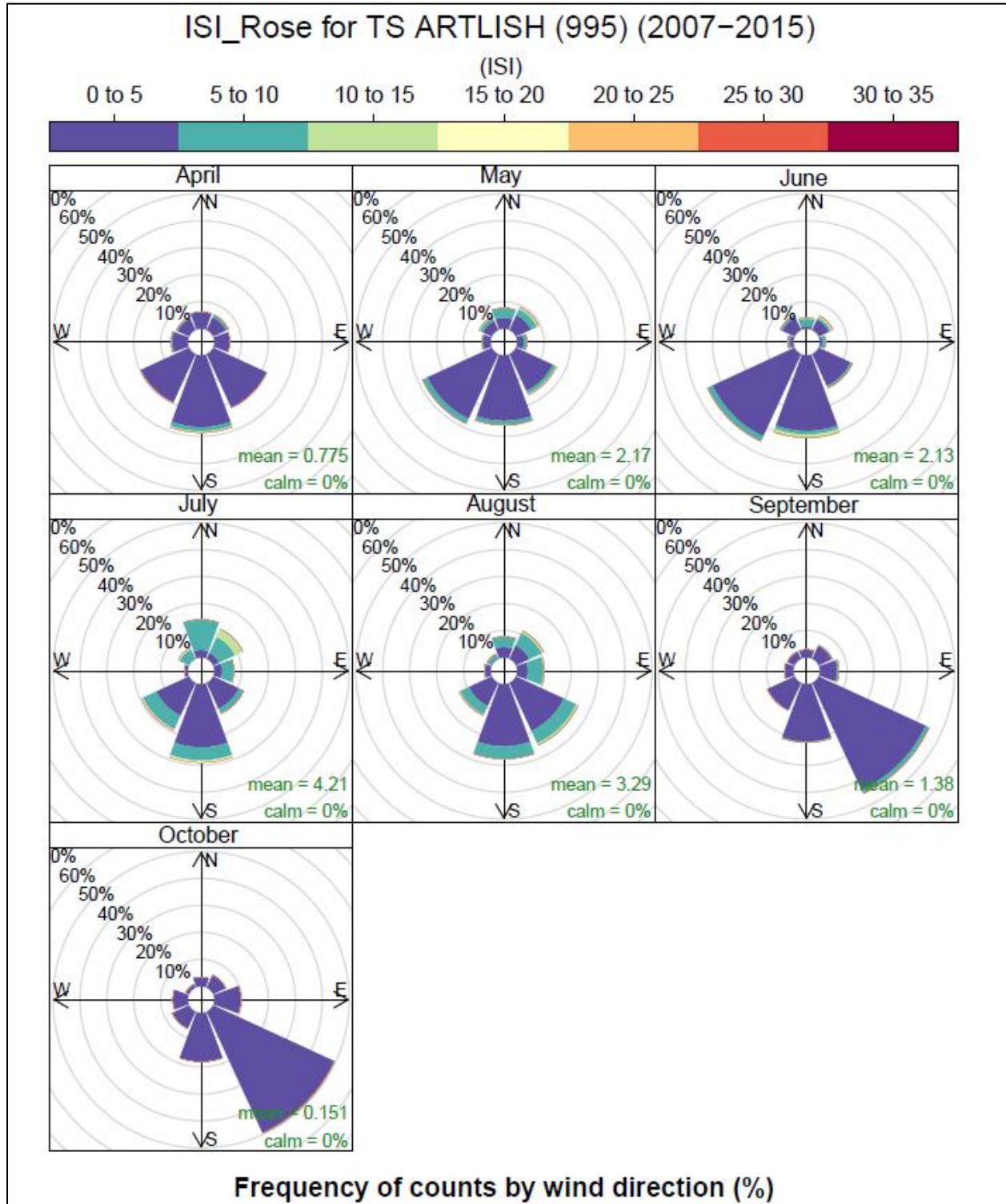


Figure 8. Initial spread index rose for TS Artlish weather station, April to October, from 2007-2015.

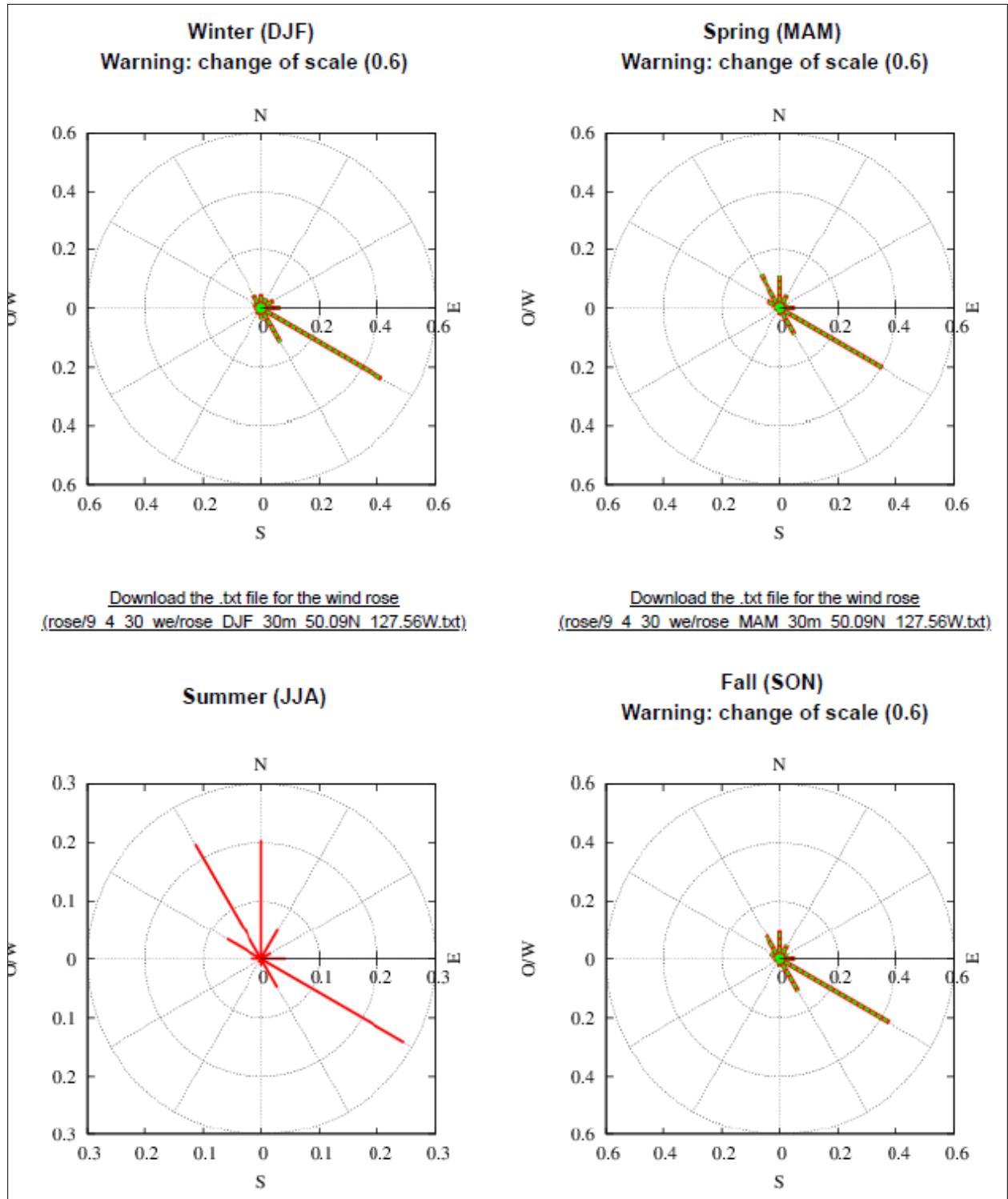


Figure 9. Canadian Wind Atlas wind frequency roses for the Kyuquot area.

## A1.4 Topography

Slope percentage and slope position of the value are both considered. Slope percentage influence a fire's trajectory and rate of spread. Slope position of the value relates to the ability of a wildfire to gain momentum during an uphill run and affects the potential impact to the value.

### ***Slope Class***

Determine slope percentages/classes for the WUI area. General fire behaviour implications of slope classes are summarized in the following table:

Table 12: Slope Percentage and Fire Behaviour Implications

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

### ***Slope Position of the Value***

Slope position of a value relates to the ability of a wildfire to gain momentum during an uphill run. A value at the bottom of the slope is equivalent to a value on flat ground; a value on the upper 1/3 of the slope would be impacted by high preheating and faster rates of spread than a value on flat ground.

Determine the values' location relative to the slope (bottom, mid-slope on a bench, mid-slope on a continuous slope, upper 1/3 of slope). When different portions of the community are in different relative slope positions, assess the portions separately. General fire behaviour implications of slope position to the value are summarized in the following table:

Table 13: Slope Position of Value and Fire Behaviour Implications

<b>Slope Position of Value</b>	<b>Fire Behaviour Implications</b>
<b>Bottom of Slope/ Valley Bottom</b>	Impacted by normal rates of spread.
<b>Mid Slope - Bench</b>	Impacted by increase rates of spread. Position on a bench may reduce the preheating near the value. (Value is offset from the slope).
<b>Mid slope – continuous</b>	Impacted by fast rates of spread. No break in terrain features affected by preheating and flames bathing into the fuel ahead of the

	fire.
<b>Upper 1/3 of slope</b>	Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel.

## A1.5 Local Wildfire Threat Classification

Classify the WUI into Local Wildfire Threat Classes based on the updated fuel map (Section 4.3.1). The following explains the process to be used in determining local wildfire threat:

1. Acquire the Provincial Strategic Threat Analysis and metadata from BCWS clipped to the area of interest.
2. Using the previously corrected fuel type map for the area of interest, find areas where the fuel types have been changed. Areas where there is no fuel type change use the PSTA threat score.
3. Look for a similar fuel type in the local area, crosswalk the HFI value from the similar fuel type to the corrected fuel type polygon and place into a table to recalculate the wildfire threat for the corrected polygon. Fire density and spotting impact numbers should not change due to any input at a local level. If the fire density seems to be misrepresentative of the local fire history, this can be captured in the rationale at the treatment design stage.

Table 14: PSTA Inputs Cross Walk Table.

	<b>Head Fire Intensity (60%)</b>	<b>Fire Density (30%)</b>	<b>Spotting Impact (10%)</b>	<b>Wildfire Threat Score (100%)</b>
<b>Original PSTA Values</b>	1 (O-1a/b) 1 (O-1a/b) 2(O-1a/b)	6 6 4	3 3 3	
<b>Original Weighted Values</b>	6 6 12	18 18 12	3 3 3	27 (5 - Moderate) 27 (5 - Moderate) 27 (5 - Moderate)
<b>Updated HFI (based on fuel type change)</b>	3 (M-1/2) 4 (C-3) 4 (C-3)	6 6 4	3 3 3	
<b>Updated Weighted Values</b>	18 24 24	18 18 12	3 3 3	39 (7 - High) 45 (8- High) 39 (7 - High)

Table 15. PSTA Classification table - Low, Moderate, High, Extreme classifications taken from 2017 PSTA document.

	Water	Class 0	No Threat
Class 1	0.1 – 5 Low	Class 2	5.1 – 10 Low
Class 3	10.1 – 15 Low	Class 4	15.1 – 21 Moderate
Class 5	21.2 – 27 Moderate	Class 6	27.1 – 33 Moderate
Class 7	33.1 – 40 High	Class 8	40.1 – 47 High
Class 9	57.1 – 55 Extreme	Class 10	55.1 – 81 Extreme

## A1.6 Local Wildfire Risk Classification

As part of the CWPP analysis, local wildfire risk will need to be determined. The following factors are assessed to determine the local wildfire risk score.

1. Corrected wildfire threat (based on locally verified fuel type changes) is described in Section 4.3.6 – Local Wildfire Threat Calculation. This category is weighted at 30% of the total risk score.
2. Proximity is described in Section 4.3.2 – Proximity of Fuel to the Community. This weighs the risk of fuel based on distance from the community, giving a higher score for risk nearest to the values at risk in the community. This is described as “working from the value outward to mitigate risk”. This category is weighted at 30% of the total risk score.
3. Fire spread patterns (Section 4.3.3) use ISI roses and fire perimeter history to forecast the most likely potential fire spread direction for an approaching wildfire to the relative position of the community. Stratify the WUI into areas that tend to be downwind, upwind, or off-set, to these fire spread patterns. Due to the high variability of this information from community to community, generic relative weightings are not provided here, and local evaluation and weightings based on the strength of the local wind direction and intensity patterns is required. This category is weighted at 30% of the total risk score (when clear patterns are evident).
4. Topography (Section 4.3.4) is an important factor in increasing the rate of spread and the resulting head fire intensity of a wildfire. Slope may have little influence depending on the area of the province where the community is located. This category is weighted at 10% (5% for position and 5% for slope class) of the total risk score.

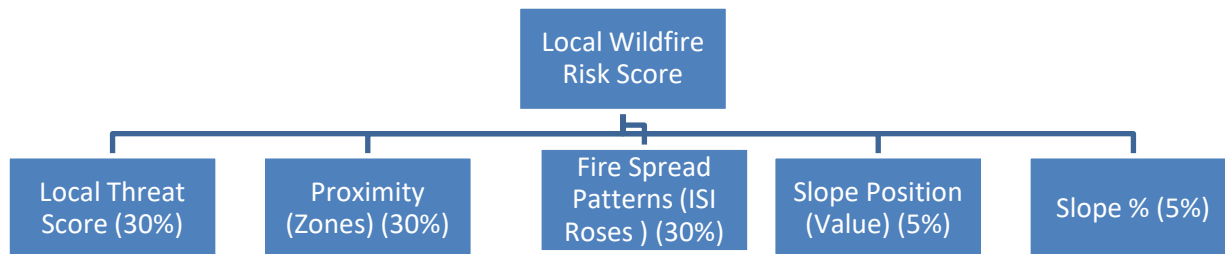


Figure 10: Local Wildfire Risk Inputs

A table explaining the weightings used in determining local wildfire risk are provided below:

Table 16: Local Wildfire Risk Summary

Local Threat Score (30%)	Proximity (30%)	Fire Spread Patterns (30%)	Slope Position (5%)	Slope Percent (5%)	Wildfire Risk Score (100%)
6.6/10	10/10 (within 100 m of value)	8/10 (west of community with predominant SW to NE wildfire spread pattern)	2/10 (lower part of the slope)	5/10 (30% slope)	7.73/10 (High)

Weighted Values

1.98	3	2.4	0.1	0.25	7.73
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NB: Example of the process, not actual values used.

The wildfire risk assessment process outlined above provides a means to determine the wildfire risk as it applies to forest fuel hazard, proximity of fuel to the community, fire spread patterns and topography. These factors all influence how a wildfire could impact the community if ignition were to occur. It is also important for Professionals to consider and assess high forest fire risk activities, human use, and other environmental factors that affect wildfire threat and risk within different areas of the WUI. Note any additional local factors that influence (increase or decrease) the wildfire threat information that is unique to the community.

Where local factors are sufficient to justify changes to the wildfire risk values determined above, document the rationale and provide a map of any alterations, as part of the CWPP. Considering all of the factors noted above should allow the Professional to provide a comprehensive assessment of the wildfire hazard and risk.

Table 17: Local Wildfire Risk Weighting

Relative Risk	Weighting
No Risk	<0.1
Low	0.1 - 3.9
Moderate	4 - 6.9
High	7 - 8.9
Extreme	9+

NB: The scoring system is based on a maximum score of 10.

## A1.7 Summary of Fire Risk Classes

**No Risk (Gray):** The combination of the local fuel hazard (usually PSTA Class 0 or 1), weather influences, topography, proximity to the community, fuel (non-fuel) position in relation to fire spread patterns, and known local wildfire threat factors make it a no risk for threatening a community. These areas are non-fuel or sparsely vegetated and will not support spreading fires, and any patches of vegetation will usually self-extinguished. Low to no risk to any values at risk.

**Low (Green):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it a lower potential for threatening a community. These stands will support surface fires, single tree or small groups of conifer trees could torch/ candle in extreme fire weather conditions. Fuel type spot potential is very low, low risk to any values at risk.

**Moderate (Yellow):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns and known local wildfire threat factors make it possible that a wildfire in this area would threaten the community. Areas of matted grass, slash, conifer plantations, mature conifer stands with very high crown base height, and deciduous stands with 26 to 49% conifers. These stands will support surface fires, single tree or small groups of conifer trees could torch/ candle. Rates of spread would average between 2-5 meters/ minute. Forest stands would have potential to impact values in extreme weather conditions. Fuel type spot potential is unlikely to impact values at a long distance (<400m).

**High (Orange):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it likely that a wildfire in this area would threaten the community. This includes stands with continuous surface/ crown fuel that will support regular torching/ candling, intermittent crown and/or continuous crown fires. Rates of spread would average 6 - 10 meters/ minute. Fuel type spot potential is likely to impact values at a long distance (400 - 1 000m).

**Extreme (Red):** The combination of the local fuel hazard, weather influences, topography, proximity to the community, fuel position in relation to fire spread patterns, and known local wildfire threat factors make it very likely that a wildfire in this area would threaten the community. Stands with continuous surface/ crown fuel and fuel characteristics that tend to support the development of intermittent or continuous crown fires. Rates of spread would

average >10 meters/ minute. Fuel type spot potential is probable to impact values at a long distance (400 -1 000m or greater).These forest stands have the greater potential to produce extreme fire behaviour (long range spotting, fire whirls and other fire behaviour phenomena.

## APPENDIX 2: EXAMPLE FIRESMART PRACTICES AND ACTIVITIES

FOCUS AREA	EXAMPLE ACTIVITIES
<b>1. EDUCATION</b>	<ul style="list-style-type: none"> <li>• Develop and/or promote local FireSmart educational activities and tools. Refer to <a href="#">BC FireSmart Resources</a> for FireSmart materials that are currently available.</li> <li>• Develop and/or promote education for the reduction of human-caused fires</li> <li>• Encourage active participation in Wildfire Community Preparedness Day</li> <li>• Organize and host a community FireSmart day, FireSmart events and workshops, and wildfire season open houses</li> <li>• Apply for <a href="#">FireSmart Canada Community Recognition</a></li> </ul>
<b>2. PLANNING</b>	<ul style="list-style-type: none"> <li>• Develop or update a CWPP</li> <li>• Develop policies and practices for design and maintenance of FireSmart publicly owned land and First Nations land, such as parks and open spaces</li> <li>• Develop policies and practices for design and maintenance of FireSmart publicly owned buildings</li> <li>• Conduct site visits and FireSmart and/or risk assessments for publicly owned lands, First Nation lands and publicly owned buildings</li> </ul>
<b>3. DEVELOPMENT CONSIDERATIONS</b>	<ul style="list-style-type: none"> <li>• Amend Official Community Plans, Comprehensive Community Plans and/or land use, engineering and public works bylaws to incorporate FireSmart policies</li> <li>• Revise landscaping requirements in zoning and development permit documents to require fire resistant landscaping</li> <li>• Establish Development Permit Areas for Wildfire Hazard in order to establish requirements for the exterior design and finish of buildings<sup>53</sup></li> <li>• Include wildfire prevention and suppression considerations in the design of subdivisions (e.g. road widths, turning radius for emergency vehicles, and access and egress points)</li> </ul>

<sup>53</sup> Local governments should refer to [Changes for Local Governments Under Section 5 of the Building Act: Appendix to Section B1 of the Building Act Guide \(Revised February 2017\)](#) for information on the use of development permits for wildfire hazard.

	<ul style="list-style-type: none"> <li>• Amend referral processes for new developments to ensure multiple departments, including the fire department and/or emergency management staff, are included</li> </ul>
<b>4. INTERAGENCY CO-OPERATION</b>	<ul style="list-style-type: none"> <li>• Develop and/or participate in regional or local FireSmart planning tables</li> <li>• Participate in multi-agency fire and/or fuel management tables</li> </ul>
<b>5. EMERGENCY PLANNING</b>	<ul style="list-style-type: none"> <li>• Develop and/or participate in cross-jurisdictional meetings and tabletop exercises, including seasonal readiness meetings</li> <li>• Review structural protection capacity (i.e. Fire safety assessments)</li> </ul>
<b>6. CROSS TRAINING</b>	<ul style="list-style-type: none"> <li>• Cross-train fire departments to include structural fire and interface wildfire training (e.g. <a href="#">S-100</a>)</li> <li>• Provide or attend training for Local FireSmart Representatives and community champions</li> <li>• Support professional development to increase capacity for FireSmart activities</li> </ul>
<b>7. FIRESMART DEMONSTRATION PROJECTS</b>	<ul style="list-style-type: none"> <li>• Undertake FireSmart Demonstration Projects for publicly owned buildings or publicly and provincially owned critical infrastructure. This may include: <ul style="list-style-type: none"> <li>○ Replacing building materials (i.e. siding or roofing) with fire-resistant materials</li> <li>○ Replacing landscaping with fire-resistant plants as outlined in the <a href="#">FireSmart Guide to Landscaping</a></li> </ul> </li> </ul>
<b>8. FIRESMART ACTIVITIES FOR PRIVATE LAND</b>	<ul style="list-style-type: none"> <li>• Planning for private land (only with private property owners' consent) <ul style="list-style-type: none"> <li>○ Develop FireSmart Community Plans for specific areas</li> <li>○ Conduct <a href="#">FireSmart home and property assessments</a></li> </ul> </li> <li>• Offer local rebate programs to home owners on private land and First Nations land that complete eligible FireSmart activities on their own properties</li> <li>• Provide off-site debris disposal for private land owners who have undertaken their own vegetation management, including: <ul style="list-style-type: none"> <li>○ Provide a dumpster, chipper or other collection method</li> <li>○ Waive tipping fees</li> <li>○ Provide curbside debris pick-up</li> </ul> </li> </ul>

## APPENDIX 3: WILDFIRE AND EMERGENCY RESPONSE TRAINING COURSES

### RELEVANT TRAINING COURSES IN WILDLAND URBAN INTERFACE FIRE

COURSE NAME	TARGET AUDIENCE	FORMAT	FURTHER INFORMATION
S-100 BASIC FIRE SUPPRESSION AND SAFETY (2005)	Contract fire crews	2 day, 16 hour course with classroom and field component	Required by OHS Regulation Section 26.3.1 for wildfire contract crews  A list of recognized instructors is found <a href="#">here</a> .
S-100A BASIC FIRE SUPPRESSION AND SAFETY ANNUAL RECURRENCE (ALSO KNOWN AS S-10A)	Refresher training for those with valid S100 training	0.5 day classroom and field components	
S-185 FIRE ENTRAPMENT AVOIDANCE & SAFETY (2006)	All those involved in fire suppression operations. General knowledge course on wildfire safety and entrapment avoidance	2-3 hour classroom training session	BCWS Information on Wildfire Training <sup>54</sup>
S-215 FIRE OPERATIONS IN THE WILDLAND/URBAN INTERFACE	Advanced training for wildland fire fighters	3 day instructor led course	
S-230 SINGLE RESOURCE LEADER (CREW BOSS)	Advanced training for wildland fire fighter supervisors	4 day instructor led course	
NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 1001 LEVELS	Exterior and Interior Structure Firefighter training	7-12 weeks, depending on the delivery format (full-	

<sup>54</sup> <https://www2.gov.bc.ca/gov/content/safety/wildfire-status/employment-and-contracts/wildfire-training>

1 AND 2		time or part time)	
STRUCTURE PROTECTION PROGRAM WILDLAND FIREFIGHTER LEVEL 1 (SPP-WFF 1)	Additional training for structure firefighters	6 hours - classroom	Replaces S-100 for Structure Firefighters. BCWS information for structure firefighters working with WUI fires <sup>55</sup>
SPP-115 STRUCTURE PROTECTION WORKSHOP	Additional training for structure firefighters	7-8 hours, including classroom and practical	Focuses on the use of wildfire pumps and hose, application of sprinklers

### TRAINING COURSES IN FIRESMART

FIRESMART 101	Community members	Online	FireSmart Canada <sup>56</sup>
LOCAL FIRE SMART REPRESENTATIVE WORKSHOP	Fire professionals, resource professionals, emergency preparedness staff	2 days (16 hours), classroom. Offered by FireSmart Canada	FireSmart BC information can be found <a href="#">here</a> .
FIRESMART COMMUNITY CHAMPION WORKSHOP	Community members	2-4 hours, offered by Local FireSmart Representative	Local FireSmart Representatives can be found <a href="#">here</a> .

### TRAINING COURSES IN EMERGENCY PLANNING AND MANAGEMENT

FNESS FIRE PROTECTION LEADERSHIP GOVERNANCE TRAINING	Band council, staff, and administration	Tier 1 – Home Fire Protection Tier 2 – Community Fire Protection Tier 3 – Fire Departments	FNESS <sup>57</sup>
EMERGENCY SUPPORT	Community Volunteers	Online or In-Person	Justice Institute of BC <sup>58</sup>

<sup>55</sup> <https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/fire-safety/wildland-urban-interface-fire-information>

<sup>56</sup> FireSmart 101. <https://firesmartcanada.ca/programs-and-education/firesmart-101/>

<sup>57</sup> FNESS. Fire Protection Leadership Governance. <https://www.fness.bc.ca/core-programs/fire-services>

<sup>58</sup> Justice Institute of BC (JIBC). Emergency Support Services. [https://www.jibc.ca/sites/default/files/emd/images/JIBC-ESS-Slick\\_Web\\_Ready\\_20150623.pdf](https://www.jibc.ca/sites/default/files/emd/images/JIBC-ESS-Slick_Web_Ready_20150623.pdf)

SERVICES LEVEL 1			
EMERGENCY SUPPORT SERVICE DIRECTOR	Community Volunteer	In-person	
INCIDENT COMMAND SYSTEM (ICS) LEVEL 100	First responders, local government administration, community organizations involved in response	In-person, on site; or Online	Justice Institute of BC. Eligible for BC Hydro Community Safety grant <sup>59</sup>
ICS LEVEL 200	First responders, local government administration, community organizations involved in response	Online	JIBC <sup>60</sup>

<sup>59</sup> BC Hydro Community Safety Grants. <https://www.bchydro.com/community/community-giving/grants.html#safety>

<sup>60</sup> JIBC. Incident Command System. <https://www.jibc.ca/course/incident-command-system-level-100>

## **APPENDIX 4: FIRESMART COMMUNITY HAZARD ASSESSMENT (2019)**

Provided in a separate PDF document for reference. Completed by First Nations' Emergency Services Society in October 2019.

## **APPENDIX 5: WILDFIRE THREAT ASSESSMENT – FUEL TYPE CHANGE RATIONALE**

Provided in a separate PDF document.