Read Island and Surge Narrows Area
(Strathcona Regional District – Electoral Area C)
2020 Community Wildfire Protection Plan

Submitted to:

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Surge Narrows Community Association and residents

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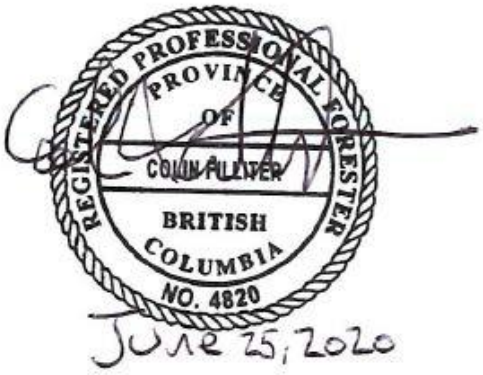
REGISTERED PROFESSIONAL SIGN & SEAL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EXECUTIVE SUMMARY

The Read Island and Surge Narrows Area 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 (AOI) is the wildland urban interface (WUI) surrounding settled areas on Read Island, Maurelle Island, Rendezvous Island, and Sonora Island (Owen Bay) within Electoral Area C of the Strathcona Regional District. The AOI's are within the traditional territories of the We Wai Kai First Nation, Wei Wai Kum First Nation, Homalco First Nation (Xwemalhkwu), Tla'amin Nation, K'omoks First Nation, Kwiakah First Nation and Klahoose First Nation.

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 the development of this CWPP, there has been no formal engagement in wildfire protection planning in the area.

The fuel types in the area are predominantly a mixture of mature conifer forests, immature forests, recently harvested cutblocks, and deciduous patches. Previous fire history in the area indicates low number of ignitions, both human and lighting caused. However, two fires have occurred on Read Island during the past two wildfire seasons (2018 and 2019). The local wildfire threat is Low to Moderate with some pockets of High. The local wildfire risk classification ranges from Low to High, with higher risk areas associated with fuels in close proximity (within 500m) to structures.

Recommendations 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 recommendations focus on FireSmart hazard assessments and activities within 100m of structures. Fuel management should focus on the reduction of surface and ladder fuels. In addition to fuel management, community awareness and education play a critical role in reducing wildfire risk. Community awareness focuses on FireSmart principles, understanding and abiding by fire use restrictions, emergency preparedness, and regularly sharing fire safety related information with the community.

The BC Wildfire Service is responsible for wildfire management and response on Crown land. The area does not have fire department service, or connection to electrical, water, or sewage utilities. The remote location, marine access, limited communication and road networks, and isolated nature of structures and homes dispersed throughout the WUI creates unique challenges. Due to these challenges and limited water availability for fire suppression, prevention of human caused ignitions and FireSmart planning are focal points for the recommendations in this plan.

This plan makes 24 recommendations to the Strathcona Regional District and residents. The recommendations should be further prioritized by the SRD 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.	High	To reduce the risk of human caused WUI fire events within the WUI. Start with assessing the level of community support for enacting a local bylaw to regulate fire use.	Conduct a community/resident survey on possible intent and objectives for a local fire use bylaw that regulates open burning. A Bylaw may restrict the timing, size, materials, and location of open burns within the AOI. Bylaw enforcement will be a logistical challenge. Alternatively, consider a voluntary local open fire ban or related restriction to be adopted by community members.	SRD and community groups
Rationale: Recommended best practice, to use policy tools to reduce the likelihood of human caused WUI fire events.				
2.	High	To develop emergency preparedness and evacuation plans specific to each of the AOI's.	Assess and map emergency evacuation routes, muster points, emergency reporting and communication plans for each AOI. Make Emergency Evacuation Maps available on the SRD and community group websites.	SRD
Rationale: Based on gaps identified during CWPP engagement. No specific evacuation plan is available for the AOI's.				
3.	Med	To reduce the fuel hazard within the identified treatment areas. Treatment areas are associated with High Risk within WUI100.	Engage a qualified forest professional in developing and implementing site level prescriptions for each treatment area (Table 6. Summary of recommended treatment areas.) Consultation with applicable First Nations, and engagement with private landowners, industry tenure holders, and MFLNRORD will be required as part of the operational planning process.	SRD
Rationale: Recommended treatment areas based on local wildfire risk analysis. High risk areas within 100m of community structures or critical infrastructure are priority for treatment.				

4.	Med	To engage community members in FireSmart planning to help reduce the likelihood of disaster in the event of a WUI fire in isolated areas.	Contact a Local FireSmart Representative to conduct a FireSmart Awareness workshop and Local FireSmart Champion Workshop. Advertise the workshop on the SRD and community group websites.	SRD with support from community groups
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.				
5.	High	To improve community FireSmart awareness and implementation of FireSmart practices to help reduce the likelihood of disaster in the event of a WUI fire in isolated areas.	Contact a Local FireSmart Representative to conduct FireSmart Community Hazard Assessments for priority areas identified in Table 7.	SRD with support from community groups
Rationale: FireSmart program, as referred to in #4. Priority areas for community hazard assessments based on clusters of homes within the AOI's.				
6.	High	To improve community FireSmart awareness and implementation of FireSmart practices to help reduce the likelihood of disaster in the event of a WUI fire in isolated areas.	Generate a list of property owners interested in a FireSmart hazard assessment. Co-ordinate and organize LFR hazard assessment trips to interested properties.	SRD with support from community groups
Rationale: FireSmart program, as referred to in #4				
7.	High	To assist private landowners who have undertaken FireSmart vegetation management with fuel/debris disposal.	Seek funding opportunities to assist private landowners in disposing of removed fuels – this may include hiring contractors with wildfire suppression and pile burning expertise, or community chipping days. Logistics and costs are a challenge, consider working with industrial partners to reduce the costs of barging equipment.	SRD with support from community groups

Rationale: Fuel management requires the removal of fuels which can be costly and a barrier to action. Providing free or subsidized debris disposal is a best practice for encouraging private landowner participation in fuel management activities.				
8.	High	To reduce the ignition risk within the FireSmart structural ignition zone by making property owners aware of preferred FireSmart building materials.	Connect property owners to FireSmart guides for selecting building materials and incorporating FireSmart principles into construction and location. The FireSmart Home Development Guide is a key resource. In the absence of an Electoral Area C building bylaw, the SRD should recommend best practices for building within Area C to minimize WUI risk. Make the resources available online where other SRD building code/bylaw information is located	SRD
Rationale: Best practice recommendation associated with the development planning discipline of the FireSmart program, as referred to in #4.				
9.	Med	To improve community awareness of the FireSmart program principles and activities.	Encourage residents to complete the free, online, FireSmart 101 course.	SRD and community groups
Rationale: Best practice recommendation related to community education as part of FireSmart program implementation. Refer to #4.				
10.	High	To make this Plan and its associated maps available to the community for education and awareness.	Upload a digital copy of the CWPP to the SRD Emergency Planning website	SRD
Rationale: Recommended best practice for community education and awareness regarding wildfire protection planning and FireSmart program implementation.				
11.	High	To community education material available to improve understanding of WUI fire threat and risk; to raise awareness of preventative and mitigative actions.	Develop a Surge Narrows/Outer Islands specific Fire Safety and Wildfire Preparedness information factsheet for residents. Link this resource on the SRD and community group websites. Make hard copies available for property owners. This factsheet	SRD

			should include information on frequently asked questions regarding legal requirements, FireSmart principles, emergency evacuation routes, wildfire safety, wildfire reporting, and BCWS resources on fire bans, air quality.	
Rationale: Recommended best practice for community education and awareness regarding wildfire protection planning and FireSmart program implementation.				
12.	Med	To improve community understanding of wildfire risk and raising awareness of the wildfire threat to the community.	Organize an annual Community Fire Safety day. Activities may include checking fire extinguishers and smoke alarms in homes, conducting FireSmart clearing of Priority 1 (up to 10m) zones around critical community infrastructure, FireSmart presentations, fire extinguisher practice, water pump practice, etc.	SRD with support of community groups
Rationale: Recommended best practice for community education and awareness regarding wildfire protection planning and FireSmart program implementation. Addresses education and emergency planning FireSmart disciplines (refer to #4).				
13.	Med	To share the content of this plan with industrial stakeholders operating within the areas of interest.	Share the contents of this plan with industrial stakeholders operating in the area – engage in dialogue about fire weather monitoring, slash management and fuel hazard management initiatives.	Community groups with SRD support
Rationale: Based on CWPP engagement, improved dialogue would benefit awareness, planning, and cooperation.				
14.	Low	To reduce the risk of human caused WUI fire events by promoting alternative means of yard management and yard waste disposal beyond open fires.	Provide residents within information on alternatives to burning yard waste. Link this information on the SRD website. Alternatives to burning include chipping, composting or xeriscaping.	SRD
Rationale: Recommended practice, observed from other similar jurisdictions. Contributes to public education and development planning; potential to reduce the likelihood of human caused WUI fire events.				

15.	Low	To improve resident and visitor awareness of wildfire prevention measures through signage.	Work with the BCWS to install informational signage at a high traffic location (Surge Narrows dock or other highly visible locations for marine traffic) visible to residents and visitors (i.e.: Prevent, Observe, Report sign)	SRD and community groups
Rationale: Recommended best practice for community education and awareness regarding wildfire protection planning and FireSmart program implementation.				
16.	High	To improve the availability of firefighting tools for residents.	Inventory current fire tools available within the community, purchase community fire tools and personal protective equipment (PPE) where there may be deficiencies. Encourage neighbours to cooperatively build up tool/PPE caches. S100 wildland firefighting training course is recommended for safety and training on how to use fire tools.	Community groups, residents
Rationale: Recommended as a good practice for residents because properties are remote/isolated and the response time for external resources may take time to arrive.				
17.	High	To improve water availability for fire suppression to reduce the risk of a structure fire spreading to the forested interface.	Assess the water availability, volume requirements, and equipment needed for fire suppression in the community hall/school area. A professional with expertise in structural and WUI firefighting should be consulted.	SRD
Rationale: The school/community hall is critical community infrastructure. The current water storage reservoir is not set up to directly support fire suppression and the amount of water required for suppression has not been assessed.				
18.	High	To improve water availability for fire suppression to reduce the risk of a structure fire spreading to the forested interface.	Individual property owners, with the help of professional expertise, should assess the water availability and volume requirements for fire suppression. Where increased water availability is required, property owners should invest in water tanks or other storage	Community groups, residents

			systems to store rainwater/surface water for fire suppression during drought conditions.	
Rationale: Surface water is limited during fire season, water readily available for fire suppression was a gap identified through the CWPP engagement and research process.				
19.	Low	To improve emergency evacuation communications.	Encourage residents to sign up to the SRD's free Connect Rocket emergency notification service which sends out text messages to cellular subscribers and voice calls to landlines.	SRD
Rationale: Existing program/infrastructure to continue to encourage residents to use.				
20.	Med	To identify, clear and maintain helicopter landing areas for emergency evacuations and/or wildfire response operations.	Identify potential helicopter landing sites throughout the AOI's. Designate areas within a Local Emergency Plan. Helicopter landing sites should be continually maintained to be free of obstructions, loose debris and overhanging vegetation or obstacles; and visibly marked where possible. The field at the Surge Narrows school is a good example. Due to the remoteness and limited road connectivity, the identification of multiple sites is recommended. Landing areas should be easily accessible and easily controlled spaces.	SRD
Rationale: Recommended best practice for emergency access and evacuation planning.				
21.	High	To improve community capacity to address WUI fires by providing access to formal training.	Generate local interest and organize S100 training and annual refresher courses for community members.	SRD with support from community groups
Rationale: Recommended for residents to increase local capacity and knowledge in firefighting techniques and use of water pumps and hand tools. Training is recommended for residents as it supports skills beneficial to isolated/remote living.				
22.	High	To improve community preparedness for structure protection due	Develop a checklist for property owners of fire suppression equipment and emergency	SRD

		to the remote and isolated location of properties and absence of a local fire department.	supplies to keep readily available during fire season. Items should include smoke alarms, fire extinguishers, hand tools, personal protective equipment, communications devices, and a first aid kit.	
Rationale: Recommended best practice for emergency preparedness considerations that uniquely address isolated/remote local conditions of the WUI.				
23.	Med	To improve community capacity for structure protection.	Purchase sprinkler kits to be set up on the community hall/school structure. Consider water availability for fire suppression, as additional water storage may be required to supply sprinkler kits through summer months.	SRD, community groups
Rationale: Recommended best practice because, based on CWPP engagement, the equipment availability for structure protection in the area could be improved. Deployment of a structure protection unit faces logistical challenges.				
24.	Med	To improve community capacity for structure protection.	Encourage property owners to purchase sprinkler kits and water supply systems for sprinkler kits to deploy on their homes/critical structures.	SRD
Rationale: Recommended best practice because, based on CWPP engagement, the equipment availability for structure protection in the area could be improved. Deployment of a structure protection unit faces logistical challenges.				

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

Resources	**Land Jurisdiction**	**Types of Projects**
Local government taxation	Municipal Private	Various projects as directed by local governments including FireSmart assessments and activities, debris disposal, equipment purchases, training, etc.
Regional District Grant-In-Aid	n/a	Non-profit community organizations eligible to apply for funding for projects that benefit the general community
Forest Enhancement Society BC (FESBC)	Provincial Crown	Fuel management treatment prescriptions and prescription implementation
UBCM Community Resiliency Investment Program (CRI)	Municipal First Nations Private	FireSmart hazard assessments, demonstration projects, off-site debris disposal (i.e.: chip trucks) Community Education Development planning Emergency planning and cross training
UBCM Community Emergency Preparedness Fund (CEPF)	n/a	Emergency support services training Fire department training or equipment Emergency evacuation planning Emergency operations training
BC Wildfire Service	Provincial Crown	Fuel management treatments (in coordination with local fire zone officer) Public education and outreach

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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
FSR	Forest Service Road
FWI	Fire Weather Index
GIS	Geographical Information System
ISI	Initial Spread Index
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
SNCA	Surge Narrows Community Association
SRD	Strathcona Regional District
TFL	Tree Farm Licence
UBCM	Union of BC Municipalities
VRI	Vegetation Resource Inventory
WUI	Wildland Urban Interface

SECTION 1: INTRODUCTION

The Community Resiliency Investment (CRI) program is a new provincial program intended to reduce the risk and impact of wildfire to communities in BC through community funding, supports and priority fuel management activities on provincial Crown land.

The Union of BC Municipalities (UBCM), First Nations' Emergency Services Society (FNESS) and the Forest Enhancement Society of BC (FESBC) are working with the Ministry of Forests, Lands, Natural Resource Operations & Rural Development (FLNRORD), represented by the BC Wildfire Service (BCWS), to administer the FireSmart Community Funding & Supports 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 BC are 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.

In the Fall of 2019, SuavAir was awarded a contract from the Strathcona Regional District (SRD) to develop and update Community Wildfire Protection Plans (CWPP) for several rural and remote communities on northern Vancouver Island and for Read Island as part of SRD Electoral Area C. A meeting with community stakeholders (Surge Narrows Community Association) in October 2019 indicated a strong community interest in a broader area to be included in the planning process. In November 2019, SuavAir requested a change in the project scope, which was approved by the SRD and UBCM. Therefore, this CWPP includes areas of interest on Read Island, Sonora Island (Owen Bay & Diamond Bay), southwest Maurelle Island, and Rendezvous Island.

1.1 Purpose

The purpose of this CWPP is to identify the wildfire risks within and surrounding the AOI, to describe the potential consequences if a wildfire were to impact the community, and to examine possible ways to reduce wildfire risk. This CWPP provides an updated assessment of the wildfire risk to the area. The goal is to define the threat to human life, property, and critical infrastructure from wildfires within the AOI; identify measures necessary to mitigate those threats; and outline an action plan to implement those measures. The CWPP is intended to provide the community with a framework of information for the implementation of specific actions that will result in

- reduced likelihood of wildfire entering the community,
- reduced impacts and losses to property and critical infrastructure and
- reduced negative economic and social impacts to the community.

1.2 CWPP Planning Process

The Strathcona Regional District (SRD) obtained a CRI grant from UBCM to develop community wildfire protection plans for the Electoral A area 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:tles7et'h First Nations; and for Read Island within Electoral Area C. 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 (BC Wildfire Service), 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. Use best available information from Data Catalogue (including Vegetation Resource Inventory data), updated Google Earth imagery, and other proprietary sources to adjust data for fuel typing errors, re-calculate threat and risk classification
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 study and analysis. Other relevant data was gathered through field visits to the communities, stakeholder engagement and meetings, and publicly accessible data from the BC Data Catalogue published by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLRNORD).

SECTION 2: LOCAL AREA DESCRIPTION

2.1 CWPP Area of Interest

Electoral Area C (Area C) is the largest electoral area within the SRD, it covers approximately 10,650 square kilometres, including Quadra Island, Read Island, Redonda Island, Port Neville, Refuge Cove, Hardwick Island, East & West Thurlow Islands & Mainland Inlets. The region boasts several islands and the intricate waterways that are known for amazing beaches, wildlife viewing and natural beauty. There is also an abundance of on-land activities to enjoy such as endless mountain biking trails, climbing sites, hiking routes, camping and parks. Visitors will find everything from fishing and kayak lodges to a floating post office.[1]

The areas of interest (AOI) for this CWPP include Read Island, Owen Bay on Sonora Island, southwest Maurelle Island, and Rendezvous Island within Area C (Map 1). The AOI's are within the traditional territories of the We Wai Kai First Nation, Wei Wai Kum First Nation, Homalco First Nation (Xwemalhkwu), Tla'amin Nation, K'omoks First Nation, Kwiakah First Nation and Klahoose First Nation.

The AOI's include a 2km buffer around areas with structure density greater than 6 to 25 structures per km^2. Structure density was provided by the BCWS as part of the provincial strategic threat analysis dataset. The communities are not incorporated, and the local government is the Strathcona Regional District, represented by the SRD Area C Director. The Surge Narrows Community Association (SNCA) is a registered charity representing the interests of residents in the area[2] and was the primary community group engaged in this CWPP process.

Land ownership within the AOI's consists mainly of a mixture of large private lots and provincial crown land. Parcels of private managed forest land, provincial parks, federal and regional district land occur on Read Island. Land ownership classes are shown on Map 2.

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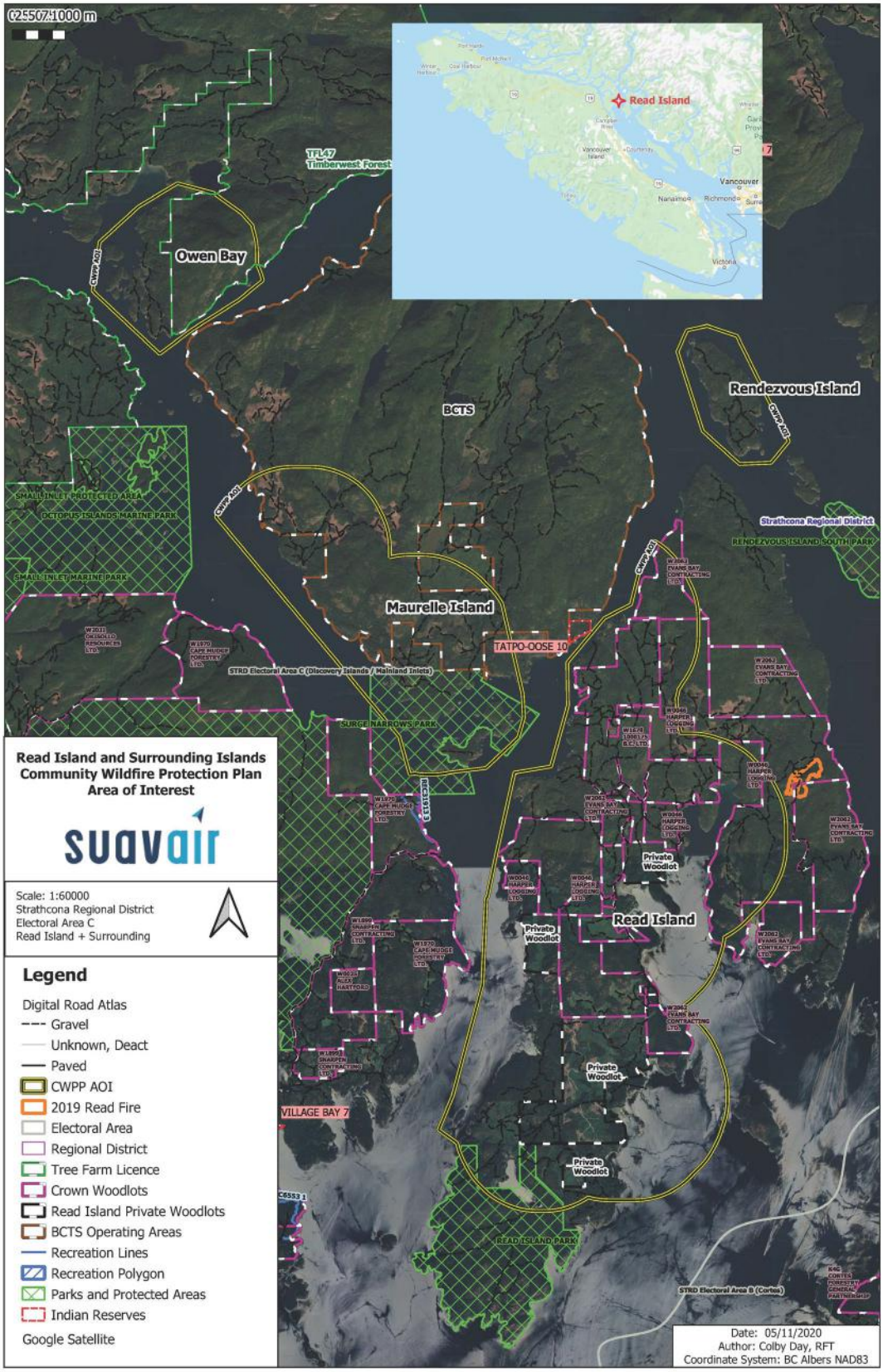
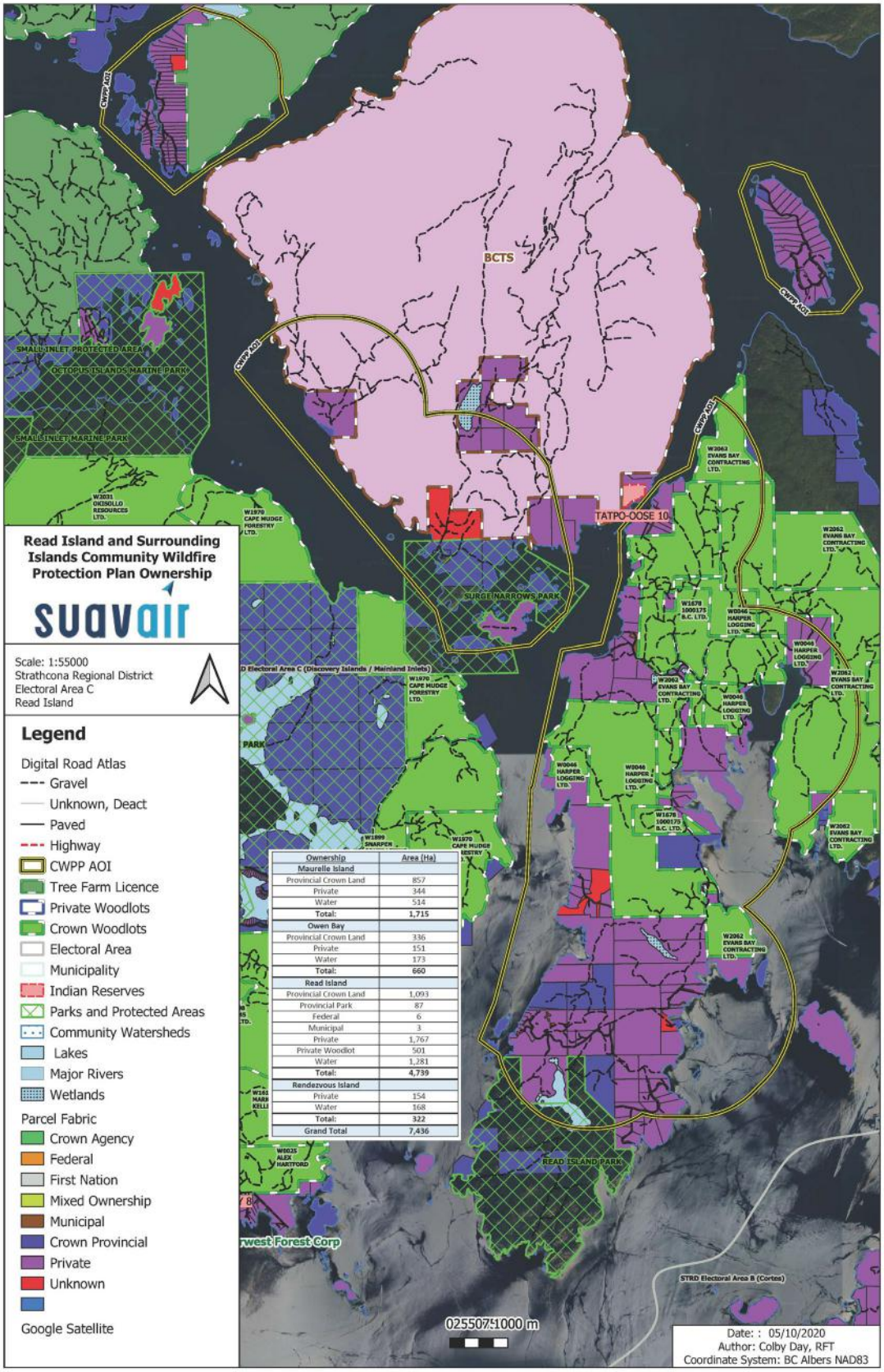
[1] SRD. Electoral Area C. https://srd.ca/about/srd-electoral-areas/electoral-area-c/

[2] Surge Narrows Community Association. https://www.snca.ca/about.



Map 1. CWPP AOI Overview – portions of Read, Sonora, Maurelle and Rendezvous Islands.



Map 2. Land ownership classes within each AOI.

2.2 Community Description

All communities addressed in this CWPP are unincorporated, isolated, rural, and remote. The AOI's are distinct because there is no developed urban centre and residents live on isolated acreages, mainly accessed by water. The area is populated by both year-round and part-time residents.

Access to the area is either by personal boat, water taxi, or float plane. The AOI's are not serviced by BC Ferries or other means of public transportation. Many residents use the Hoskyn Channel dock on Quadra Island for boat access. Limited road networks exist on each of the islands, the roads are not publicly maintained, and most are industrial roads under the responsibility of forestry tenure holders. Homes are "off the grid" as they are not connected to any utility services. The AOI's are not within a fire protective services area, water improvement district, or sewer service area.

Photo 1. Aerial images of the CWPP areas of interest.

2.3 Past Wildfires, Evacuations, and Impacts

Read Island has seen 2 wildfires in the past 2 successive fire seasons (Table 2). One human-caused wildland urban interface (WUI) fire occurred near Hjorth Bay (2018) and another lightning caused fire occurred on the east side of the island in 2019.

Table 2. Fire information for 2018 and 2019 fires on Read Island.

Fire Number	**V50433**	**V50493**
Date	May 2018	June 2019
Suspected Cause	Person	Lightning
Size	8.6ha	17.3ha

The 2018 Read Island fire occurred within 100m of structures on private property. No structures were threatened, and no evacuation alerts or orders were issued. However, thick smoke impacted air quality in the area. BCWS responded with ground crews and helicopters. The 2019 fire was not near any structures and is outside of the Read Island CWPP AOI. Due to the steep and rugged terrain, remoteness, limited resources, and difficult access on Read Island, the response to the 2019 fire required the co-operation of private landowners in providing staging areas for the BCWS to support their initial response.

Two other lightning-strike initiated fire incidents were recorded in the general area in 2018, 1 on Read Island east of Burdwood Bay, and another on Sonora Island south of Owen Bay. Both fires were less than 0.009ha and do not have associated fire perimeters. The impact of the recent fires has been that the community is now hyper-aware of the possibility of WUI fire incidents impacting homes, property, and air quality; and looking to increase their level of preparedness starting with engaging in the preparation of this CWPP.

2.4 Current Community Engagement

This CWPP is the first wildfire protection planning process undertaken in the area. Previous and ongoing community engagement with wildfire prevention measures include FireSmart awareness workshops and S100 training, both delivered by BCWS – Sunshine Coast Fire Zone. In 2018, a fire awareness workshop led by BCWS also included a FireSmart assessment of the Surge Narrows school. Some private landowners have conducted FireSmart activities on their properties, but the extent to which this has been completed is not known. No previously treated areas are found on Crown lands within the areas of interest.

2.5 Linkages to Other Plans and Polices

The intent of this sub-section is to identify the sources and linkages to other documents 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

Areas within the AOI's are not covered in an Emergency Plan. Emergency evacuation maps are available for nearby Quadra and Cortes Islands. No emergency evacuation routes or plans are known to be in place for the AOI's.

2.5.2 Affiliated CWPPs

Adjacent Electoral Area C island communities of Quadra Island and Cortes Island had CWPP's completed in 2011.

2.5.3 Local Government and First Nation Plans and Policies

No community plans or bylaws currently apply within the AOI's. Building permits are not required within Electoral Area C. Area C is currently involved in an Integrated Community Sustainability Plan planning process.[3] Additionally, the Surge Narrows Community Association has formed a Community Planning Group. North Quadra Island (part of Electoral Area C) is currently assessing the level of community support for enacting a bylaw to regulate open burning. No such initiatives are known to be underway within the AOI.[4] Bylaw enforcement would be a challenge due to the remote and isolated nature of the AOI's. However, the process for consulting on and developing Bylaws can result in increased community awareness on an issue.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
1.	High	To reduce the risk of human caused WUI fire events within the WUI. Start with assessing the level of community support for enacting a local bylaw to regulate fire use.	Conduct a community/resident survey on possible intent and objectives for a local fire use bylaw that regulates open burning. A Bylaw may restrict the timing, size, materials, and location of open burns within the AOI. Bylaw enforcement will be a logistical challenge. Alternatively, consider a voluntary local open fire ban or related restriction to be adopted by community members.	SRD and community groups
2.	High	To develop emergency preparedness and evacuation plans specific to each of the AOI's.	Assess and map emergency evacuation routes, muster points, emergency reporting and communication plans for each AOI. Make Emergency Evacuation Maps available on the SRD and community group websites.	SRD

[3] SRD. Electoral Area C. Integrated Community Sustainability Plan. https://srd.ca/projects/icsp/

[4] SRD. Building Permits. https://srd.ca/building-and-planning/building/permits/

2.5.4 Higher Level Plans and Relevant Legislation

Read Island, Maurelle Island, and Rendezvous Island are within the Cortes Landscape Unit (LU). The Cortes LU Sustainable Resource Management Plan was approved in 2012.[5] Sonora Island is within the Thurlow Landscape Unit, a LU included in the Great Bear Rainforest Land Use Objectives Order.[6] Provincial forest management legislation – *Forest and Range Practices Act* and its associated regulations; and provincial wildfire legislation – *Wildfire Act* and its associated regulations apply to provincial Crown land. Other relevant legislation includes the *Heritage Conservation Act, Land Act, Private Managed Forest Land Act,* and the *Environmental Management Act – Open Burning Smoke Control Regulation.*

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. More information regarding the *Wildfire Act* is included in Appendix 4: Supplemental Information – Wildfire Act and Wildfire Regulation.

For industrial activities fire hazard assessments are required to be conducted at 6-month intervals during which industrial activities are taking place (*Wildfire Regulation,* Section 11(3)(a)). For non-forest tenure holders conducting industrial activities: hazard abatement is required within 12 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)).

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.

The BC Wildfire Service open fire bans and campfire bans apply within the AOI, there are no local bylaws. As with all jurisdictions, open burning must also comply with the *Open Burning Smoke Control Regulation* under the *Environmental Management Act*.

2.5.5 Ministry or Industry Plans

The AOI's are within the Campbell River Natural Resource District and North Island Fire Zone (Owen Bay); and Sunshine Coast Natural Resource District and Sunshine Coast Fire Zone (Read, Maurelle and Rendezvous Islands). The MFLRNORD Vancouver Island Central Coast Response Fire Management Plan, a framework for wildfire suppression and response, applies

[5] Sunshine Coast Natural Resource District. Sunshine Coast Landscape Unit Plans. https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/south-coast-region-plans/sunshinecoast-lu

[6] Great Bear Rainforest Legal Direction and Agreements. https://www2.gov.bc.ca/gov/content/industry/crown-land-water/land-use-planning/regions/west-coast/great-bear-rainforest/great-bear-rainforest-legal-direction-agreements

in the area. BCWS/FLNRORD guidance on wildfire management and fuel management is updated periodically and posted online.[7] MFLRNORD guidance includes the 2019 Fuel Management Prescription Guidance[8] and 2019 Tactical Fuel Management Planning Standard.[9]

The AOI is within the Moderate (southern half of Read Island) and Low (all other areas) risk polygons of the BCWS Fuel Hazard Assessment and Abatement Fire Risk Map.[10] 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.[11]

Crown forest tenures occur throughout the AOI's. Mosaic Forest Management TFL 47 is adjacent to private land lots in the Owen Bay AOI; BC Timber Sales Chinook Business Area is adjacent to private land lots in the Maurelle Island AOI; and provincial woodlot tenures are within the Read Island AOI. Rendezvous Island is entirely composed of privately owned lots. No fuel treatment plans, forest health plans, ecological restoration plans, parks/protected area plans are known to apply within the AOI's at this time.

[7] BCWS. Wildfire Prevention. https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/vegetation-and-fuel-management/fire-fuel-management/fuel-management

[8] 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

[9] 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

[10] BCWS Post Harvest Hazard Abatement Map. https://governmentofbc.maps.arcgis.com/apps/webappviewer/index.html?id=9bb5372c65464f0bab178907a5c39947

[11] 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

SECTION 3: VALUES AT RISK

The intent of this section is to introduce the extent to which wildfire has the potential to impact values within a community and should be primarily driven by the Critical Infrastructure Assessment competed under the Local Emergency Planning process. Values at risk (VAR) are the human or natural resources that may be impacted by wildfire. This includes human life, property, critical infrastructure, high environmental and cultural values, and resource values.

3.1 Human Life and Safety

The 2016 Census data shows Electoral Area C has a total population of 2,431.[12] However, Area C covers a large area and includes more populated neighbouring Quadra and Cortes Islands. The 2016 Census tallied the population of Read Island to be 66, down from 81 in 2011.[13] No specific census data breakdown is available for Owen Bay, Maurelle Island or Rendezvous Island. SNCA approximates the regional population to be 131 full-time residents and 105 part-time residents.[14] Part-time residents are most likely to be in the area during fire season and summer months. Residents live on remote acreages, often with significant distance between neighbours. Some neighbouring residents share access through sharing the same dock between several properties. The remoteness presents a challenge to emergency response. Recreation opportunities (boating, kayaking) may also increase the number of people in the area during fire season.

3.2 Critical Infrastructure

The intent of this sub-section is to clearly identify and understand where critical infrastructure is 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 well-being 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.

Read Island supports a floating Canada Post office, community hall, and a community school. The Read Island community hall/school is a primary gathering spot for the community. There are no airports, airstrips, hospitals, water treatment facilities, waste treatment facilities or other infrastructure within the AOI. The community hall on Read Island is also the site of a health clinic, visited every 2 weeks by a clinician.

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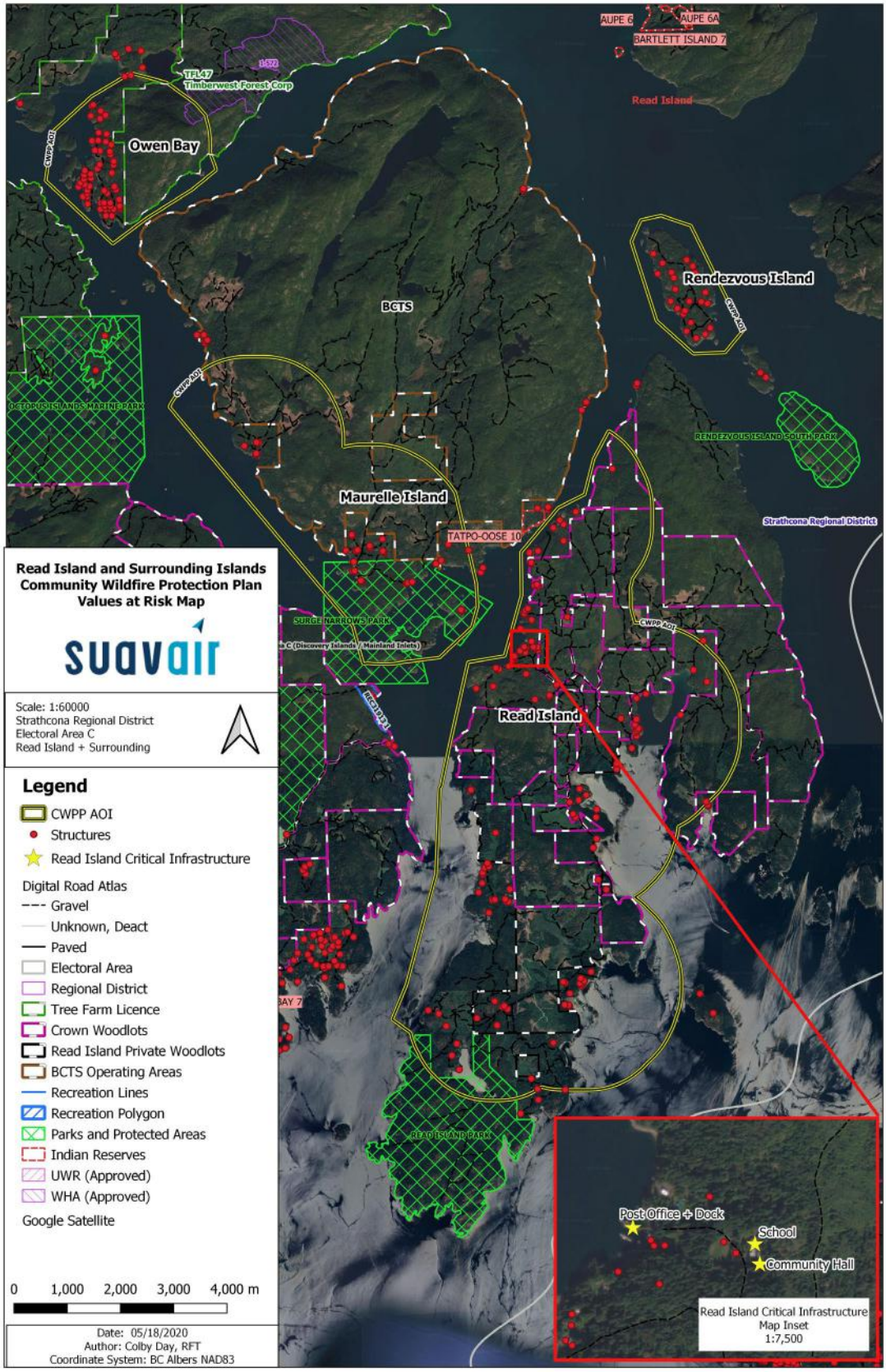
[12] Statistics Canada. 2016 Census Profile. Strathcona C, Regional district electoral area. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/Page.cfm?Lang=E&Geo1=CSD&Code1=5924054&Geo2=PR&Code2=59&SearchText=owen%20bay&SearchType=Begins&SearchPR=01&B1=All&type=0

[13] Statistics Canada. 2016 Census Profile. Read Island, Unincorporated place. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=DPL&Code1=590105&Geo2=PR&Code2=59&SearchText=read%20island&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

[14] Surge Narrows Community Association. https://www.snca.ca/about



Map 3. Values at Risk in the CWPP AOI.

Photo 2. Aerial overview of community hall and school. Surge Narrows dock and post office on the water.

3.2.1 Electrical Power

The islands included in the AOI are not connected to the main BC Hydro grid. Instead, homes and structures are independently powered by generators, solar panels, or other means. The community hall/school is powered by a diesel generator.

3.2.2 Communications, Pipelines and Publicly Owned Buildings

Publicly owned buildings include the floating post office, the community school building, and the old Surge Narrows store (closed). The SRD plans to restore the old store and foreshore area with a goal of future consideration of the site as a heritage site.

3.2.3 Water and Sewage Infrastructure

The AOI is not connected to any community water or sewage infrastructure. Water availability for firefighting is a concern due to the reliance on surface water and the potential for drought conditions during fire season.

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 to effectively determine wildfire risk and identify mitigation activities.

3.3.1 Drinking Water Supply Area and Community Watersheds

Drinking water is drawn from mainly surface sources near or adjacent to homes and private property. The community does not have a water reservoir. There are no designated community watersheds within the AOI's. Communities that depend on surface water from a specific watershed 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 for many years. In worst-case scenarios, the water supply may have to be abandoned (temporarily or permanently) or new water treatment infrastructure may need to be built, which can take several years and substantial funding.

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.[15] The AOI is within the traditional territories of the We Wai Kai First Nation, Wei Wai Kum First Nation, Homalco First Nation (Xwemalhkwu), Tla'amin Nation, K'omoks First Nation, Kwiakah First Nation and Klahoose First Nation

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 the Ministry of Forests, Lands and Natural Resource Operations and Rural Development 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. Locally identified cultural heritage values that may be impacted by wildfire or suppression efforts can be included, if supported by the area's First Nations.

[15] 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.

3.3.3 High Environmental Values

Read Island Provincial Park is located at the south end of Read Island. The Park's primary purpose is to protect biodiversity associated with the CWHxm biogeoclimatic subzone, its secondary purpose is to provide recreational opportunities.[16] Surge Narrows Provincial Park is located at the south end of Maurelle Island and includes nearby smaller islands. This Park's primary purpose is to protect natural values associated with a fast water marine ecosystem, its secondary purpose is to provide recreational opportunities.[17] The north end of the Owen Bay AOI includes a portion of an approved wildlife habitat area (WHA). Numerous established Visual Quality Objective polygons exist throughout the AOI's ranging from Retention to Partial Retention objectives.

3.4 Other Resource Values

The AOI contains portions of timber harvesting land base within TFL 47, BCTS timber sales area, and woodlot licences with valuable commercial tree species including western red cedar, douglas-fir, sitka spruce, and western hemlock. The *Forest Planning and Practices Regulation* stipulates riparian reserves and management zones along streams which may constrain fuel treatment opportunities. The AOI also provides significant recreational opportunities for boaters and kayakers. Areas of mature forests such as Lot 302 on Read Island are also of particular importance to the community.

3.5 Hazardous Values

No known landfills, large propane facilities, storage facilities are found within the AOI's. Propane tanks for domestic use are likely to be found on private property near structures/homes. Temporary explosives storage may be found within the AOI associated with road construction activities related to the forest industry.

[16] BC Parks. Read Island Provincial Park. Purpose Statement and Zoning Plan. 2003. http://www.env.gov.bc.ca/bcparks/planning/mgmtplns/readisle/readisle_ps.pdf?v=1585093613624

[17] BC Parks. Surge Narrows Provincial Park. Purpose Statement and Zoning Plan. 2003. http://bcparks.ca/planning/mgmtplns/surge/surge_ps.pdf?v=1588282992431

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 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's are defined by the regional climate of the Coastal Western Hemlock very dry maritime subzone (CWHxm) as described in the BC biogeoclimatic (BEC) zone classification system. The CWHxm climate is one of warm, dry summers and moist, mild winters.[18] The CWHxm is the driest subzone on northern Vancouver Island, the mean annual precipitation is about 1505mm, and mean precipitation from April-September is about 363mm.[19]

The CWHxm subzone is classified as Natural Disturbance Type 2 (NDT2) – infrequent stand initiating events. The mean return interval for stand replacing disturbances (large scale forest disturbance) is about 200 years.[20] Wildfires occurring in NDT2 are moderately sized (20 to 1000ha), larger fires occur after extended periods of drought.

Fire Weather

The Canadian Forest Fire Danger Rating System[21] (CFFDRS) is a computer-based model used to assess fire danger and potential fire behaviour. The two main parts of the CFFDRS are: the

[18] A Field Guide for Site Identification and Interpretation for the Vancouver Forest Region, 1994. https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh28.htm.

[19] Ecosystems of British Columbia, February 1991. https://www.for.gov.bc.ca/hfd/pubs/docs/Srs/Srs06/

[20] BC Forest Practices Code Biodiversity Guidebook September 1995. https://www.for.gov.bc.ca/hfd/library/documents/bib19715.pdf.

[21] 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[22] (FWI) and fire behaviour prediction system (FBP).[23] Hourly weather data is collected throughout fire season (April to October) at automated fire weather stations throughout British Columbia to support the CFFDRS.

Wildfire threat exposure to the AOI's 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. The Fire Danger rating classes are summarized in the table below.

Table 3. Summary and description of fire danger classes.

Fire Danger Classes[24]	Definition / Fire Behaviour Summary
Class I/II – Very Low/Low	Fires may start easily and spread quickly but there will be minimal involvement of deeper fuel layers or larger fuels.
Class III – Moderate	Forest fuels are drying and there is an increased risk of surface fires starting. Carry out any forest activities with caution.
Class IV – High	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.
Class V – Extreme	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.

Regional Weather Stations

The closest BCWS weather station is located on Maurelle Island where fire danger data is available from 2010-2019 (Figure 1). As expected, July and August are the most critical months for fire danger ratings of High or Extreme. However, High and Extreme fire danger is also routinely recorded in May and June.

[22] Natural Resources Canada. Background Information: Canadian Forest Fire Weather Index (FWI) System. https://cwfis.cfs.nrcan.gc.ca/background/summary/fwi

[23] Natural Resources Canada. Background Information: Canadian Forest Fire Behaviour Prediction (FBP) System. https://cwfis.cfs.nrcan.gc.ca/background/summary/fbp

[24] BC Wildfire Service. Fire Danger. https://www2.gov.bc.ca/gov/content/safety/wildfire-status/wildfire-situation/fire-danger?keyword=danger&keyword=rating

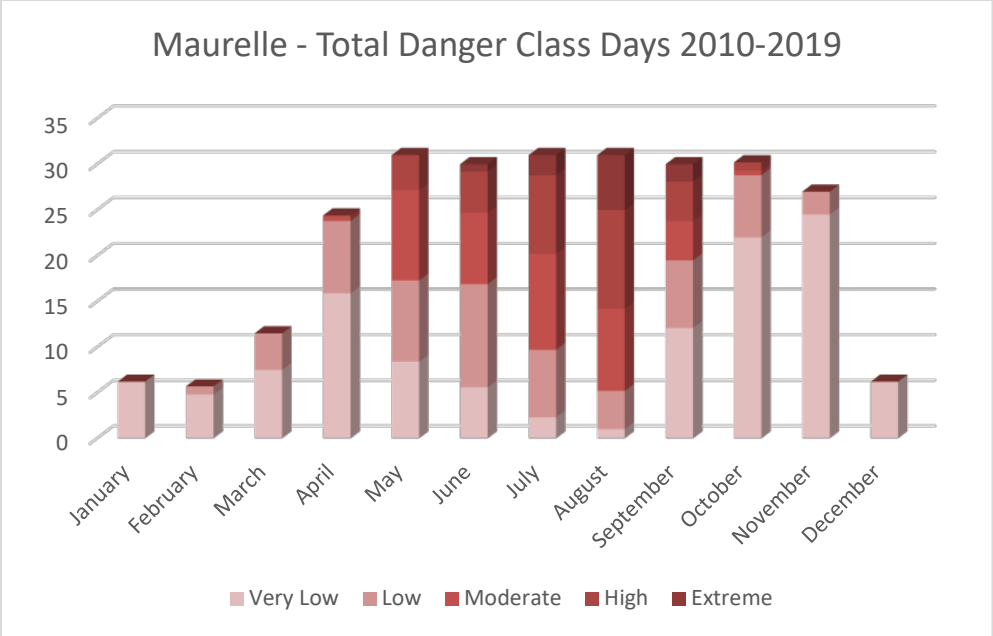


Figure 1. TS Maurelle BCWS weather station average monthly total danger class days 2010-2019.

The most representative long-term BCWS weather station is Campbell River Airport, 27km to the southwest.

Forest Health Issues

There are no known landscape level forest health issues that contribute to large scale changes in fire regime or forest attributes. However, ongoing drought stress on western red cedar is likely to affect fire hazard in the drier regional climate of the CWHxm subzone.

Human Development and Natural Events

A significant portion of the AOI is within the provincial crown timber harvesting land base or private managed forest lands. Forest harvesting and, to a lesser degree, land clearing for human settlement is the main driver of forest cover changes within the AOI.

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.[25] Climate change will continue to impact 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.[26] 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 SRD area include decrease in snowpack, high intensity precipitation, increase in hot/dry conditions, increase in temperature, longer dry season, and reduced water supply.[27] 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 was directly sourced from the Pacific Climate Impacts Consortium.[28]

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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[25] 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

[26] Pacific Climate Impacts Consortium. November 2013. Climate Summary for West Coast Region. Available from https://www.pacificclimate.org/analysis/publications/climate-summary-west-coast.

[27] 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.

[28] Pacific Climate Impacts Consortium. November 2013. Climate Summary for West Coast Region. Available from https://www.pacificclimate.org/analysis/publications/climate-summary-west-coast.

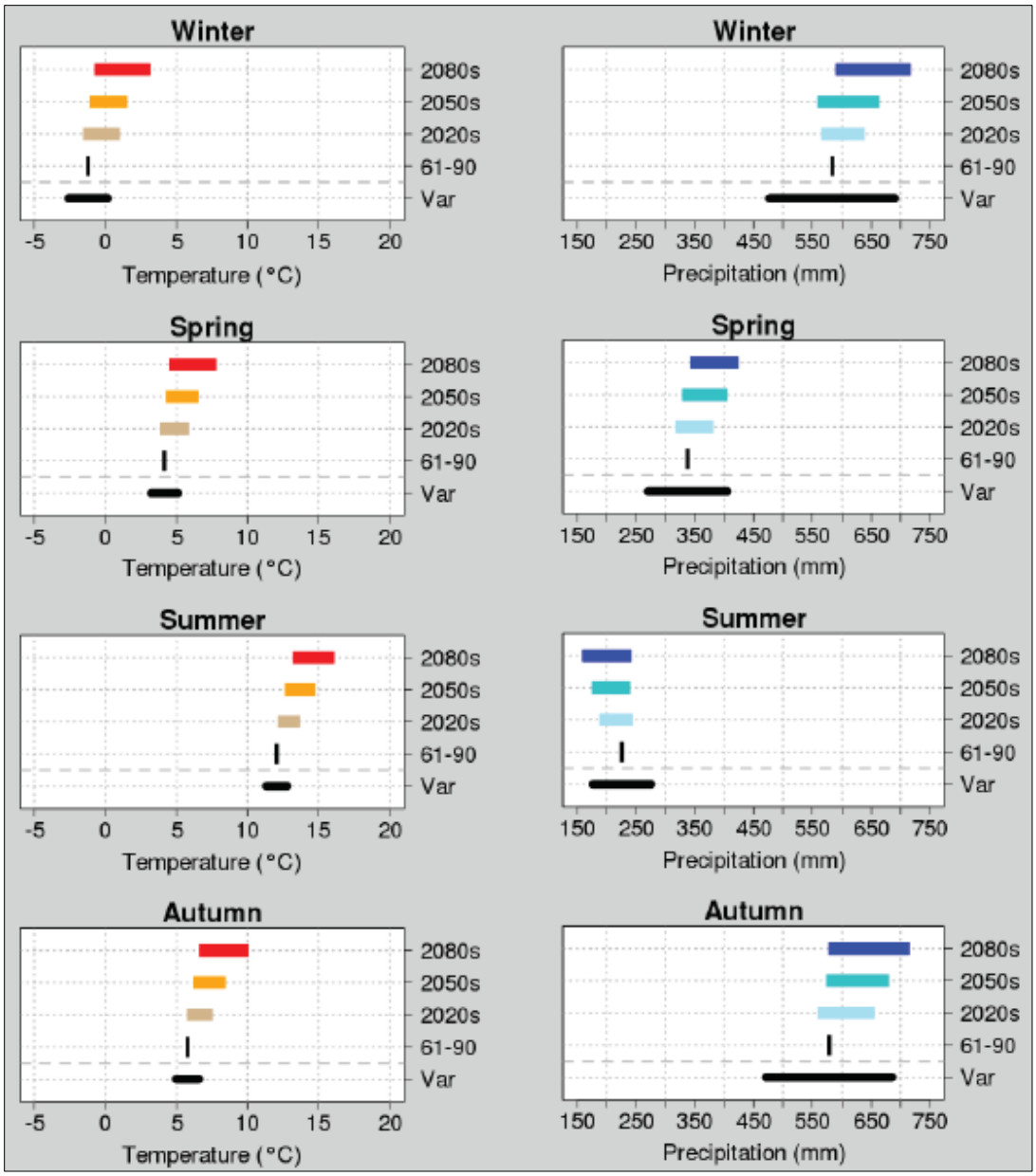

Figure 2. Cumulative seasonal precipitation and mean seasonal temperature projections for 2020s, 2050s, and 2080s.

4.2 Provincial Strategic Threat Analysis (PSTA)

The PSTA[29] 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.[30] 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 1-2.

Head Fire Intensity

Head fire intensity (HFI) is the intensity of the flaming fire front during 90th 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 mostly Low with isolated pockets of Moderate. Changes to fuel types within the AOI are described in Appendix A1.1 Fuel Type Attribute Assessment.

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[29] 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

[30] 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

MFLRORD and the BCWS maintain the BC Historical Fires Database. Within the AOI's the largest historical fires were person-caused fires that occurred through the 1920's, most likely associated with historical logging practices. Other historical fire data includes the Fire Incident Locations where BCWS tracks actual fires, suspected fires, nuisance fires, smoke chases, etc.[31]

The most recent fires within the AOI occurred in 2018 and 2019 on Read Island. The 2018 fire was a human-caused WUI fire incident, the BCWS responded with ground crews and helicopter support, the fire was contained at 8.6 hectares. The 2019 fire was lightning initiated, the BCWS responded with an initial attack crew, then with several helicopters and further ground crews. The fire was a ground fire, smoking in the ground with knee to hip height flames.[32] The remoteness and lack of water availability was a challenge for the response. Both 2018 and 2019 fires occurred early in the fire season, which may be indicative of drier spring conditions in recent years. Neither fires resulted in any evacuation alerts or orders, no human safety or property were threatened or lost. The historical fire density within the CWPP AOI is in the lowest 2 density classes ranked in the PSTA.

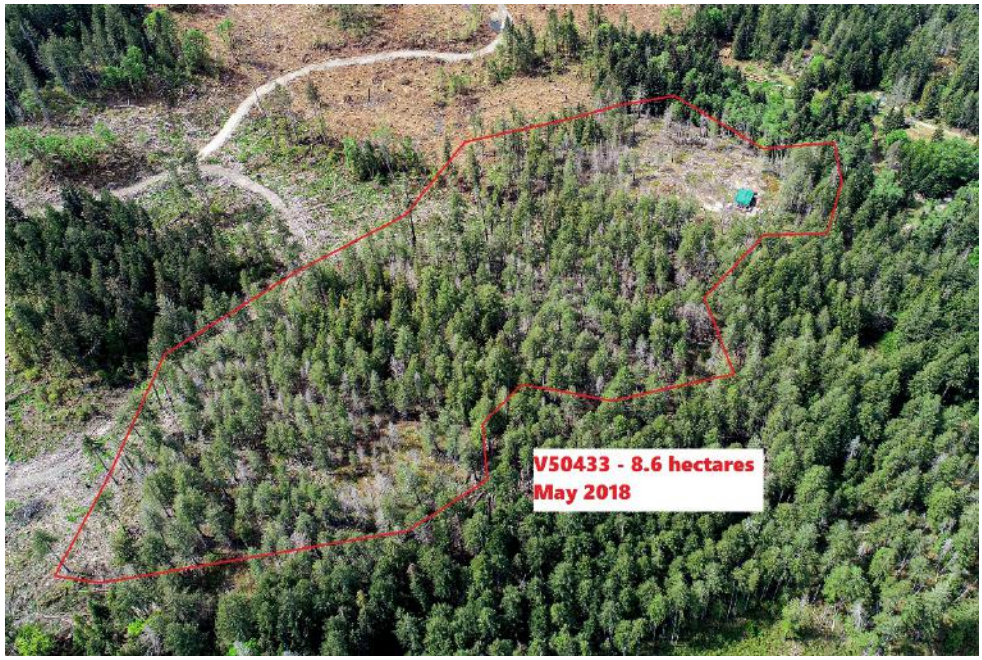
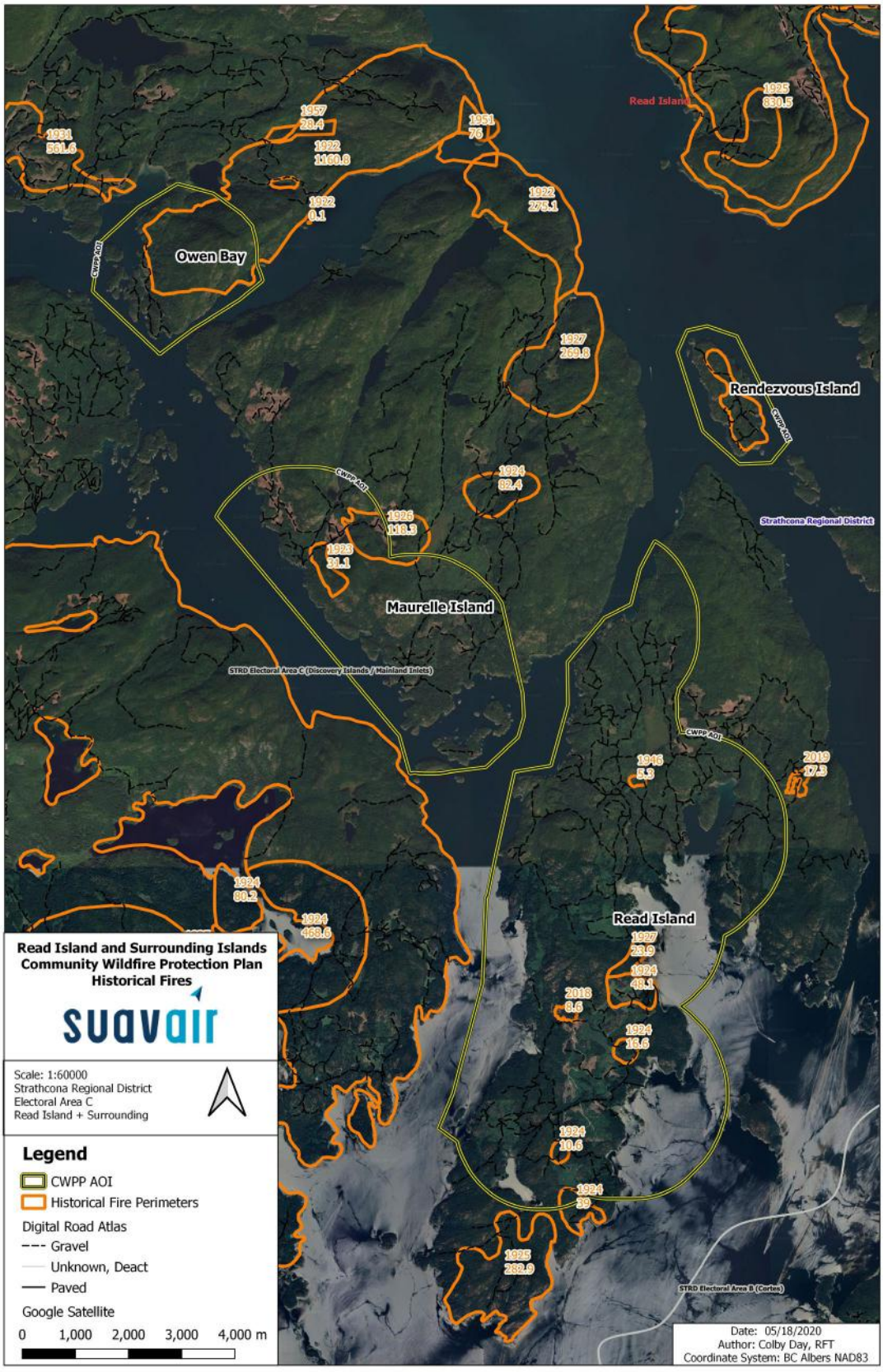


Photo 3. Fire V50433 burned 8.6ha hectares on Read Island in May 2018.

[31] BC Data Catalogue. Fire Incident Locations – Historical. https://catalogue.data.gov.bc.ca/dataset/e2dadc60-292f-4d98-b42b-56ca9e4fe694

[32] Campbell River Mirror. 9 June 2019. Read Island fire not over 30 hectares in size. https://www.campbellrivermirror.com/news/read-island-fire-now-over-30-hectares-in-size/



Map 4. Historical Fires within the CWPP AOI.

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 is described in further detail in Appendix 1.

4.3.1 Fuel Type Assessment

Fuels in the AOI's are generally mature conifer forests (C-5), young and dense conifer forests (C-3), recently harvested cut blocks (S-3), and some alder/cottonwood/maple deciduous patches (D-1/2). A detailed description of fuel types is provided in Appendix A1.1 Fuel Type Attribute Assessment.

PSTA fuel types have been verified through spatial analysis to the extent possible by the available spatial information from Data Catalogue BC, VRI data, RESULTS; and updated Google Earth imagery. The major changes to the fuel type layer that resulted within the AOI included:

- recently harvested cut blocks (less than 5 years) were changed to fuel type S-3,
- water areas were corrected with more accurate spatial data sources,
- coniferous mapped as deciduous fuel types, especially on steep slopes, 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 A1.1 Fuel Type Attribute Assessment for each AOI.

4.3.2 Proximity of Fuel to the Community

Fuel closest to the community usually represents the highest hazard as it is the most likely to spread fire to nearby infrastructure. 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 away from the value.

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 the FireSmart Planning and Activities section 5.2 below.

Photo 4. Example of the 100m WUI buffer on individual homes on the southern part of Rendezvous Island.

4.3.3 Fire Spread Patterns

Wind speed, wind direction, and fine fuel moisture condition influences wildfire trajectory and rate of spread. These effects are summarized in the Initial Spread Index (ISI) Rose(s) from the local representative BCWS weather station(s). Wildfire that occurs upwind of a value poses a much more significant threat to that value than a fire that occurs downwind. For example, prevailing northerly winds (wind blowing from the north) will mean the greatest spread potential is from the north, and therefore fuels to the north are higher priority treatment areas.

The TS Maurelle weather station recorded mainly south/southwest/northwest winds from 2010-2016 fire season months April – October. July and August tend to see afternoon outflow winds from the northwest. Another source for wind data is the Canadian Wind Atlas (CWA). The CWA[33] models wind speeds and direction from large scale and long-term atmospheric data. CWA data for the AOI shows dominant winds from the northwest in the summer (June, July, August) months.

[33] Canadian Wind Atlas. http://www.windatlas.ca/maps-en.php

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 influences 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 structures within the AOIs generally situated on slopes <20%. Slopes tend to rise up and away from the locations of structures which are generally near the waterfront. Generally, slopes will cause preheating of fuel in a direction away from structures rather than towards it. The fire behaviour implications of slope percentage classes are summarized in A1.4 Topography.

Slope Position of the Value

Generally, structures within the AOI are 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 position are summarized in A1.4 Topography.

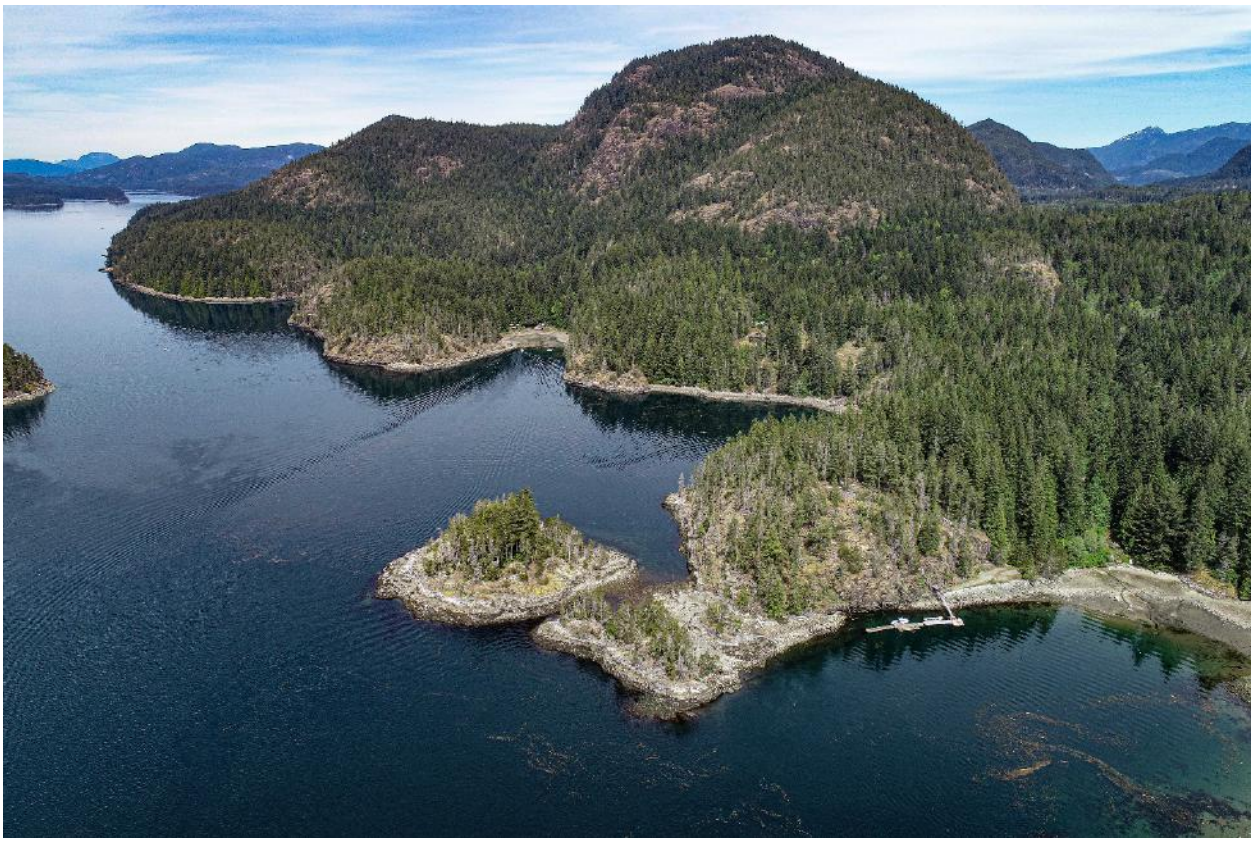


Photo 5. The steep slopes and rock bluffs on Maurelle Island. Structures mostly located near the water at toe slope position.

4.3.5 Local Wildfire Threat Classification

A local wildfire threat classification was completed, the process for the classification is summarized in A1.5 Local Wildfire Threat Classification. The wildfire threat classification maps are provided below. A summary of the threat classification areas is provided in Table 4. Generally, the wildfire threat within the AOI's is Moderate or Low.

Table 4. Wildfire threat class summary from the local threat assessment process.

Wildfire Threat Class	Read Island		Owen Bay		Maurelle		Rendezvous	
	Area (ha)	% of AOI	Area (ha)	% of AOI	Area (ha)	% of AOI	Area (ha)	% of AOI
Extreme	0	0%	0	0%	0	0%	0	0%
High	104	2%	57	9%	0	0%	0	0%
Moderate	1906	40%	288	44%	848	49%	6	2%
Low	1309	28%	120	18%	333	20%	130	40%
Very Low / No Threat (Water)	1420	30%	194	29%	535	31%	186	58%
Total	4738		659		1716		322	

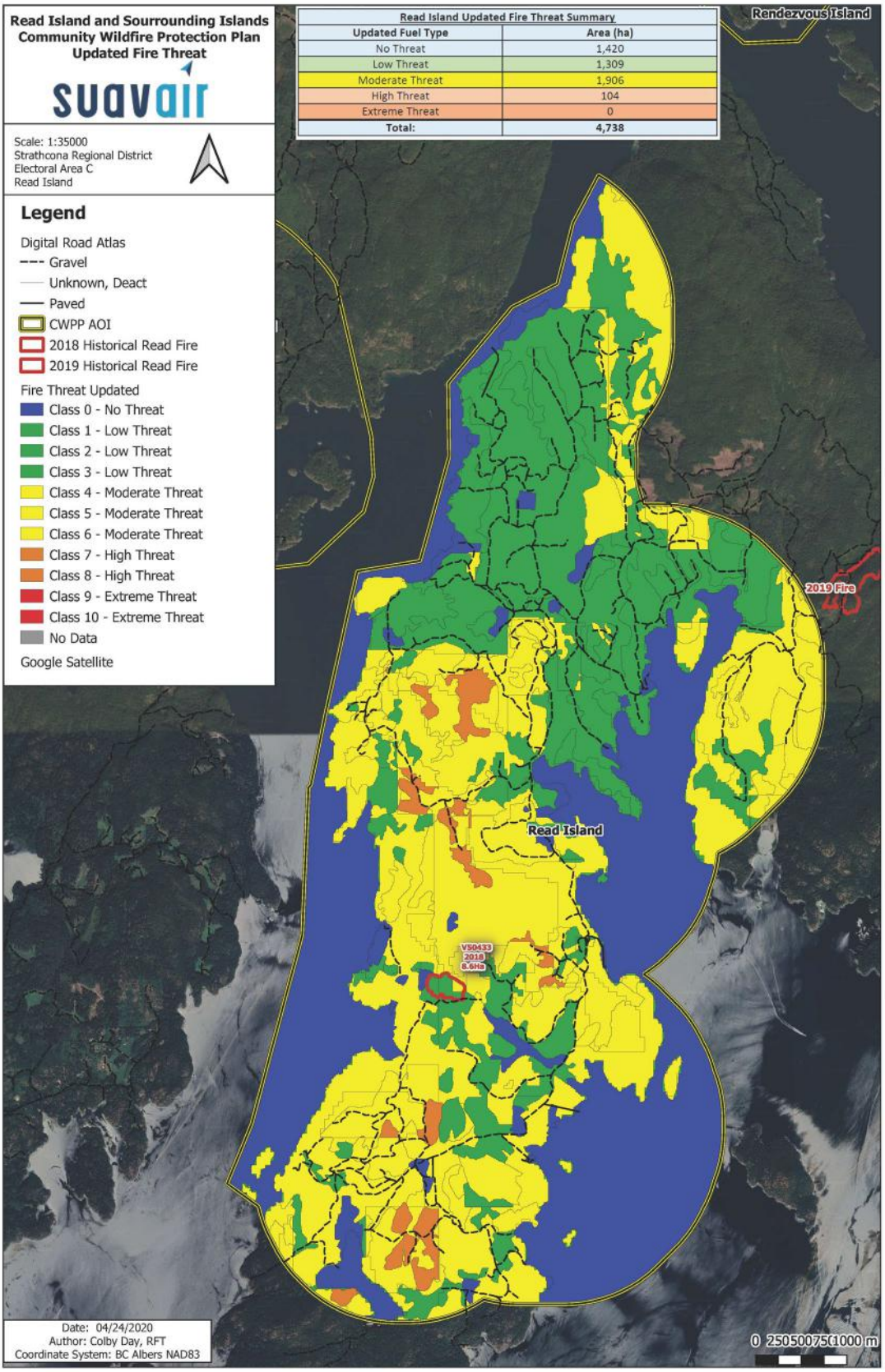
4.3.6 Local Wildfire Risk Classification

The 2019 PSTA data classifies the Owen Bay WUI polygon as Risk Class 5 (Moderate). Other areas of interest are not assigned WUI risk classes in the PSTA.

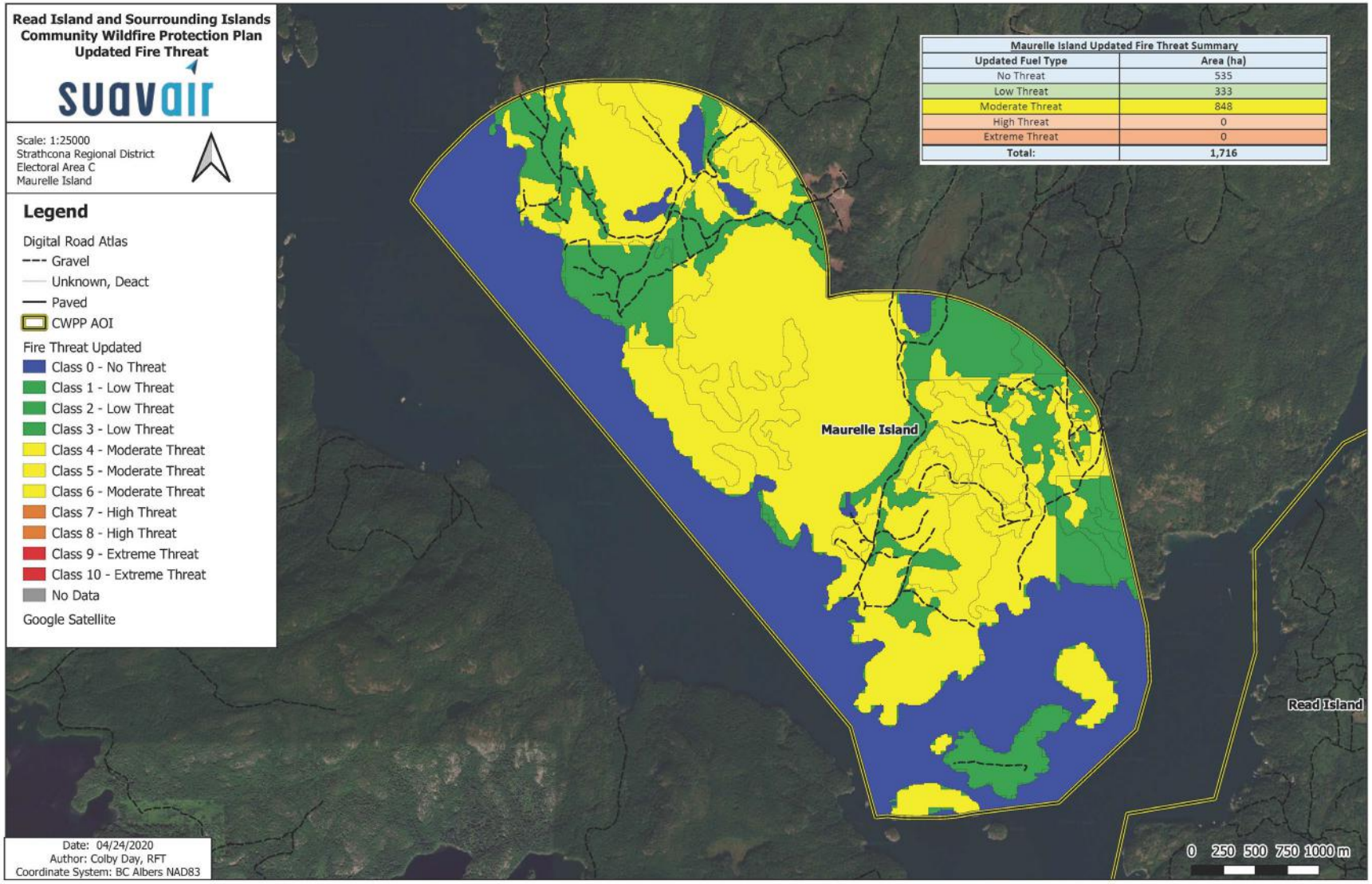
A local wildfire risk classification was completed based on the updates to the fuel type layer and local wildfire threat classification. Proximity to structures/values, fire spread patterns, and topography are the other key determinants of wildfire risk. The risk is generally higher within the WUI100 due to proximity. A summary of risk classification areas is provided in Table 5 and in the maps below. The detailed wildfire risk assessment process is found in Appendix A1.6 Local Wildfire Risk Classification.

Table 5. Wildfire risk class summary from the local risk assessment process.

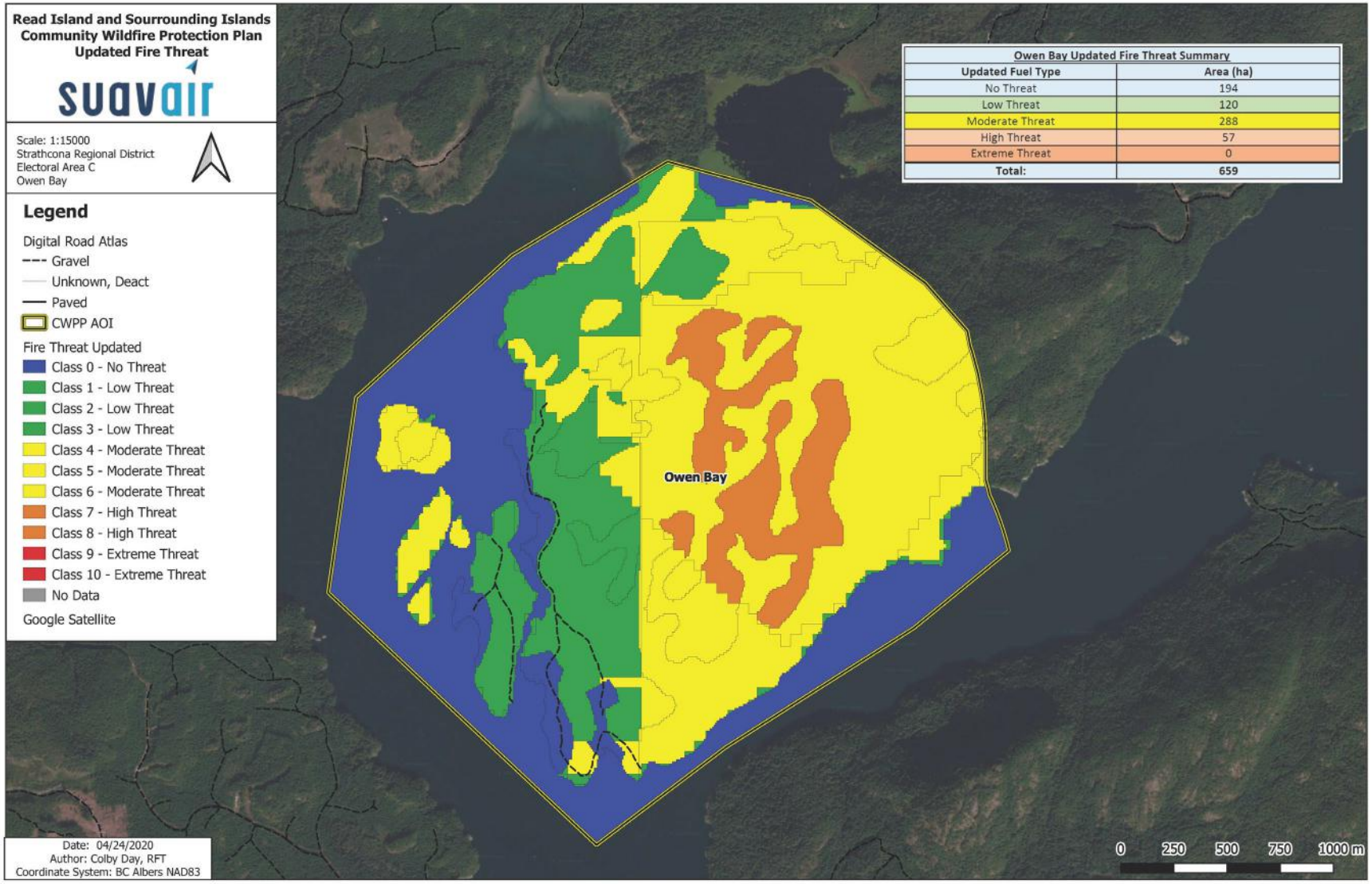
Wildfire Risk Class	Read Island		Owen Bay		Maurelle		Rendezvous	
	Area (ha)	% of AOI	Area (ha)	% of AOI	Area (ha)	% of AOI	Area (ha)	% of AOI
Extreme	5	0.1%	0	0%	0	0%	0	0%
High	799	17%	21	3%	36	2%	117	36%
Moderate	2247	47%	313	48%	1188	69%	205	64%
Low	1686	36%	325	49%	492	29%	0	0%
Total	4738		659		1716		322	



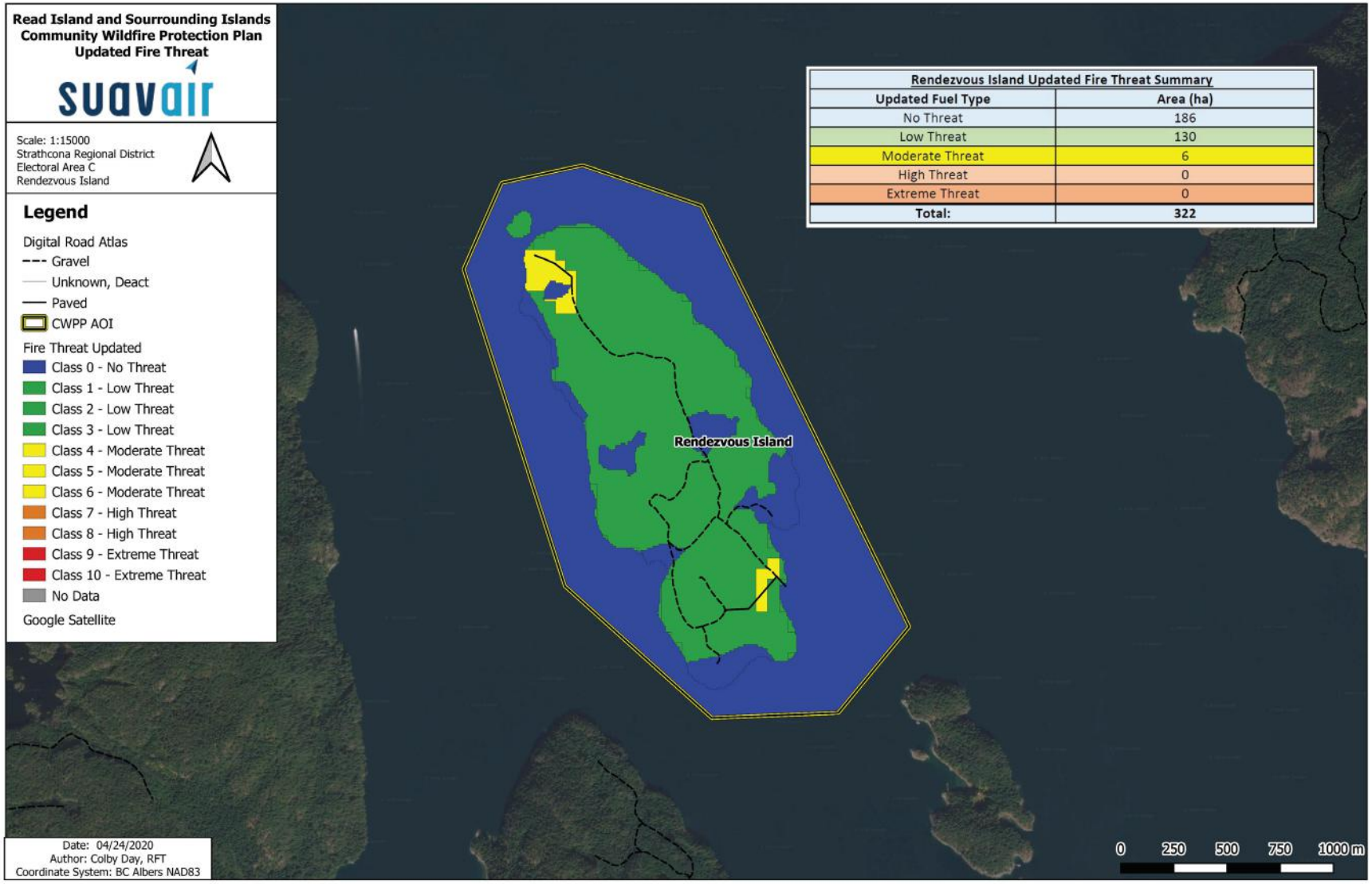
Map 5. Read Island AOI updated local wildfire threat classification.



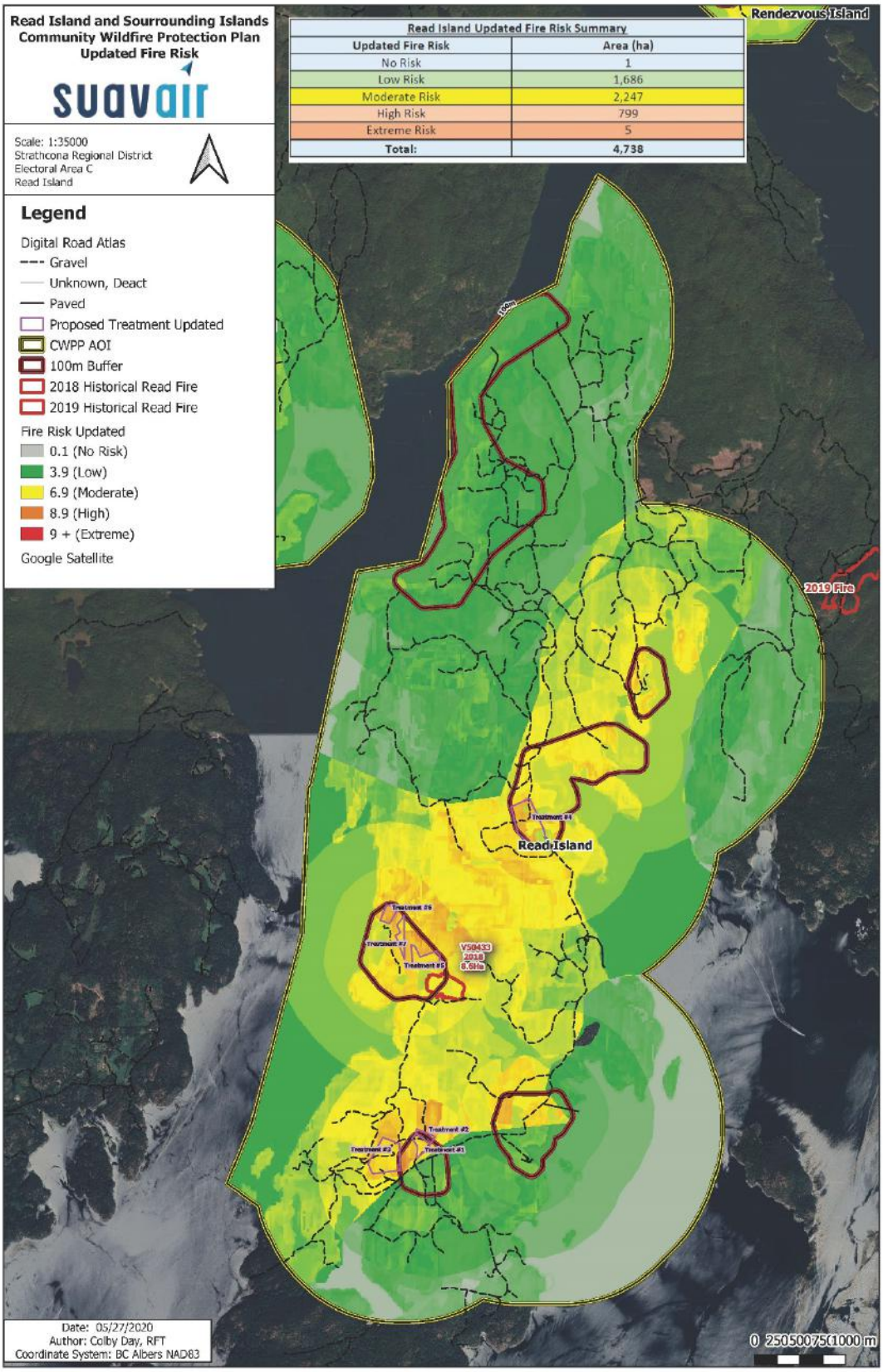
Map 6. Maurelle Island AOI updated local wildfire threat classification.



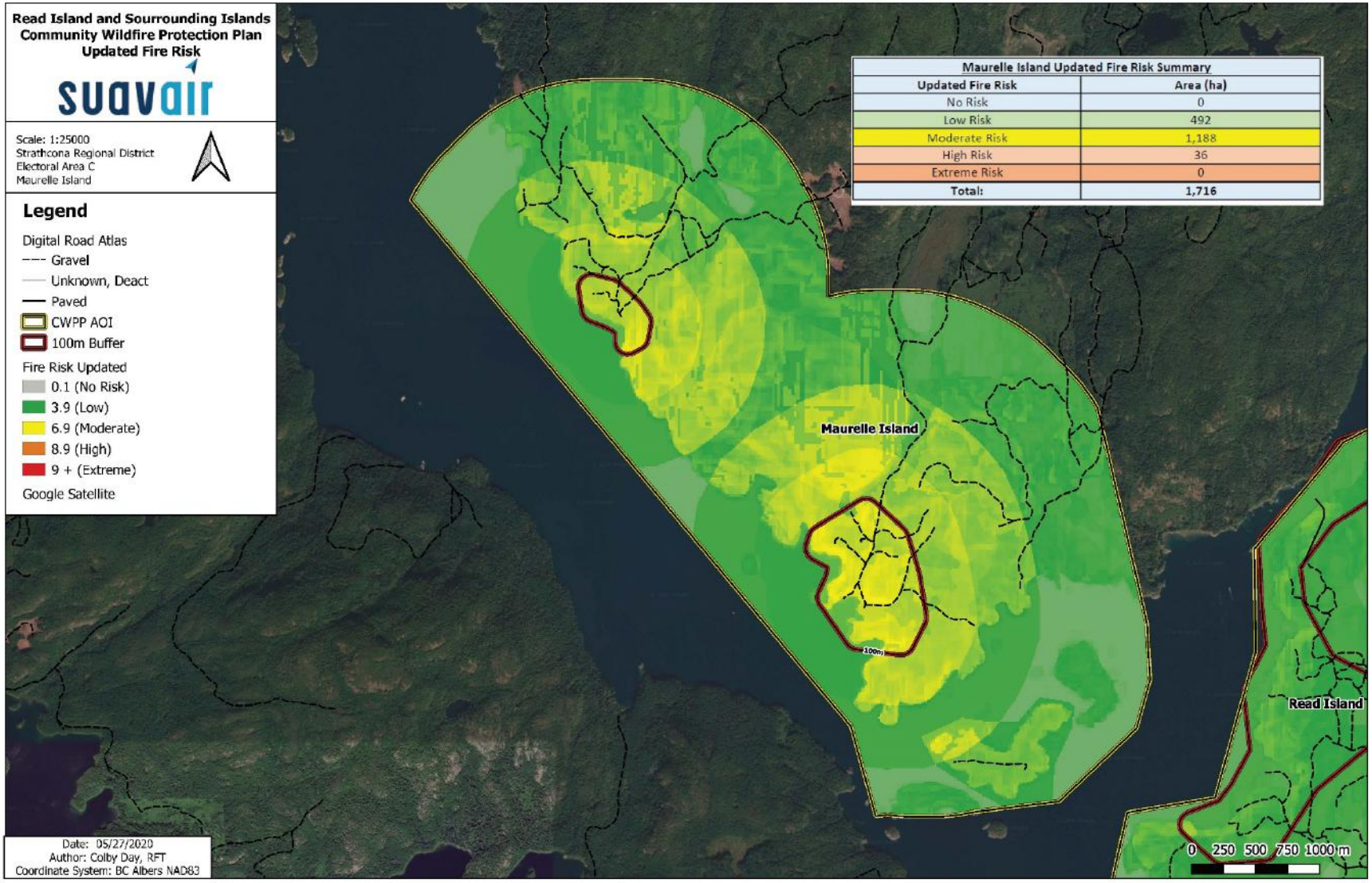
Map 7. Owen Bay AOI updated local wildfire threat classification.



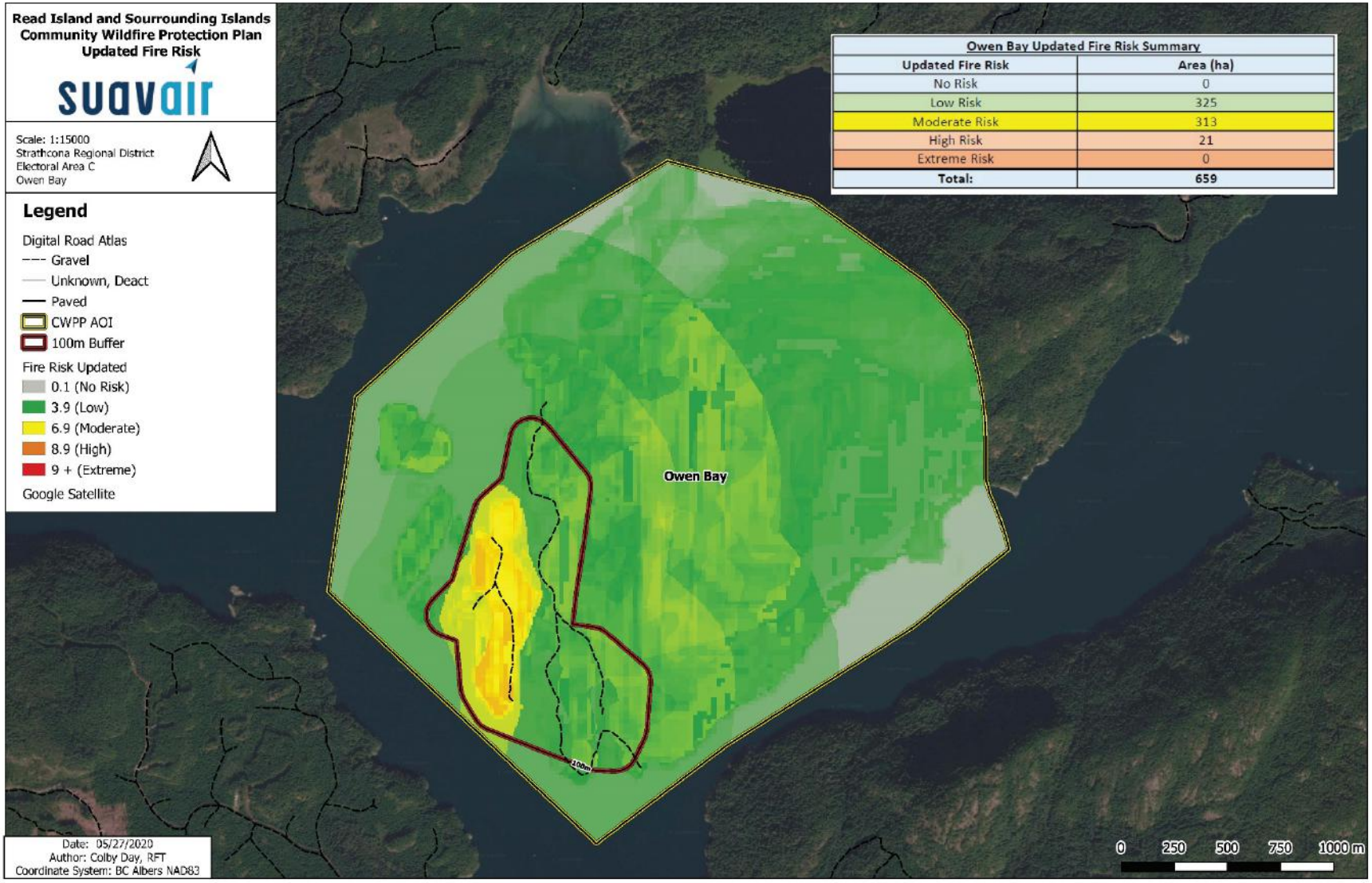
Map 8. Rendezvous Island AOI updated local wildfire threat classification.



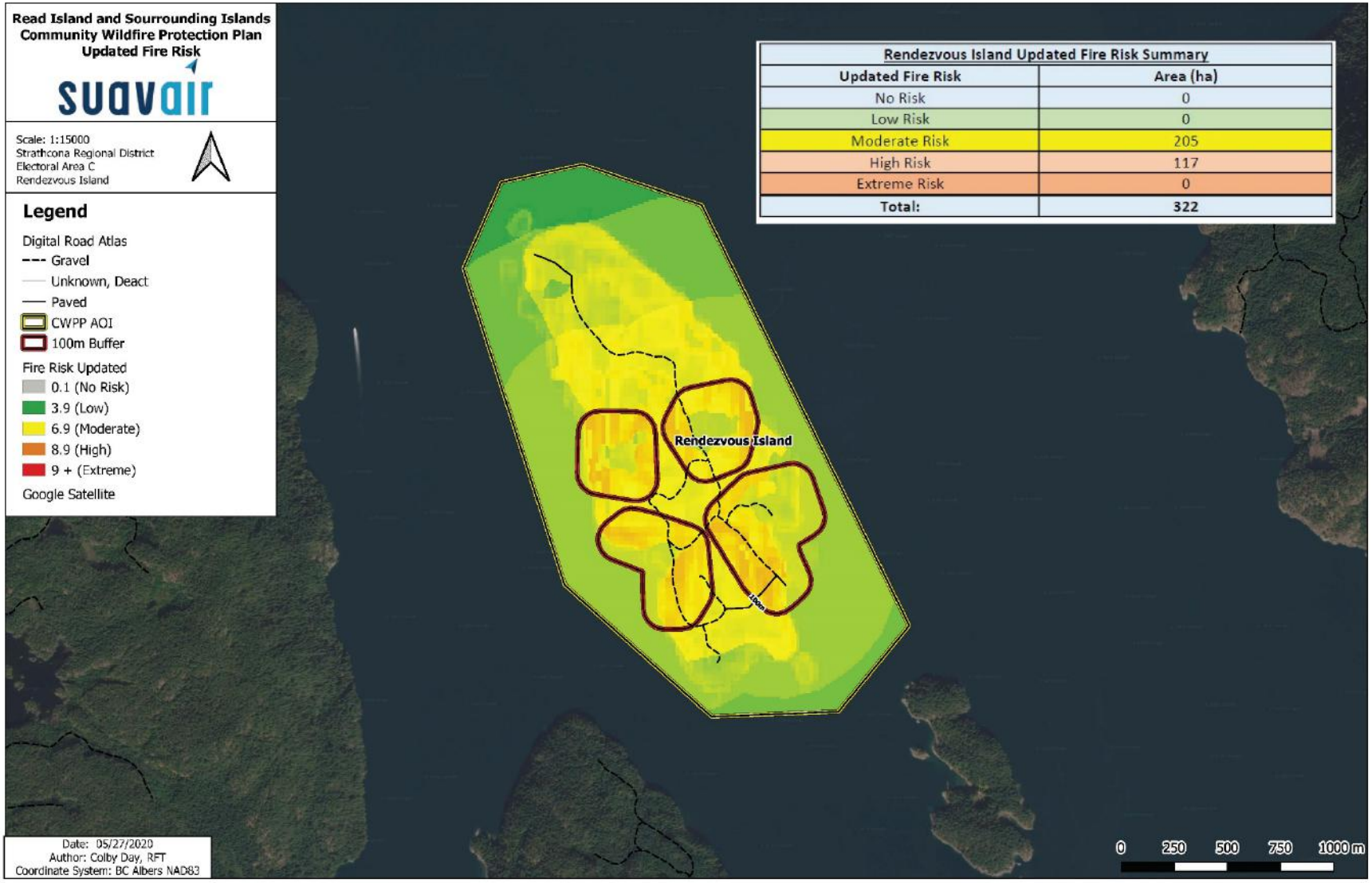
Map 9. Local wildfire risk classification Read Island AOI and recommended treatment areas.



Map 10. Local wildfire risk classification – Maurelle Island AOI.



Map 11. Local wildfire risk classification Owen Bay AOI.



Map 12. Local wildfire risk classification Rendezvous Island AOI.

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.[34] Treatment strategies should prioritize surface and ladder fuel changes over canopy changes.[35] 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). Removal surface fuels and ladder fuels are the main considerations 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) also contribute to wildfire hazard across the landscape. Harvested areas dry out faster, dead and down material does not retain moisture and is more susceptible to ignitions. Surface 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 when harvested areas occur within the WUI.

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[34] 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

[35] Ibid.

Figure 3. Understory thinning can reduce surface and ladder fuels.[36]

Figure 4. The vertical arrangement of ladder fuels can carry a fire from the surface into the canopy.[37]

[36] Partners in Protection. FireSmart Protecting Your Community from Wildfire. https://firesmartcanada.ca/wp-content/uploads/2018/10/FireSmart-Protecting-Your-Community.pdf.

[37] Ibid.

5.1.1 Fuel Treatment Areas

Read Island

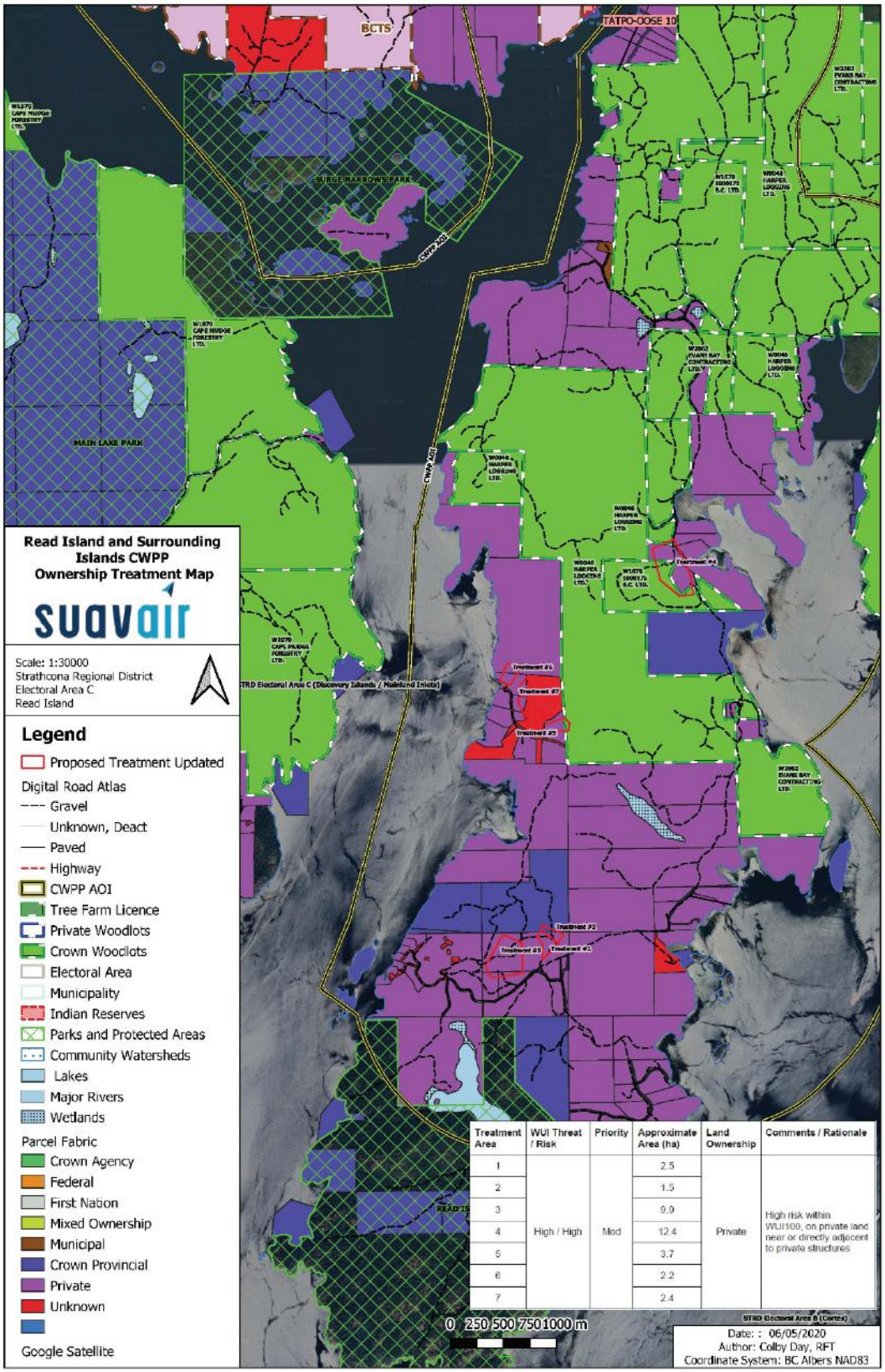
Based on the risk analysis, fuel treatment areas are recommended within the Read Island AOI (Table 6 and Map 13). Any fuel management activities planned on Crown land, or beyond those described in the FireSmart Activities section, should engage the professional advice of a qualified Registered Professional Forester. Qualified professionals should be relied on to create site level fuel management prescriptions that have specific measurable targets, contain site specific objectives, and align with other legal and non-statutory objectives including First Nations consultation requirements.[38]

Proximity affects risk and therefore fuels in closer proximity to structures, where private land is situated, are higher risk. Therefore, recommended treatment areas are within 500m (WUI500) of structures. No treatment is recommended beyond the WUI500 because it is unlikely to occur over the lifetime of this CWPP. This CWPP should be re-visited in 5 years to determine progress on recommended actions, at which time additional fuel treatment areas may be recommended.

Table 6. Summary of recommended treatment areas.

Treatment Area	WUI Threat / Risk	Priority	Approximate Area (ha)	Land Ownership	Comments / Rationale
1	High / High	Mod	2.5	Private	High risk within WUI100, on private land near or directly adjacent to private structures
2			1.5		
3			9.9		
4			12.4		
5			3.7		
6			2.2		
7			2.4		

[38] 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



Treatment Area	WUI Threat / Risk	Priority	Approximate Area (ha)	Land Ownership	Comments / Rationale
1	High / High	Mod	2.5	Private	High risk within WUI100, on private land near or directly adjacent to private structures
2			1.5		
3			9.9		
4			12.4		
5			3.7		
6			2.2		
7			2.4		

Map 13. Read Island AOI recommended treatment areas and land ownership classes.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
3.	Med	To reduce the fuel hazard within the identified treatment areas. Treatment areas are associated with High Risk within WUI100.	Engage a qualified forest professional in developing and implementing site level prescriptions for each treatment area (Table 6. Summary of recommended treatment areas.) Consultation with applicable First Nations, and engagement with private landowners, industry tenure holders, and MFLNRORD will be required as part of the operational planning process.	SRD

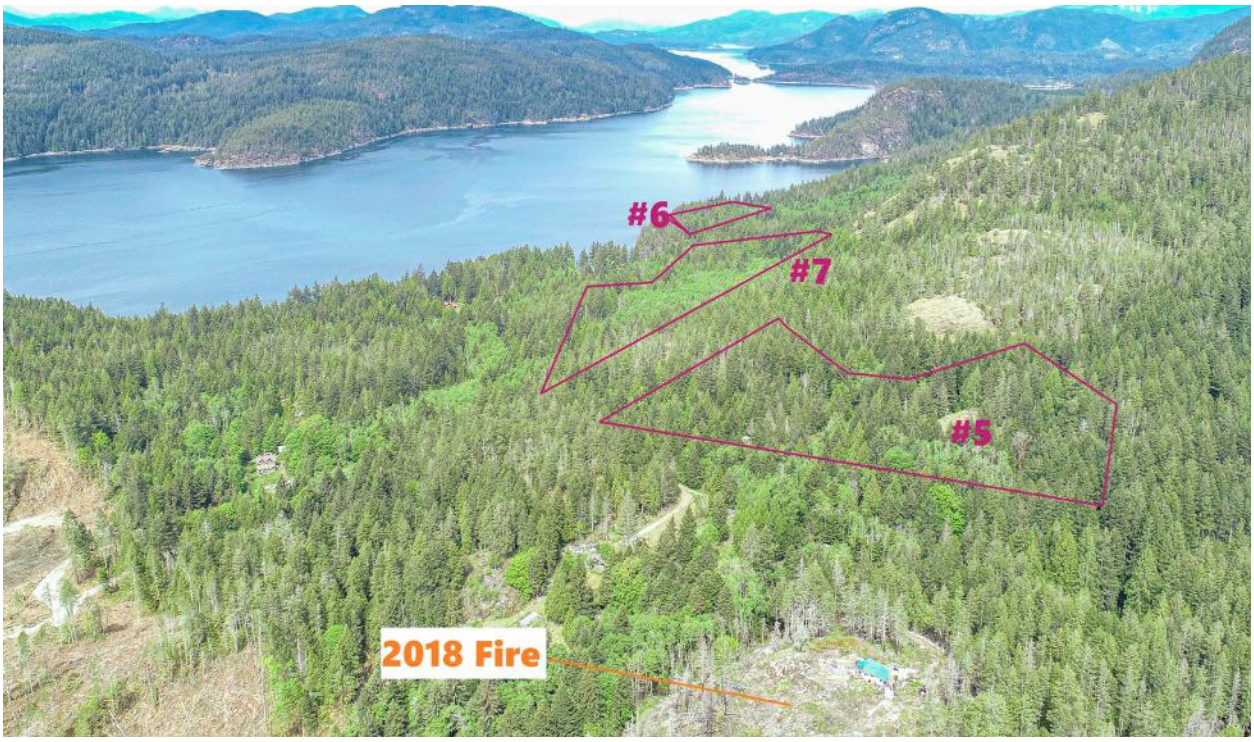


Photo 6. Recommended treatment areas #5, #6, #7.

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, and to identify future FireSmart activities within the AOI.

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.[39]

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 the remote location and absence of fire protection services, it is critically important to consider the impacts of WUI fires in both directions. In the event of WUI fires, BCWS resources 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.

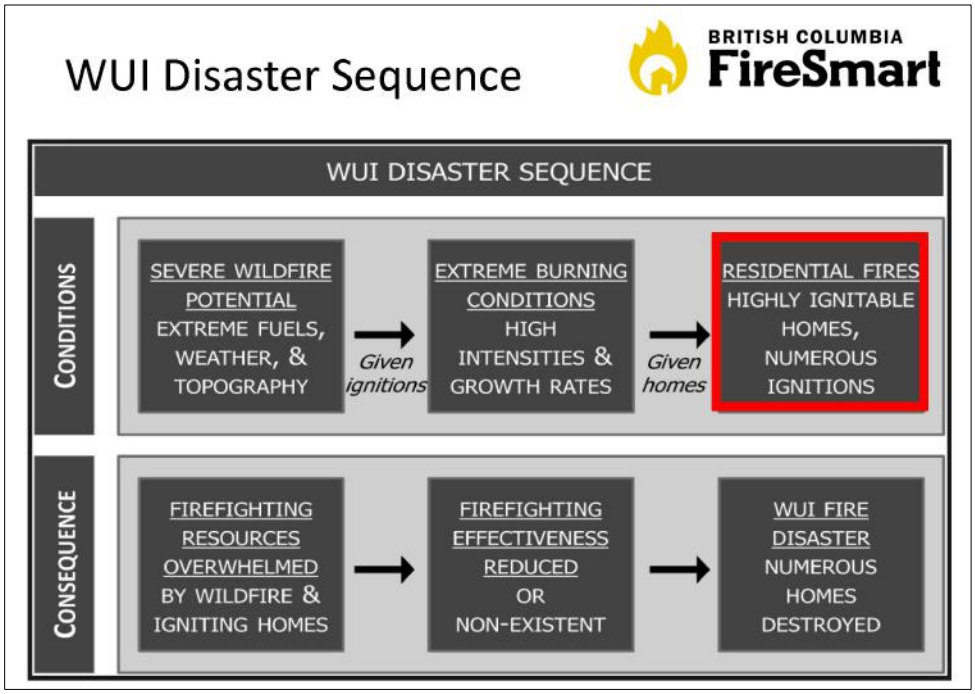


Figure 5. Wildland urban interface disaster sequence and where residents and landowners can break the disaster sequence.

[39] 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

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.

Adopting FireSmart principles and engaging in FireSmart practices is the best way private landowners can take responsibility and action on reducing the WUI fire hazard and risk of loss to their homes and communities. The conditions of the Structure (Home) Ignition Zone (SIZ)[40] are a main determinant of whether a home/structure will be lost due to a WUI fire (Figure 6). Simple actions to modify the SIZ can make a big difference. Figure 7 shows the priority areas for vegetation management within the SIZ, beginning from the structure with the Non-Combustible zone (0-1.5m), Priority 1 zone (1.5-10m), Priority 2 zone (10-30m), and Priority 3 zone (30-100m).

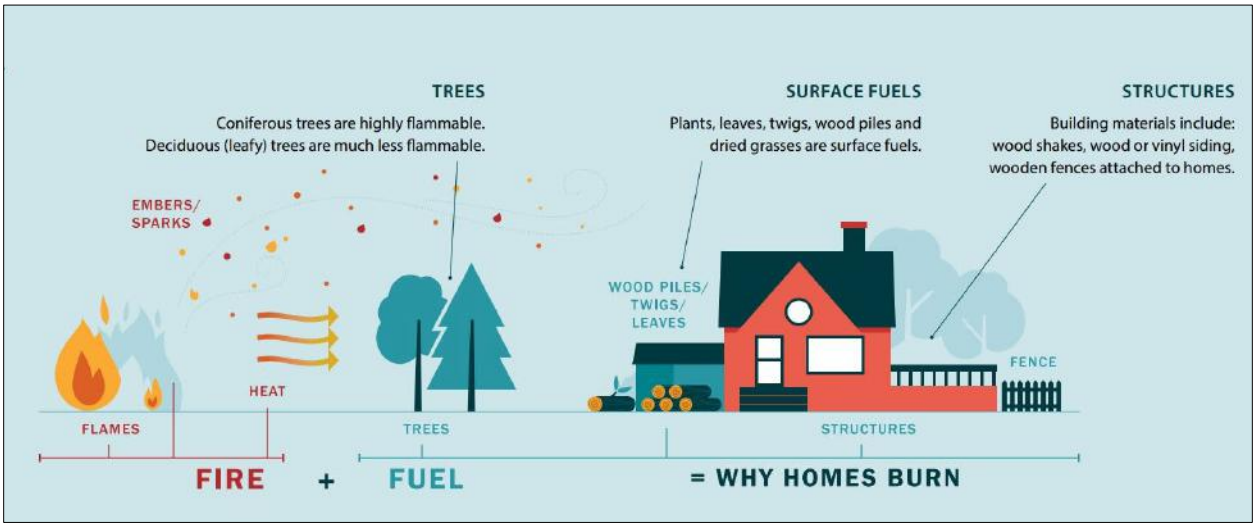


Figure 6. Why homes burn during WUI fire incidents.[41]

[40] FireSmart Canada. FireSmart Home Ignition Zone. https://www.youtube.com/watch?v=k0ClodnHp2c.

[41] FireSmart – Why Homes burn in WUI Fire Incidents https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart

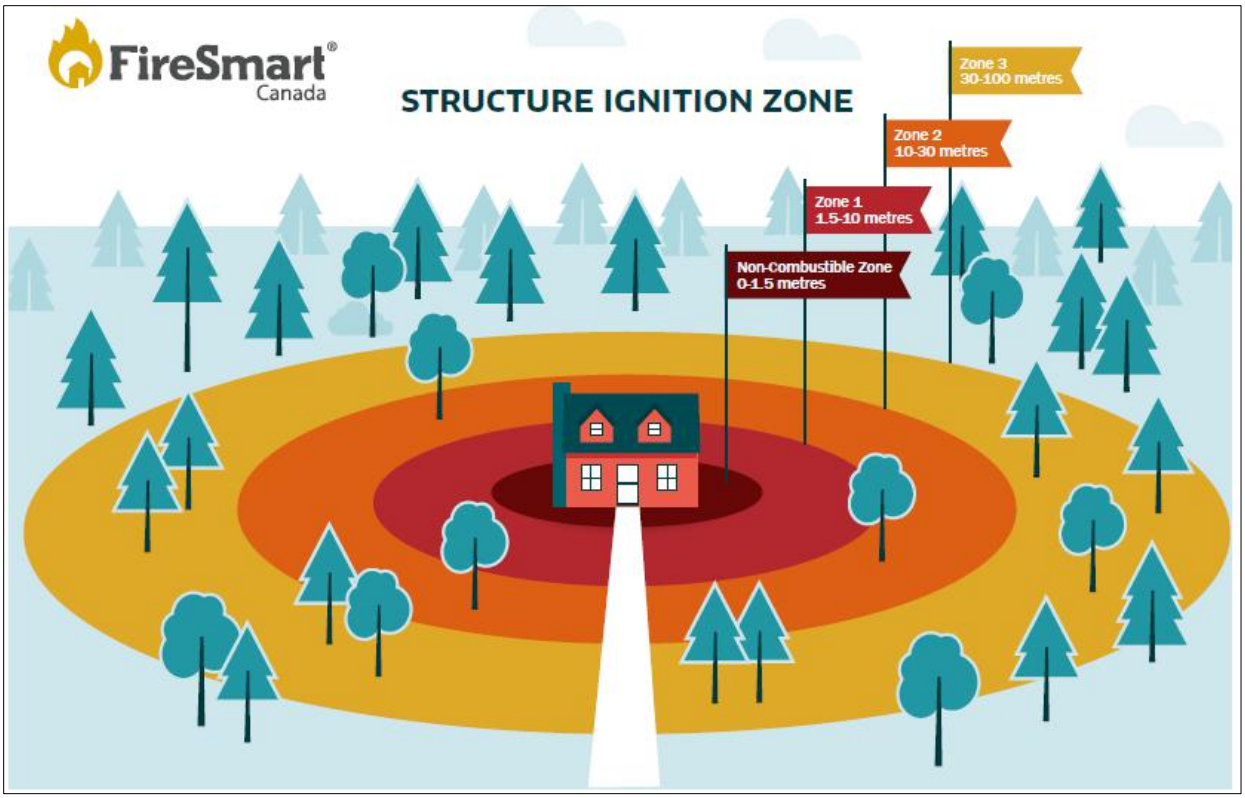


Figure 7. The FireSmart Structure Ignition Zone.

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.[42] This was true in both the urban and rural areas.

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

[42] 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.

- 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

5.2.2 Key Aspects of FireSmart for Community Members and Local Governments

The intent of this sub-section is to provide a summary of FireSmart activities that can be used to measure current level of implementation and to recommend next steps. There are many ways members of the community and stakeholders can provide options to mitigate the risk. A general list of FireSmart practices and activities can be found in Appendix 2: FireSmart Practices and Activities.

Due to the remoteness of the AOI's, limited infrastructure, and lack of access to fire protective services, it is highly recommended that all private property owners and community members engage with the FireSmart program and begin adopting FireSmart practices around their homes and properties.

The following is generalized guidance for FireSmart activities within the structure/home ignition zone, this guidance applies to all structures within the WUI:

- 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

When completing vegetation management activities, landowners should also consider strategies for disposal of the vegetative materials. Options may include piling and burning, or chipping and dispersing.

If structural upgrades or new construction is planned, it is recommended that FireSmart guidelines (FireSmart Home Development Guide[43]) 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.

[43] FireSmart Canada. Home Development Guide. https://firesmartcanada.ca/wp-content/uploads/2019/10/FireSmart_Canada_Home_Development_Guide.pdf

- Use fire resistant materials for decks, close in the areas below balconies and decks

More information regarding FireSmart guidelines is available in the BC FireSmart Begins at Home Manual[44], and/or contacting a Local FireSmart Representative.[45]

5.2.3 Identify Priority Areas within the Area of Interest for FireSmart

The intent of this sub-section is to use the information gathered on local wildfire threat and risk assessments (Section 4.0 above) to best understand the priority areas for FireSmart planning and activities. This could be based on the relative level of wildfire risk adjacent to established neighbourhoods, although the application of FireSmart principles to isolated critical infrastructure could also be a priority.

Each individual property owner or resident should consider their home as their first FireSmart priority area and begin to work on the FireSmart activities listed in Section 5.2.2 above. The following community structures or clusters of homes are recommended for FireSmart Hazard Assessments. The intent is that when the LFR conducts hazard assessments on community infrastructure, residents are part of the process so the learnings can be taken and applied to their own properties.

Table 7: Summary of recommended FireSmart priority areas.

Area ID	Wildfire Risk Rating (E/H/M/L)	Recommended FireSmart Activities
Priority Area # 1: Surge Narrows Community Hall and School (Read Island)	Low	• Contact a Local FireSmart Representative to conduct a FireSmart Hazard Assessment • Invite all community members to attend • Implement Hazard Assessment recommendations through community work parties
Priority Area #2: Private homes and structures	Low-High	• Identify interested property owners • Contact a Local FireSmart Representative to conduct FireSmart Hazard Assessments for identified properties

[44] BC FireSmart. FireSmart Begins at Home Manual. https://www2.gov.bc.ca/gov/content/safety/wildfire-status/prevention/firesmart

[45] Local FireSmart Representative look-up. https://firesmartbc.ca/local-firesmart-representatives/

Where resources are limited, priority should be given to FireSmart hazard assessments and activities, over the larger scale proposed treatment areas identified in Table 6. The following recommendations are made regarding FireSmart activities:

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
4.	Med	To engage community members in FireSmart planning to help reduce the likelihood of disaster in the event of a WUI fire in isolated areas.	Contact a Local FireSmart Representative to conduct a FireSmart Awareness workshop and Local FireSmart Champion Workshop. Advertise the workshop on the SRD and community group websites.	SRD with support from community groups
5.	High	To improve community FireSmart awareness and implementation of FireSmart practices to help reduce the likelihood of disaster in the event of a WUI fire in isolated areas.	Contact a Local FireSmart Representative to conduct FireSmart Community Hazard Assessments for priority areas identified in Table 7.	SRD with support from community groups
6.	High	To improve community FireSmart awareness and implementation of FireSmart practices to help reduce the likelihood of disaster in the event of a WUI fire in isolated areas.	Generate a list of property owners interested in a FireSmart hazard assessment. Co-ordinate and organize LFR hazard assessment trips to interested properties.	SRD with support from community groups
7.	High	To assist private landowners who have undertaken FireSmart vegetation management with fuel/debris	Seek funding opportunities to assist private landowners in disposing of removed fuels – this may include hiring contractors with wildfire suppression and pile burning expertise, or community chipping days. Logistics and costs are a challenge, consider working with industrial partners to reduce the	SRD with support from community groups

		disposal.	costs of barging equipment.	
8.	High	To reduce the ignition risk within the FireSmart structural ignition zone by making property owners aware of preferred FireSmart building materials.	Connect property owners to FireSmart guides for selecting building materials and incorporating FireSmart principles into construction and location. The FireSmart Home Development Guide is a key resource. In the absence of an Electoral Area C building bylaw, the SRD should recommend best practices for building within Area C to minimize WUI risk. Make the resources available online where other SRD building code/bylaw information is located.	SRD
9.	Med	To improve community awareness of the FireSmart program principles and activities.	Encourage residents to complete the free, online, FireSmart 101 course.	SRD and community groups

5.3 Community Communication and Education

Following the 2018 wildfire season, wildfire risk was at the forefront of public awareness. The challenge is to maintain this level of awareness, interest, and orientation towards action outside of major wildfire seasons. 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 another critical part of emergency planning and response in the event of a WUI fire. Education and communication in advance of a WUI incident is required to ensure community members are prepared, informed about their roles and the roles of residents, the SRD, and BCWS.

Moving from the planning phase to successful implementation of specific activities requires that the community be well informed of the reasons for, and the benefits of, specific mitigation activities. Communication with First Nations' communities, residents, visitors, landowners, industrial stakeholders, and provincial government agencies is required for the successful implementation of this plan. Continual engagement between the SRD and other stakeholders throughout the duration of this CWPP (at least 5 years) is required to sustain momentum in addressing the recommendations.

The CWPP will be made accessible to the community in the following ways:

- A recorded video presentation made available to the SRD
- Hard copies and digital copy of the plan submitted to the SRD
- A digital copy should be uploaded to the Strathcona Regional District Emergency Planning website
- Alternative community communication forums can also be used to share selected highlights from the plan, including social media accounts and the SNCA website.

The development of a comprehensive communication and/or public education strategy is outside the scope of this CWPP. However, important communication and education initiatives are recommended below.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
10.	High	To make this Plan and its associated maps available to the community for education and awareness.	Upload a digital copy of the CWPP to the SRD Emergency Planning website.	SRD
11.	High	To community education material available to improve understanding of WUI fire threat and risk; to raise awareness of preventative and mitigative actions.	Develop a Surge Narrows/Outer Islands specific Fire Safety and Wildfire Preparedness information factsheet for residents. Link this resource on the SRD and community group websites. Make hard copies available for property owners. This factsheet should include information on frequently asked questions regarding legal requirements, FireSmart principles, emergency evacuation routes, wildfire safety, wildfire reporting, and BCWS resources on fire bans, air quality.	SRD
12.	Med	To improve community understanding of wildfire risk and raising awareness of the wildfire threat to the community.	Organize an annual Community Fire Safety day. Activities may include checking fire extinguishers and smoke alarms in homes, conducting FireSmart clearing of Priority 1 (up to 10m) zones around critical community infrastructure, FireSmart presentations, fire extinguisher practice, water pump practice, etc.	SRD with support of community groups
13.	Med	To share the content of this plan with industrial stakeholders operating within the areas of interest.	Share the contents of this plan with industrial stakeholders operating in the area – engage in dialogue about fire weather monitoring, slash management and fuel hazard management initiatives.	Community groups with SRD support

5.4 Other Prevention Measures

Human-caused ignitions are preventable and will continue to be a focus of wildfire prevention measures. Human-caused ignitions can result from industrial activities, campfire use, arson, cigarette butts, open burning debris pile escapes, discarded materials, fireworks, amongst other sources. The recorded Historical Fires data shows that most fires in the AOI have been human caused. Therefore, a focus of this CWPP is to make recommendations that will reduce the number of human-caused ignitions.

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. A Danger Class Rating Sign is located at Hoskyn Channel Dock on Quadra Island.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
14.	Low	To reduce the risk of human-caused WUI fire events by promoting alternative means of yard management and yard waste disposal beyond open fires.	Provide residents within information on alternatives to burning yard waste. Link this information on the SRD website. Alternatives to burning include chipping, composting or xeriscaping.	SRD
15.	Low	To improve resident and visitor awareness of wildfire prevention measures through signage.	Work with the BCWS to install informational signage at a high traffic location (Surge Narrows dock or other highly visible locations for marine traffic) visible to residents and visitors (i.e.: Prevent, Observe, Report sign)	SRD and community groups

SECTION 6: WILDFIRE RESPONSE RESOURCES

The intent of this section is to provide a high-level overview of the resources that are available to local governments in the case of a wildfire. 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 BC, these resources are deployed according to BC Provincial Coordination Plan for Wildland Urban Interface Fires (revised July 2016).[46]

On Crown Lands within the AOI's, wildfire management and response responsibility of the BCWS. On private lands, the AOI's are not within any fire protective service areas and property owners and neighbours would provide local response.

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

The AOI's are not within the protective service areas of any local fire department. Homes and structures are isolated and access for firefighting vehicles is limited. Community members are encouraged to maintain fire tools and personal protective equipment (PPE) caches on their properties or between neighbouring properties. Fire fighting hand tools include shovels, axes, pulaskis, backpack water pumps and fire extinguishers. Other equipment includes water pumps, hoses, and nozzles. Forest fire fighting PPE includes long pants, long-sleeved shirt made of cotton, wool, denim, or flame resistance material; gloves, boots, hard hats, face/eye protection made of non-synthetic or flame-resistant materials. The following recommendations are made regarding firefighting equipment:

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
16.	High	To improve the availability of firefighting tools for residents.	Inventory current fire tools available within the community, purchase community fire tools and personal protective equipment (PPE) where there may be deficiencies. Encourage neighbours to cooperatively build up tool/PPE caches. S100 wildland firefighting training course is recommended for safety and training on how to use fire tools.	Community groups, residents

[46] 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

6.1.2 Water Availability for Wildfire Suppression

Water availability for fire suppression is a concern for each of the AOI's. Currently, there is a 1600-gallon water storage tank at the community school. The tank is not currently setup for fire suppression use. Private landowners may have additional water storage systems, but the capacity and extent of private water sources is not known. Industrial stakeholders, when active during fire season, are required to have adequate water suppression systems on site.

Response to the 2018 and 2019 Read Island fires required significant helicopter bucketing support, where ocean water was dropped on the fires. In the 2019 fire, over 1km of hose was laid to reach a land-based water source. Drought conditions during fire season restrict the surface water available for suppression. If/when fires occur close to the ocean, oceanwater may be drafted to be used for suppression, but there may be operational constraints related to shoreline access on the ground. Options to improve water availability include water tank storage systems, water tanker trucks, pump/hose network for drafting ocean water, or dry hydrants. The following recommendations are made to improve water availability for wildfire suppression.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
17.	High	To improve water availability for fire suppression to reduce the risk of a structure fire spreading to the forested interface.	Assess the water availability, volume requirements, and equipment needed for fire suppression in the community hall/school area. A professional with expertise in structural and WUI firefighting should be consulted.	SRD
18.	High	To improve water availability for fire suppression to reduce the risk of a structure fire spreading to the forested interface.	Individual property owners, with the help of professional expertise, should assess the water availability and volume requirements for fire suppression. Where increased water availability is required, property owners should invest in water tanks or other storage systems to store rainwater/surface water for fire suppression during drought conditions.	Community groups, residents

6.1.3 Access and Evacuation

The AOI's are accessible by personal boat, water taxi, or float plane. The islands are not accessible by BC Ferries routes. A small number of properties on Read Island are connected by road or all-terrain vehicle trails. The road networks within the AOI's are not regularly maintained and are not suitable access routes for large equipment or emergency firefighting vehicles. Due to the remote access and marine environment, it most likely that BCWS and other emergency services will require the use of a helicopter. BCWS standards for helicopter landing areas are

outlined in their annual aviation pilot guide.[47] The following recommendations are made regarding improving access.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
19.	Low	To improve emergency evacuation communications.	Encourage residents to sign up to the SRD's free Connect Rocket emergency notification service which sends out text messages to cellular subscribers and voice calls to landlines.	SRD
20.	Med	To identify, clear and maintain helicopter landing areas for emergency evacuations and/or wildfire response operations.	Identify potential helicopter landing sites throughout the AOI's. Designate areas within a Local Emergency Plan. Helicopter landing sites should be continually maintained to be free of obstructions, loose debris and overhanging vegetation or obstacles; and visibly marked where possible. The field at the Surge Narrows school is a good example. Due to the remoteness and limited road connectivity, the identification of multiple sites is recommended. Landing areas should be easily accessible and easily controlled spaces.	SRD

6.1.4. Training

Training courses would be a benefit to the local community to increase awareness of regulations surrounding fire use, wildfire prevention, mitigative and preventative FireSmart measures, and emergency preparedness and response. Since there is no local fire department, training is targeted at interested and active community members. A list of relevant training courses is provided in Appendix 3: Wildfire and Emergency Response Training Courses. The following recommendations are made regarding training options to build capacity within the community:

[47] BCWS Pilot Information Guide. 2020. https://www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/aviation/bcws_pilot_information_guide.pdf

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
21.	High	To improve community capacity to address WUI fires by providing access to formal training.	Generate local interest and organize S100 training and annual refresher courses for community members.	SRD with support from community groups
22.	High	To improve community preparedness for structure protection due to the remote and isolated location of properties and absence of a local fire department.	Develop a checklist for property owners of fire suppression equipment and emergency supplies to keep readily available during fire season. Items should include smoke alarms, fire extinguishers, hand tools, personal protective equipment, communications devices, and a first aid kit.	SRD

6.2 Structure Protection

The intent of this section is to provide a summary of what is available to the community for structure protection and provide any recommendations. Currently, sprinkler units and structural protection units (SPU) are not readily available for deployment within the AOI. Limited road infrastructure and barge access makes the deployment of nearby SPU's in Campbell River or Comox not feasible. Using the community hall and school as a demonstration area, residents can come together to learn about FireSmart practices and structure protection initiatives that can also applied to their homes and properties. The following recommendations are made to improve structure protection.

No.	Priority	Objective	Recommendation / Next Steps	Responsibility
23.	Low	To improve community capacity for structure protection.	Purchase sprinkler kits to be set up on the community hall/school structure. Consider water availability for fire suppression, as additional water storage may be required to supply sprinkler kits through summer months.	SRD, community groups
24.	Low	To improve community capacity for structure protection.	Encourage property owners to purchase sprinkler kits and water supply systems for sprinkler kits to deploy on their homes/critical structures	SRD

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[48] have applied the CFFDRS/FBP fuel types to the BC context and these fuel type descriptions are used to inform 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).*

[48] 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 red cedar 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)[49]

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.

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

[49] 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.

[50] FBP Fuel Type Descriptions. https://cwfis.cfs.nrcan.gc.ca/background/fueltypes/c1

[51] 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.

	organic layer. Continuous shrub, low to moderate down woody fuel, tree crowns extend nearly to the ground. Moderately well stocked black spruce stands, bogs excluded.			
C-3	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[52].	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
C-5	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.
M-1/2	Boreal Mixed wood. Continuous leaf litter in deciduous portions, feathermoss, and needles in conifer portions. Moderate shrub and continuous herb layers, down woody	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.

[52] 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.

	fuels, conifer crowns extend near the ground. Moderately well stocked mixed wood stands.			
D-1/2	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
S-3	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
W	Water	n/a	n/a	n/a
ND	No Data / Private Land	n/a	n/a	n/a
NF	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 Spot 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[1] M1-M2 (26-49%	Low

Conifer)	
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 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), young and dense conifer forests (C-3), recently harvested cut blocks (S-3), and some alder/cottonwood/maple deciduous patches (D-1/2). 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:

- recently harvested cut blocks (less than 5 years) were changed to fuel type S-3,
- water areas were corrected with more accurate spatial data sources,
- coniferous mapped as deciduous fuel types, especially on steep slopes
- 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

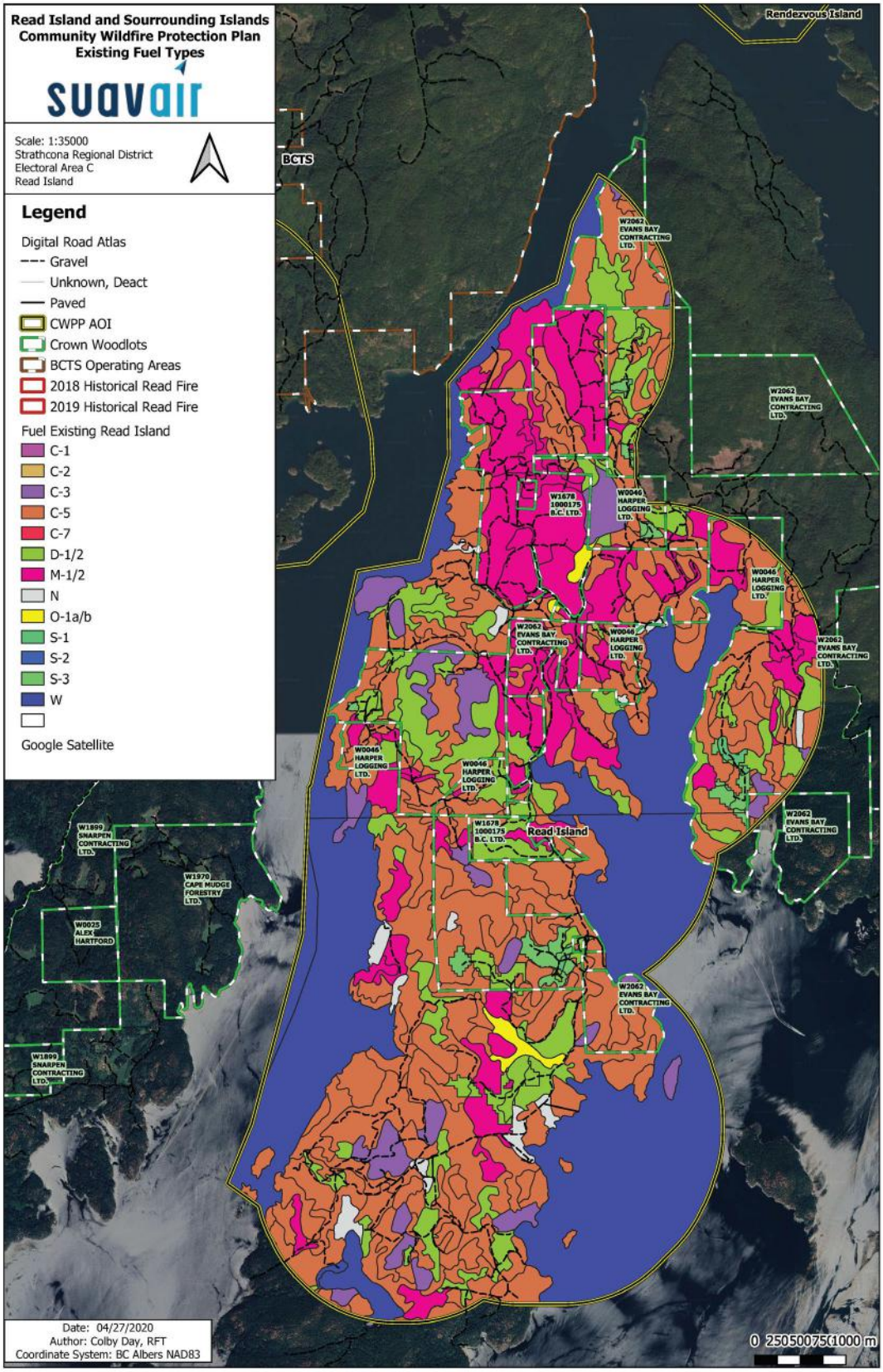
The changes in fuel type areas are summarized in the tables and maps below for each AOI.

Table 10. Read Island fuel type area summary.

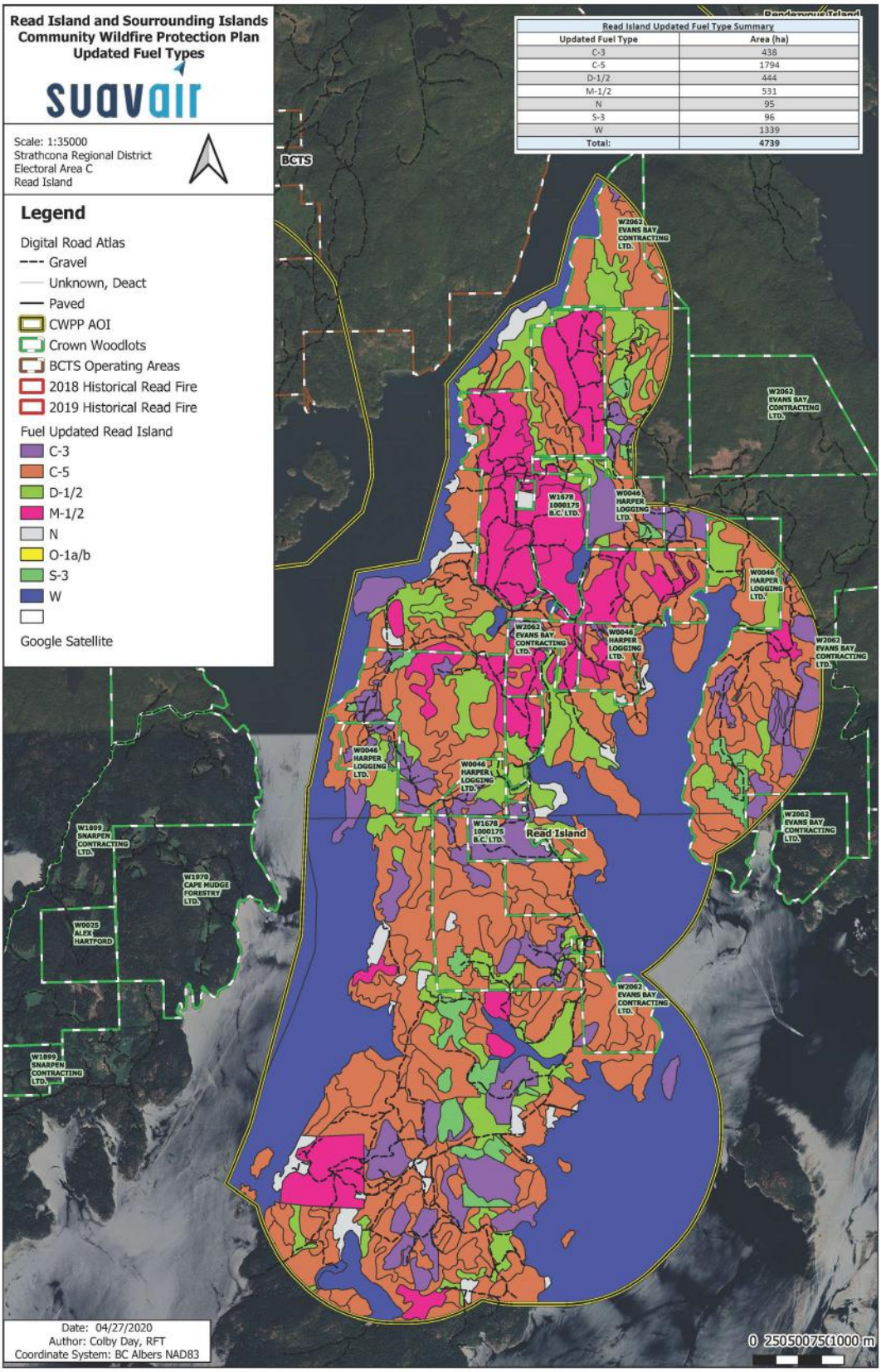
Fuel Type Class	2019 PSTA Original Area (ha)	2020 CWPP Updated Area (ha)	Net Change (ha)
C-3 (dense, pole sized coniferous)	198	438	+240
C-5 (mature coniferous)	1857	1794	-63
D-1/2 (deciduous)	504	444	-60
M-1/2 (mixed conifer/deciduous)	733	531	-202
O-1a/b (grass)	24	0	-24
S-1 (recent harvest)	8	0	-8
S-3 (recent harvest)	49	96	+47
W (Water)	1311	1339	+28
Non-Fuel	54	95	+41
Total area	4739		

Table 11. Owen Bay fuel type area summary.

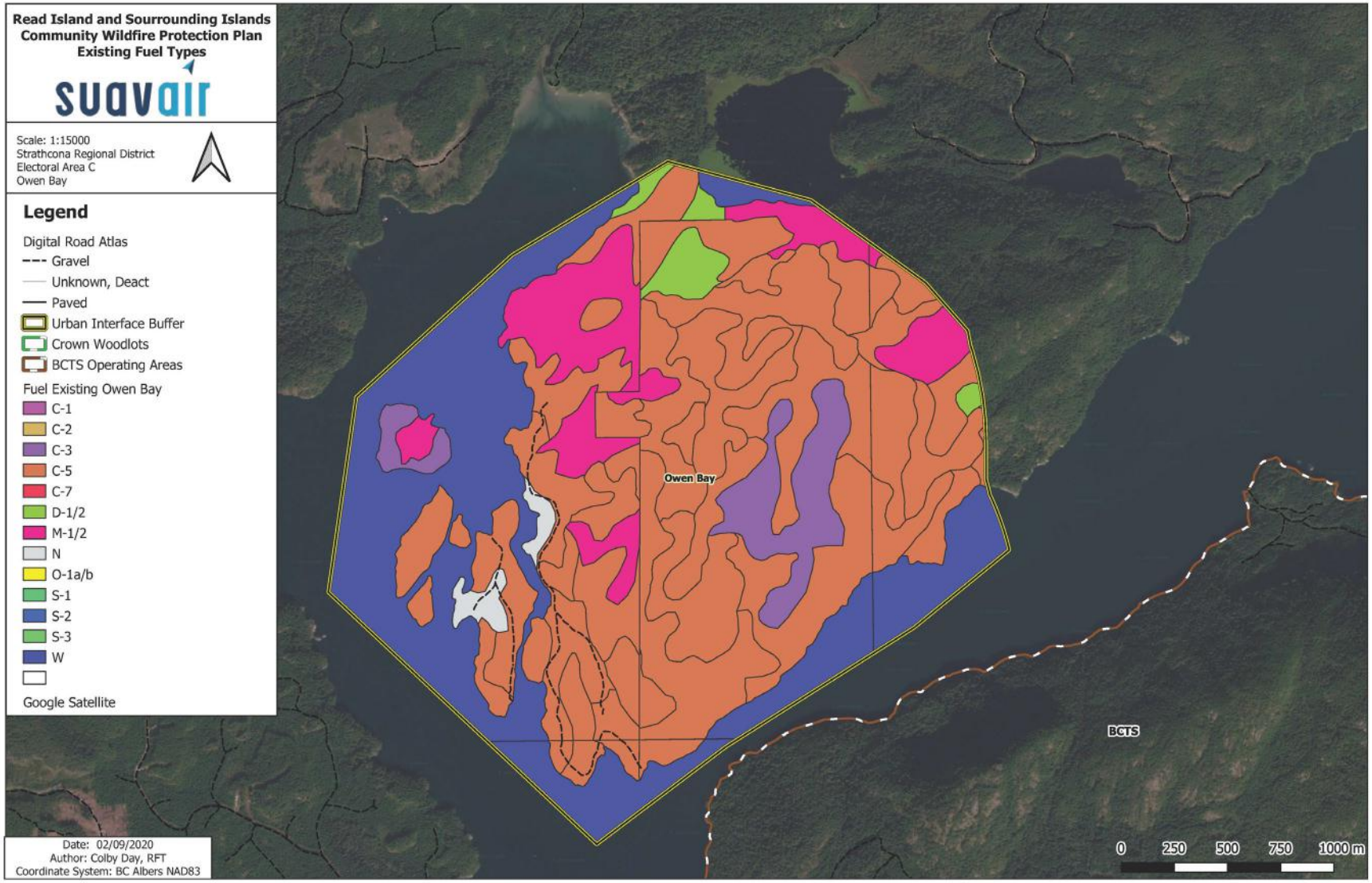
Fuel Type Class	2019 PSTA Original Area (ha)	2020 CWPP Updated Area (ha)	Net Change (ha)
C-3 (dense, pole sized coniferous)	37	6	-31
C-5 (mature coniferous)	359	403	+44
D-1/2 (deciduous)	13	56	+43
M-1/2 (mixed conifer/deciduous)	65	0	-65
W (Water)	178	178	0
Non-Fuel	7	17	+10
Total area	659		



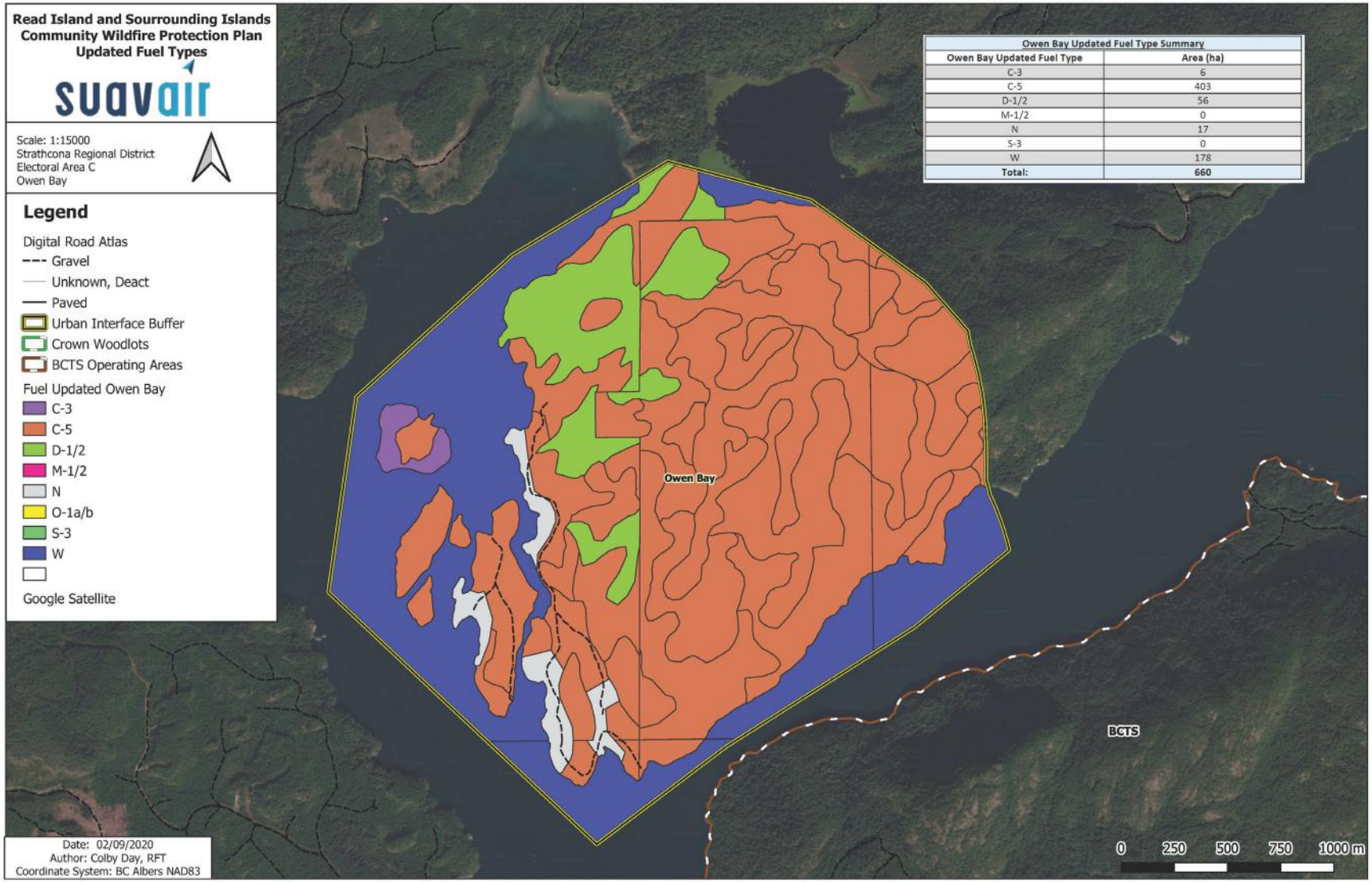
Map 14. Existing 2019 PSTA fuel types for the Read Island AOI.



Map 15. Updated fuel types for the Read Island AOI.



Map 16. Existing 2019 PSTA fuel types for the Owen Bay AOI.



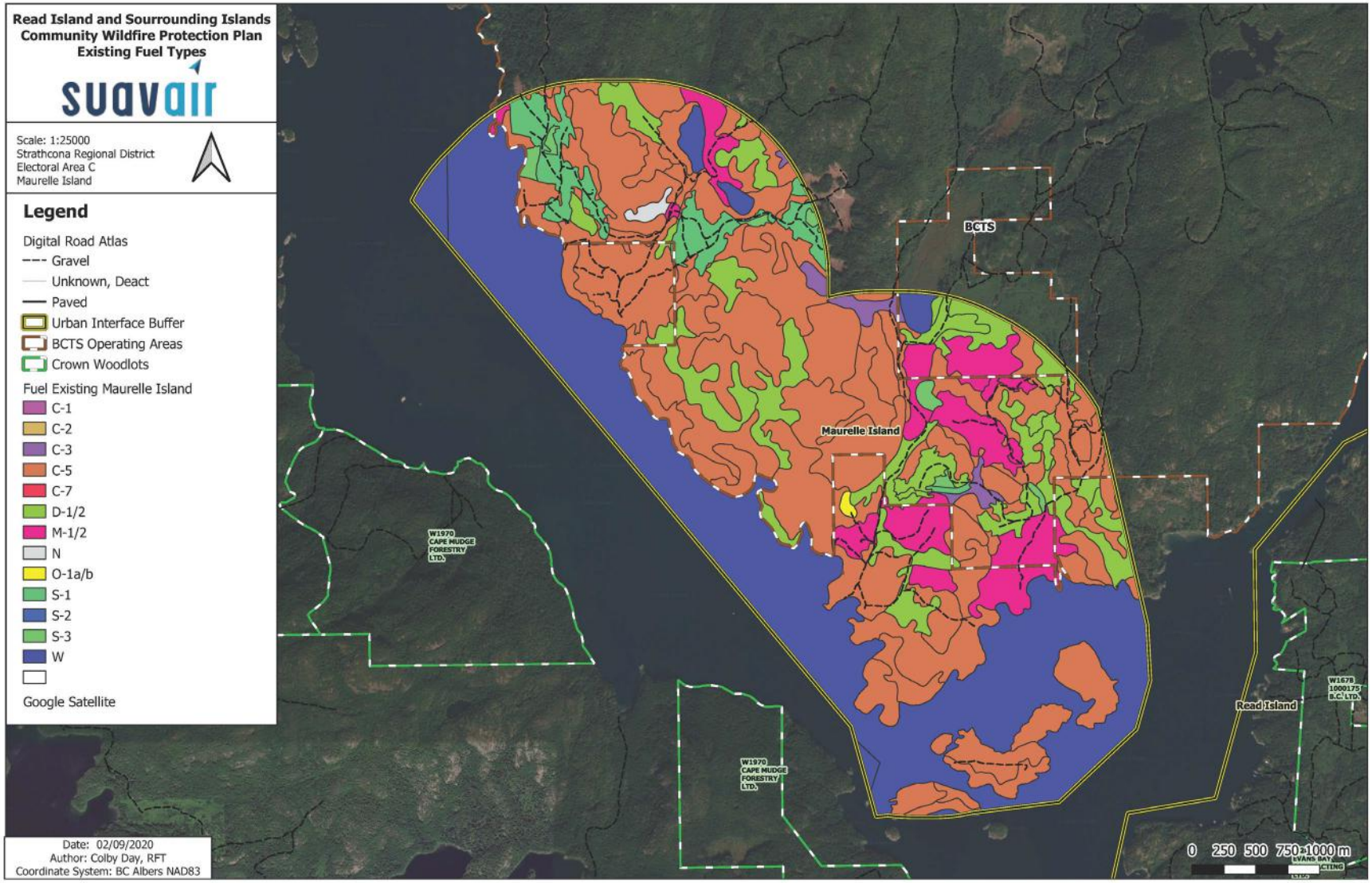
Map 17. Updated fuel types for the Owen Bay AOI.

Table 12. Maurelle Island fuel type area summary.

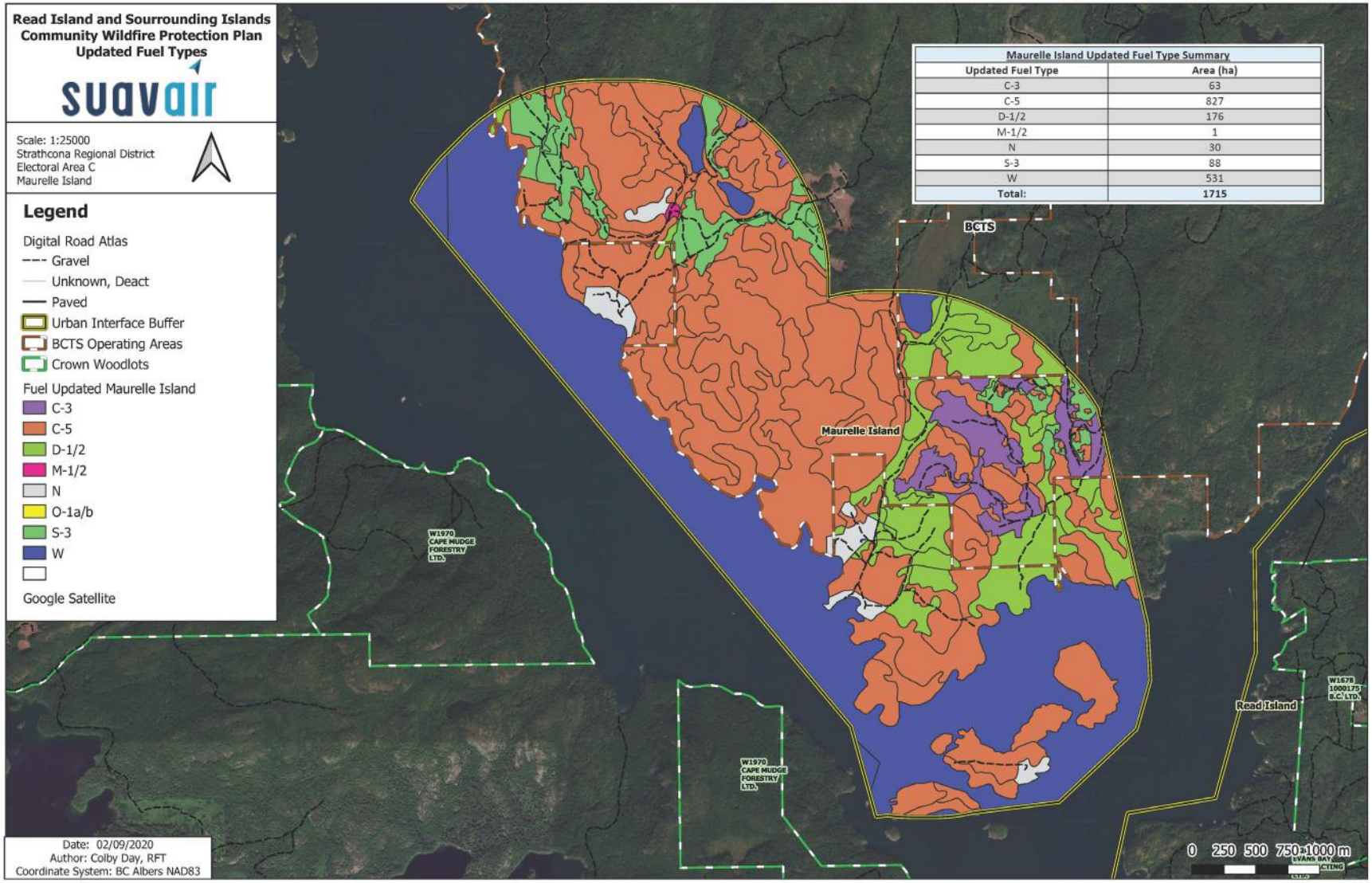
Fuel Type Class	2019 PSTA Original Area (ha)	2020 CWPP Updated Area (ha)	Net Change (ha)
C-3 (dense, pole sized coniferous)	16	63	+47
C-5 (mature coniferous)	765	827	+62
D-1/2 (deciduous)	189	176	-13
M-1/2 (mixed conifer/deciduous)	134	1	-133
O-1a/b (grass)	2	0	-2
S-1 (recent harvest)	62	0	-62
S-3 (recent harvest)	13	88	+75
W (Water)	530	531	+1
Non-Fuel	4	30	+26
Total area	1715		

Table 13. Rendezvous Island fuel type area summary.

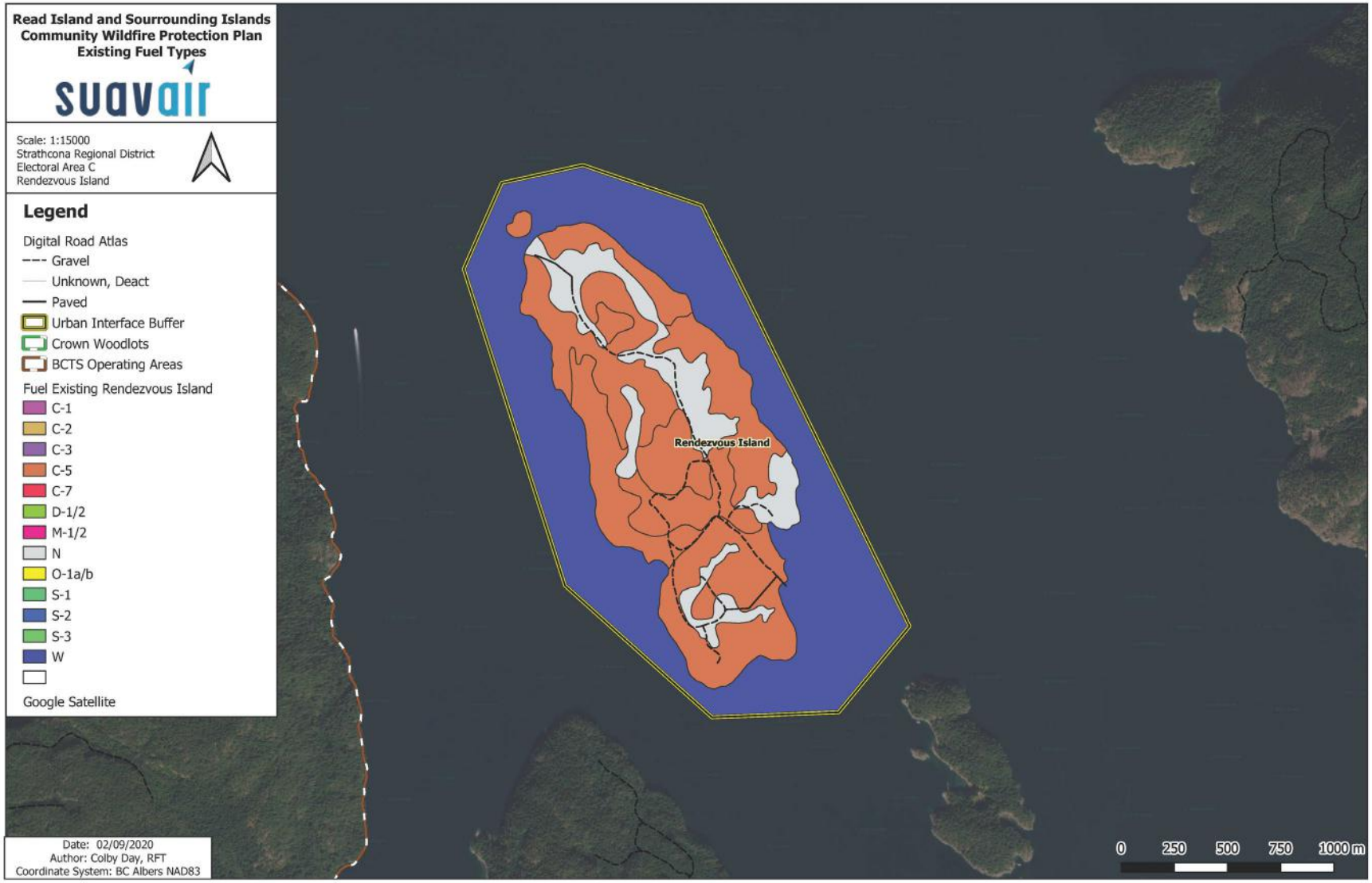
Fuel Type Class	2019 PSTA Original Area (ha)	2020 CWPP Updated Area (ha)	Net Change (ha)
C-5 (mature coniferous)	122	136	+14
W (Water)	168	167	-1
Non-Fuel	32	19	-13
Total area	322		



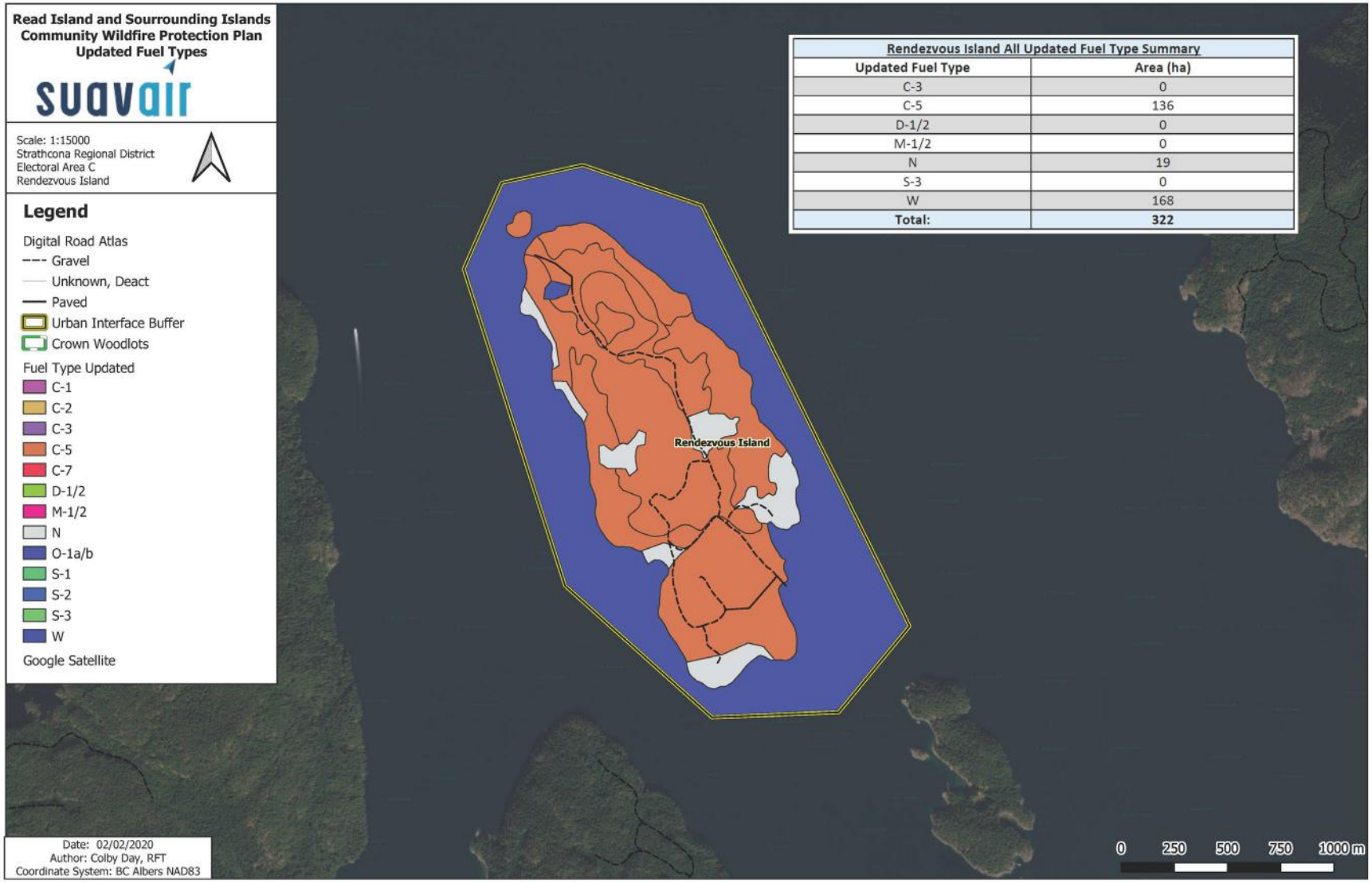
Map 18. Existing 2019 fuel types for the Maurelle Island AOI.



Map 19. Updated fuel types for the Maurelle Island AOI.



Map 20. Existing 2019 PSTA fuel types for the Rendezvous AOI.



Map 21. Updated fuel type for the Rendezvous 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 14: Proximity to the Interface

Proximity to the Interface	Descriptor*	Explanation
WUI 100	**(0-100 m)**	This Zone is always located adjacent to the value at risk. Treatment would modify the wildfire behaviour near or adjacent to the value. Treatment effectiveness would be increased when the value is FireSmart.
WUI 500	**(101-500m)**	Treatment would affect wildfire behaviour approaching a value, as well as the wildfire's ability to impact the value with short- to medium- range spotting; should also provide suppression opportunities near a value.
WUI 2000	**(501-2000 m)**	Treatment would be effective in limiting long - range spotting but short- range spotting may fall short of the value and cause a new ignition that could affect a value.
	>2000 m	This should form part of a landscape assessment and is generally not part of the zoning process. Treatment is relatively ineffective for threat mitigation to a value, unless used to form a part of a larger fuel break / treatment.

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

A1.3 Fire Spread Patterns

Wind speed, wind direction, and fine fuel moisture condition influences wildfire trajectory and rate of spread and is summarized in the Initial Spread Index (ISI) Rose from the local representative BCWS weather station – TS Maurelle. ISI is a rating based on wind speed and the fine fuel moisture code. A wildfire that occurs upwind of a value poses a much more significant threat to that value than a fire that occurs downwind. The TS Maurelle weather station recorded mainly south/southwest/northwest winds from 2010-2016 fire season months April – October. July and August tend to see afternoon outflow winds from the northwest.

Another source for wind data is the Canadian Wind Atlas (CWA). The CWA[53] models wind speeds and direction from large scale and long-term atmospheric data. CWA data for the AOI shows dominant winds from the northwest in the summer (June, July, August) months.

[53] Canadian Wind Atlas. http://www.windatlas.ca/maps-en.php

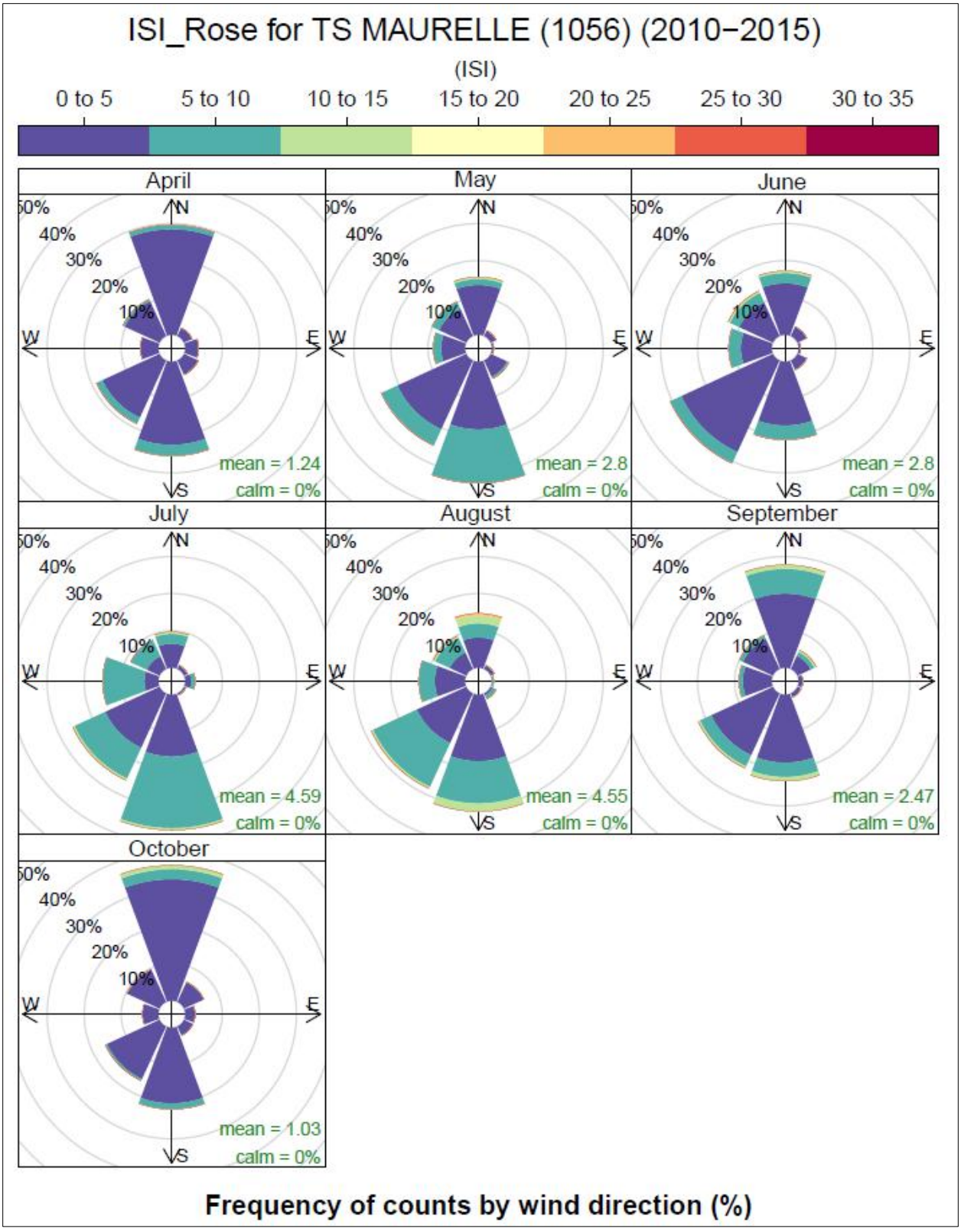


Figure 8. TS Maurelle initial spread index rose for fire season months April to October.

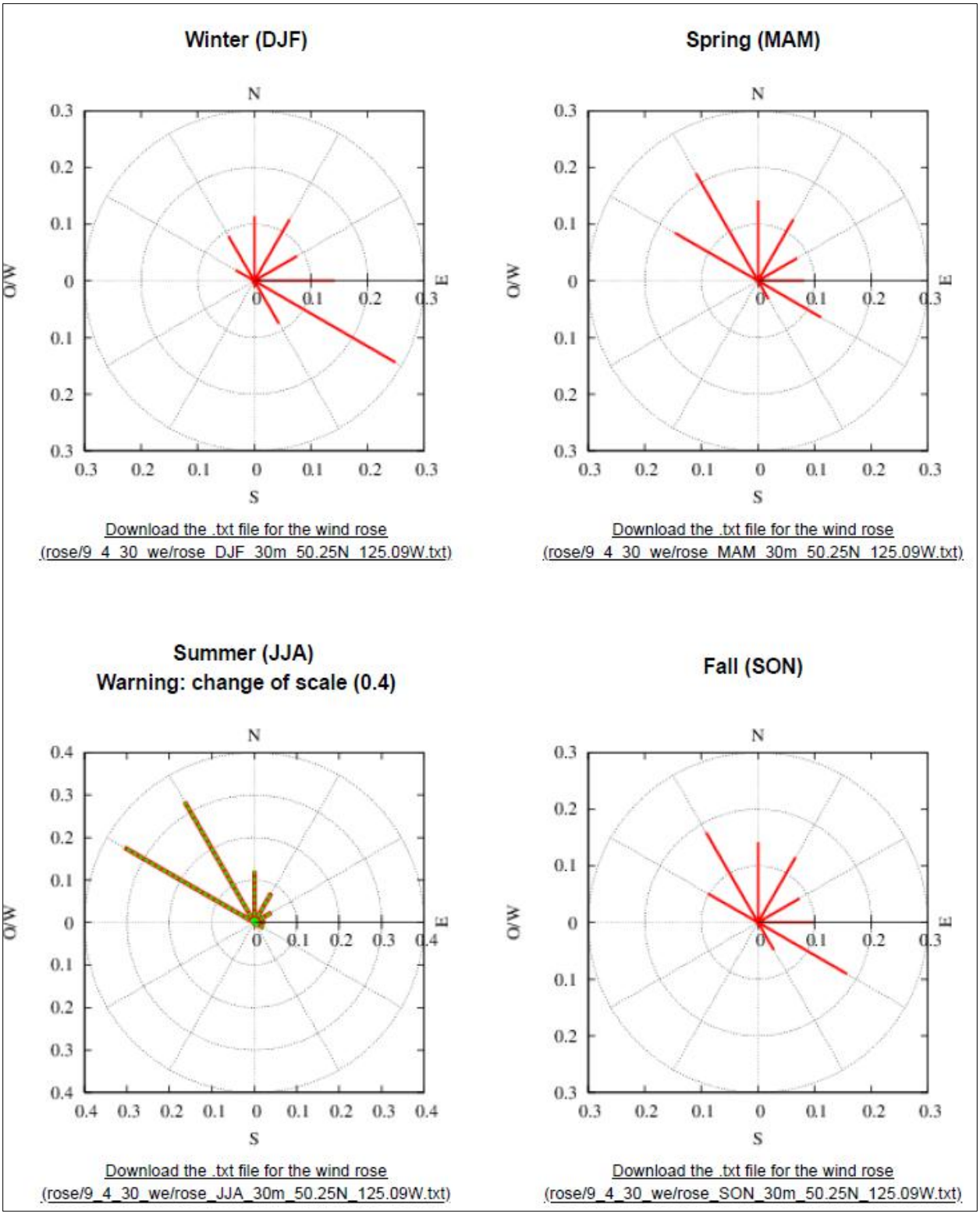


Figure 9. Canadian Wind Atlas wind rose for Surge Narrows.

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 15: Slope Percentage and Fire Behaviour Implications

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

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. General fire behaviour implications of slope position to the value are summarized in the following table:

Table 16: Slope Position of Value and Fire Behaviour Implications

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

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

A1.5 Local Wildfire Threat Classification

The process for determining local wildfire threat is described hereafter. 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 17: Example PSTA Inputs Cross Walk Table.

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

Table 18. 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, the local wildfire risk score was determined while considering the following factors:

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.

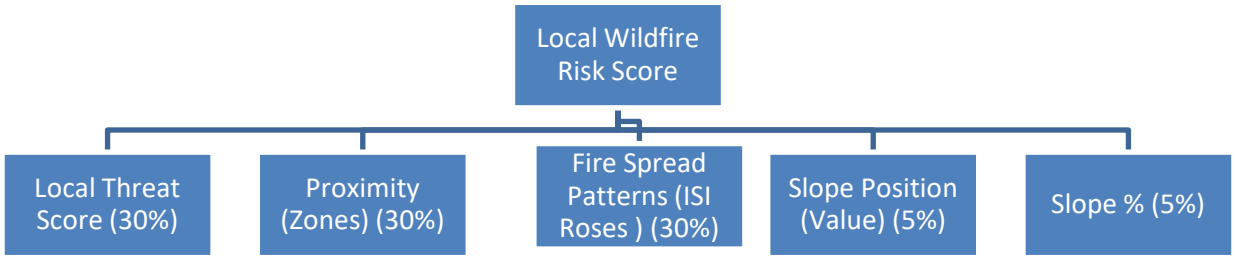


Figure 10: Local Wildfire Risk Inputs

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

Table 19: 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

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.

Table 20: 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+

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: FIRESMART PRACTICES AND ACTIVITIES

FOCUS AREA	EXAMPLE PRACTICES AND ACTIVITIES
1. EDUCATION	• Develop and/or promote local FireSmart educational activities and tools. Refer to BC FireSmart Resources for FireSmart materials that are currently available. • Develop and/or promote education for the reduction of human-caused fires • Encourage active participation in Wildfire Community Preparedness Day • Organize and host a community FireSmart day, FireSmart events and workshops, and wildfire season open houses • Apply for FireSmart Canada Community Recognition
2. PLANNING	• Develop or update a CWPP • Develop policies and practices for design and maintenance of FireSmart publicly owned land and First Nations land, such as parks and open spaces • Develop policies and practices for design and maintenance of FireSmart publicly owned buildings • Conduct site visits and FireSmart and/or risk assessments for publicly owned lands, First Nation lands and publicly owned buildings
3. DEVELOPMENT CONSIDERATIONS	• Amend Official Community Plans, Comprehensive Community Plans and/or land use, engineering, and public works bylaws to incorporate FireSmart policies • Revise landscaping requirements in zoning and development permit documents to require fire resistant landscaping • Establish Development Permit Areas for Wildfire Hazard in order to establish requirements for the exterior design and finish of buildings[54] • 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) • Amend referral processes for new developments to ensure multiple

[54] 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.

	departments, including the fire department and/or emergency management staff, are included
4. INTERAGENCY CO-OPERATION	• Develop and/or participate in regional or local FireSmart planning tables • Participate in multi-agency fire and/or fuel management tables
5. EMERGENCY PLANNING	• Develop and/or participate in cross-jurisdictional meetings and tabletop exercises, including seasonal readiness meetings • Review structural protection capacity (i.e. Fire safety assessments)
6. CROSS TRAINING	• Cross-train fire departments to include structural fire and interface wildfire training (e.g. S-100) • Provide or attend training for Local FireSmart Representatives and community champions • Support professional development to increase capacity for FireSmart activities

7. FIRESMART DEMONSTRATION PROJECTS	• Undertake FireSmart Demonstration Projects for publicly owned buildings or publicly and provincially owned critical infrastructure. This may include:
	  ○ Replacing building materials (i.e. siding or roofing) with fire-resistant materials
	  ○ Replacing landscaping with fire-resistant plants as outlined in the FireSmart Guide to Landscaping

8. FIRESMART ACTIVITIES FOR PRIVATE LAND	• Planning for private land (only with private property owners' consent)
	  ○ Develop FireSmart Community Plans for specific areas
	  ○ Conduct FireSmart home and property assessments
	• Offer local rebate programs to homeowners on private land and First Nations land that complete eligible FireSmart activities on their own properties
	• Provide off-site debris disposal for private landowners who have undertaken their own vegetation management, including:
	  ○ Provide a dumpster, chipper, or other collection method
	  ○ Waive tipping fees
	  ○ Provide curbside debris pick-up

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 here.
S-100A BASIC FIRE SUPPRESSION AND SAFETY ANNUAL RECURRENCY (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[55]
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	Exterior and Interior Structure Firefighter training	7-12 weeks, depending on the delivery format (full-	

[55] https://www2.gov.bc.ca/gov/content/safety/wildfire-status/employment-and-contracts/wildfire-training

(NFPA) 1001 LEVELS 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[56]
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[57]
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 here.
FIRESMART COMMUNITY CHAMPION WORKSHOP	Community members	2-4 hours, offered by Local FireSmart Representative	Local FireSmart Representatives can be found here.
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[58]
EMERGENCY SUPPORT	Community Volunteers	Online or In-Person	Justice Institute of BC[59]

[56] https://www2.gov.bc.ca/gov/content/safety/emergency-preparedness-response-recovery/fire-safety/wildland-urban-interface-fire-information

[57] FireSmart 101. https://firesmartcanada.ca/programs-and-education/firesmart-101/

[58] FNESS. Fire Protection Leadership Governance. https://www.fness.bc.ca/core-programs/fire-services

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[60]
ICS LEVEL 200	First responders, local government administration, community organizations involved in response	Online	JIBC[61]

[59] Justice Institute of BC (JIBC). Emergency Support Services. https://www.jibc.ca/sites/default/files/emd/images/JIBC-ESS-Slick_Web_Ready_20150623.pdf

[60] BC Hydro Community Safety Grants. https://www.bchydro.com/community/community-giving/grants.html#safety

[61] JIBC. Incident Command System. https://www.jibc.ca/course/incident-command-system-level-100

APPENDIX 4: SUPPLEMENTAL INFORMATION – WILDFIRE ACT AND WILDFIRE REGULATION

The purpose of this Appendix is help explain how existing wildfire regulations apply to forestry operations within the WUI and AOI's. While every effort has been made to ensure the accuracy of information, this Appendix is not legal advice. This intention of this Appendix is to provide guidance and answers to some frequently asked questions that arose during the CWPP process.

Forest harvesting has the potential to impact fire hazard by

1) accidental fire ignition during operations and
2) altering the forest fuel type and therefore the associated fire hazard.

The *Wildfire Act* (Act) and *Wildfire Regulation* (Regulation) address accidental fire ignition through restrictions of high-risk activities and requirements for readily available, on site fire tools and suppression systems. Fuel hazard is addressed by Fire Hazard Assessment and Abatement requirements.

What are "high-risk activities"? Defined in the legislation, this includes most forest operations activities including operating a power saw, operating metal tracked equipment, using tools that may create sparks, wood chipping, mechanical brushing, etc.

How are "high-risk activities" regulated? The Regulation restricts high-risk activities from March 1 to November 1 depending on the Fire Danger Rating. Fire Danger Rating is recorded through automated BCWS Weather Stations located throughout the province. The nearest weather station to the AOI's is located on Maurelle Island. The Regulation also requires a minimum number of firefighting hand tools and an adequate water suppression system to be on site.

How are post-harvest fire hazards regulated? The Act and Regulation require fire hazard assessments to be completed by anyone carrying out industrial activities on forest land or grass land, or within 1km of forest land or grass land.

How are post-harvest fire hazards assessed? The Act and Regulation require a person carrying out industrial activities on or within 1km of forest land or grass land to conduct fire hazard assessments at minimum 6-month intervals. Hazard assessments should be conducted by a registered professional forester. Hazard assessments must assess fuel hazards and the risk of a fire starting or spreading and must be made available to an official upon request. Identified hazards must be abated at minimum within 12 months of the assessment on private land, or within 30 months for Crown forest tenure holders.

What is "abatement"? Abatement means to reduce or lessen the fire hazard associated with a certain abatement area (i.e.: cut block). Abatement activities might include pile burning, dispersing, chipping, and dispersing, or chipping and hauling away materials until the materials remaining onsite are no longer deemed hazardous.

How much fuel is a hazard? Not all fuels require abatement and abatement guidance is provided by the BCWS. Fuel hazard varies by species, physical distribution, regional climate, topography, and aspect. Hazards should be abated when they are assessed to exceed the fuel hazard threshold for a given area. The threshold is based on risk mapping available through the BCWS.

What enforcement mechanisms are there? The Act gives authority to officials (i.e.: Natural Resource Officers, Wildfire Managers) to, by written order, order identified fire hazards to be abated.

What can I do if I am concerned about post-harvest hazards near my property? Start with engaging openly with the landowner or tenure holder. Seek professional advice from a registered professional forester or registered forest technologist. If required, leverage contacts within the BC Wildfire Service. The Act and Regulation are enforced by Natural Resource Officers. The public can identify and report a natural resource violation online.

Who is responsible for fire suppression? On Crown lands, the BC Wildfire Service is responsible for fire suppression. If a fire is started during active industrial operations, the person(s) carrying out the activities must work to extinguish the fire to the extent practicable or until they are relieved from continuing (i.e.: BCWS takes over).

Resources

BC Wildfire Act. http://www.bclaws.ca/civix/document/id/complete/statreg/04031_01

BC Wildfire Regulation.
http://www.bclaws.ca/EPLibraries/bclaws_new/document/ID/freeside/11_38_2005

Guidelines for Fire Suppression Systems.
http://www.bcforestsafe.org/files/files/Forms%20and%20Templates/Guidelines-fire-suppression-systems-hand-tools-July-16.pdf

Reporting Natural Resource Violations. https://www.for.gov.bc.ca/hen/nrv/report.htm.

APPENDIX 5: WILDFIRE THREAT ASSESSMENT – FUEL TYPE CHANGE RATIONALE

Provided in a separate PDF document.