



REGIONAL
DISTRICT
OF NANAIMO

Community Wildfire Resiliency Plan

Electoral Area B in the RDN

May 2022

Prepared for Regional District of Nanaimo
by Diamond Head Consulting

Community Wildfire Resiliency Plan for Electoral Area B in the Regional District of Nanaimo

May 2022

Submitted to:

Catherine Morrison
Manager, Emergency Services
RDN
6300 Hammond Bay Road
Nanaimo BC

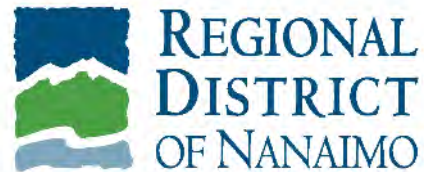
Phone: 250-390-4111

Submitted by:

Diamond Head Consulting Ltd.
3559 Commercial Street
Vancouver BC

Phone: 604-733-4886

Website: diamondheadconsulting.com



Professional Seal and Signatures



Matthew Shields, R.P.F.
Date signed: April 11, 2022

I certify that the work described herein fulfills the standards expected of a registrant of the Association of British Columbia Forest Professionals and that I did personally supervise the work.



Conor Corbett, R.P.F.
Date signed: April 11, 2022

I certify that I have reviewed this document and, while I did not personally supervise the work described, I have determined that this work has been completed to the standards expected of a registrant of the Association of British Columbia Forest Professionals.

Contents

TABLES AND FIGURES	VI
ACKNOWLEDGEMENTS	VIII
FREQUENTLY USED ACRONYMS	IX
EXECUTIVE SUMMARY	X
INTRODUCTION	1
Overview	1
Plan Goals	4
Plan Development Summary	5
RELATIONSHIP TO OTHER PLANS	6
Linkages to Existing Community Wildfire Plans	6
Linkages to Other Plans	7
COMMUNITY DESCRIPTION	10
Area of Interest	10
Wildland-urban Interface	10
Community Information	13
Values at Risk	20
Critical Infrastructure	29
WILDFIRE RISK ASSESSMENT.....	35
Wildfire Environment	35
Provincial Strategic Threat Analysis	52
Wildfire Threat Assessment	54
Hazard, Risk, and Vulnerability Assessment.....	58
INTRODUCTION TO FIRESMART	59
FireSmart – How it Works	60
FireSmart – Goals and Objectives	63
Key Aspects of FireSmart for Local Government.....	63
EDUCATION	67
Factors for Success	68
Initiatives to Consider.....	72
LEGISLATION AND PLANNING	79
Federal Acts and the Community Wildfire Resiliency Plan	79
Provincial Acts and the Community Wildfire Resiliency Plan	79
Role of the RDN	80
Factors for Success	80
Initiatives to Consider.....	81
DEVELOPMENT CONSIDERATIONS	84
Role of the Regional District of Nanaimo	84
Subdivision Bylaws	85
Development Information, Development Permits, and the Official Community Plan.....	86

INTERAGENCY COOPERATION..... 88

 Factors for Success 88

 Initiatives to Consider..... 90

CROSS-TRAINING 93

 Factors for Success 93

 Initiatives to Consider..... 95

EMERGENCY PLANNING..... 97

 Factors for Success 98

 Initiatives to Consider..... 99

VEGETATION MANAGEMENT..... 101

 Managing Vegetation through FireSmart..... 101

 Fuel Management for Forest Landscapes 103

ACTION PLAN & IMPLEMENTATION 111

APPENDICES..... 118

 Appendix A: Glossary of Terms 118

 Appendix B: Public Engagement..... 119

 Appendix C: Local Wildfire Threat and Risk Process 123

 Appendix D: CRI Map Submissions 133

List of Tables and Figures

Figure 1. Visual comparison of "interface" and "intermix" conditions.....	11
Figure 2. Area of interest for the plan and WUI.	12
Figure 3. Fire Protection District for the Gabriola Volunteer Fire Department.....	18
Figure 4. Structure density within the project area.....	22
Figure 5. Protected areas and known locations of protected species or habitat.....	26
Figure 6. Public facilities considered critical infrastructure.....	34
Figure 7. Fuel types in the area of interest.	39
Figure 8. 30-year modelled climate averages for Gabriola Island (meteoblue).	40
Figure 9. Wind rose diagram for Gabriola Island	42
Figure 10. Windspeeds by month experienced for Gabriola Island.....	43
Figure 11. Potential impacts of climate change on wildfire behaviour.	46
Figure 12. Wildfire threat ratings from Provincial Strategic Threat Analysis (PSTA)	53
Figure 13. Wildfire threat and risk resulting from the local threat assessment.	55
Figure 14. Pathways to home ignition in the WUI.....	60
Figure 15. The FireSmart zone system.....	62
Figure 16. Comparison of surface and crown fire behaviour.	106
Figure 17. Map of potential fuel management areas in EA B.....	108
Figure 18. Characteristics of the five most-common conifer fuel types in BC.....	124
Table 1. Goals of the Community Wildfire Resiliency Plan.....	4
Table 2. Linkages to existing community wildfire plans.	6
Table 3. Relationship of Community Wildfire Resiliency Plan to local government plans.	7
Table 4. Community Information for EA B.....	14
Table 5. Major resources of the Gabriola Volunteer Fire Department and unofficial fire brigades.	19
Table 6. Species and ecological communities with designated provincial conservation status.....	24
Table 7. Public facilities and buildings within EA B.....	30
Table 8. Summary of fuel types within EA B.	38
Table 9. 20-year average weather (2000-2020), from BCWS Cedar (59).	44
Table 10. Climate maximums and minimums.....	47
Table 11. Large fires (>10 ha), 1920-2020.	50
Table 12. Historical fires by community since 1950.	50
Table 13. Summary of wildfire threat from Provincial Strategic Threat Analysis.....	52
Table 14. Summary of wildfire threat and risk from the local threat assessment.	54
Table 15. FireSmart activities eligible for Community Resiliency Investment (CRI) program funding (2022).....	63
Table 16. Potential Roles of the FireSmart Coordinator.....	66
Table 17. Potential key messages for a wildfire communications strategy.....	71
Table 18. Potential sub-areas for FireSmart planning and neighbourhood initiatives.....	76
Table 19. Sample Guide to Wildfire Response Condition Level.....	98
Table 20. Areas with the highest potential for fuel management in EA B.....	109
Table 21. Action Plan.	112
Table 22. Sample tracking and reporting tool.	117

Table 23. Slope percentage and fire behaviour implications. 130
 Table 24. Slope position of value and fire behaviour implications. 130
 Table 25. Proximity to the Interface 131

List of Photos

Photo 1. Home in the Wildland Urban Interface. 2
 Photo 2. Fire hall in southern Gabriola Island. 16
 Photo 3. Mudge Island on left, Gabriola Island on right. 17
 Photo 4. Smoke can reduce air quality and cause health problems. 21
 Photo 5. The BC Ferry terminal is the main public access to Gabriola Island. 32
 Photo 6. Forest fuel layers. 36
 Photo 7. A wildfire with active crown fire. 37
 Photo 8. The Salish Sea plays a key role in determining the weather experienced in EA B. 41
 Photo 9. Wildfires in southern Vancouver Island are increasing in intensity and frequency. 49
 Photo 10. Education is a key part of developing a FireSmart community. 68
 Photo 11. Example of existing informational signage from Gabriola Fire Department. 70
 Photo 12. Example of properties within a wildfire DPA. 87
 Photo 13. Example of a forest before fuel management. 104
 Photo 14. In the same area as above, post fuel treatment. 104
 Photo 15. Example of a stand classified as C-3 fuel type. 125
 Photo 16. Example of a stand classified as C-5 fuel type. 125
 Photo 17. Example of a stand classified as M-2 fuel type 126
 Photo 18. Example of a stand classified as D-1/2 fuel type 127
 Photo 19. O-1a/b fuels in the foreground. Note the contrast with irrigated, maintained grass in the rear.
 128

Acknowledgements

The Regional District of Nanaimo (RDN) respectfully acknowledges the traditional territories of the Snuneymuxw and other Coast Salish Nations where this project has taken place.

The RDN would like to thank all those who have contributed to this Community Wildfire Resiliency Plan by providing guidance, direction, and feedback. Kaitlin Fader (Emergency Planning Coordinator) served as the RDN project manager and worked closely with the project consulting team of:

- Diamond Head Consulting Ltd
 - Matthew Shields, RPF
 - Conor Corbett, RPF
 - Michael Coulthard, RPBio, RPF
 - Marco Sanelli, GIS Analyst
- Geographica Group
 - Nick Zukanovic, GISP
- RDN Emergency Services
 - Catherine Morrison, Manager, Emergency Services
 - Kaitlin Fader, Emergency Planning Coordinator

This document would not have been possible without the contributions and support of staff and representatives from the following organizations:

- RDN Parks Services
- RDN Planning Department
- RDN Information Technology & GIS
- RDN Solid Waste
- RDN Engineering Services
- RDN Water and Wastewater Services
- RDN Board of Directors
- Gabriola Volunteer Fire Department
- Mudge Island Citizens Society
- DeCourcy Island Community Association

Additionally, we want to thank all community members of Electoral Area B for sharing suggestions, information, and questions with us during the planning process.

We would also like to thank staff from the British Columbia Wildfire Service who provided guidance and review:

- Tony Botica – Wildfire Prevention Officer – Coastal Fire Centre
- Dana Hicks – Wildfire Prevention Specialist – Wildfire Threat

Finally, we would like to thank the Community Resiliency Investment Program (CRI) and the Union of British Columbia Municipalities (UBCM), whose support was critical to the funding and completion of this project.

Frequently Used Acronyms

AOI	Area of Interest
BC	British Columbia
BCWS	British Columbia Wildfire Service
CCFDRS	Canadian Forest Fire Danger Rating System
CFBPS	Canadian Fire Behaviour Prediction System
CFS	Community Funding and Supports
CRI	Community Resiliency Investment
CWPP	Community Wildfire Protection Plan
CWRP	Community Wildfire Resiliency Plan
DICA	DeCourcy Island Community Association
DP	Development Permit
DPA	Development Permit Area
EMBC	Emergency Management British Columbia
EMP	Emergency Management Plan
FCFS	FireSmart Community Funding and Supports
FRPA	Forest & Range Practices Act
GIS	Geographic Information Systems
GVFD	Gabriola Volunteer Fire Department
HRVA	Hazard, Risk, and Vulnerability Analysis
LRMP	Land and Resource Management Plan
MICS	Mudge Island Citizens' Society
MOE	Ministry of Environment
MFLNRORD	Ministry of Forests, Lands, Natural Resource Operations and Rural Development
OCP	Official Community Plan
PSTA	Provincial Strategic Threat Assessment
RDN	Regional District of Nanaimo
SWPI	Strategic Wildfire Prevention Initiative
UBCM	Union of British Columbia Municipalities
WRR	Wildfire Risk Reduction
WUI	Wildland-urban interface

Executive Summary

The Regional District of Nanaimo (RDN) prepared this Community Wildfire Resiliency Plan for Electoral Area B (EA B), including the communities of Gabriola, Mudge, and DeCourcy Islands. This plan examines wildfire risk in the wildland-urban interface (WUI) of these communities and makes recommendations for the RDN to help build towards FireSmart communities on the islands.

The type of development and extensive forested areas that characterize EA B also contribute to its vulnerability to wildfire. Islanders live in an area called the wildland-urban interface (WUI), where forests intersect with homes and businesses. Additionally, the dominant pattern of development in the community places homes intimately among natural forest vegetation, a form of development called “intermix”. The geography of small islands surrounded by inlets, bays, and marine passages restricts most locations to only one or two points of access to the rest of the community. EA B is isolated from the rest of the RDN and relies on marine transportation to service daily needs and, if necessary, evacuation. Much of the infrastructure critical to the functioning of these communities, including water wells and electrical utilities, fire stations, communications, and community buildings, is located within the WUI.

In the WUI, consultants conducted wildfire risk assessments on public land, examining structures and the characteristics of forest vegetation. These assessments and data from the Provincial Strategic Threat Analysis were used to map the wildfire risk in relation to known values throughout the WUI. The analysis shows that much of the public land base is characterized by a moderate wildfire risk, with some areas of high risk. Development in these areas has placed buildings and infrastructure near forests that can sustain fires with moderate to high wildfire behaviour. Wildfire risk on private land was not modelled; however moderate to high risk is likely characteristic of most of EA B due to the fuel types found throughout the community. Risk on private land cannot be modelled under the funding terms for this project.

There are proactive measures that can be taken to reduce wildfire risk through education to increase public awareness, improve FireSmart programming for residents and RDN operations, emergency planning and interagency cooperation, and fuel management on public lands. The management of interface areas that are on private land is generally beyond the jurisdiction of local government. Public education and awareness of wildfire risk and options for mitigation and preparedness is a critical component of this Community Wildfire Resiliency Plan. The FireSmart program and its resources are the foundation for raising public awareness in EA B. Adapting this guidance to local circumstances is the overarching task of initiatives proposed in the Action Plan included in this document.

This Community Wildfire Resiliency Plan has been developed to acknowledge existing wildfire risk in the community. Risk has likely increased with climate change and will continue to do so, making the cyclical and repeat nature of community wildfire planning both necessary and apparent. Recommendations in the Action Plan are framed with suggested priorities and implementation timeframes. The project partners recognize this Plan as a fundamental first step towards improving the resilience of the communities to the impacts of wildfires.

Introduction

Overview

To be resilient means to recover from difficulty. In the landscape of Electoral Area B (EA B), wildfire is an inevitable event that can cause great difficulties for people and communities. Emergency preparedness, wildfire response, vegetation management, community planning, and personal readiness are all important elements of building resiliency to wildfire. Being resilient doesn't mean that wildfire will never mark EA B; instead, it means that communities will emerge from a wildfire disaster in EA B intact and recognizable.

This Community Wildfire Resiliency Plan (CWRP) examines wildfire risk in EA B and makes recommendations for managing that risk in support of building resiliency to wildfire. The purpose of the plan is to propose pathways toward a FireSmart future for EA B, focusing on actions that are within the Regional District of Nanaimo's (RDN) authority and capacity. Wildfire resiliency is not a single destination with a defined roadmap. Although the recommendations made by the plan can each improve wildfire resiliency; many involve multiple values or long timeframes which deserve further consideration.

This plan is the result of a partnership between provincial and local governments that has allowed communities to access funding for community wildfire prevention since 2004. Funding for this plan was provided through the **Community Resiliency Investment Program**. The Community Wildfire Resiliency Plan assesses risk within the **wildland-urban interface (WUI)**, an area of land where natural vegetation and urban development are in proximity to one another. The WUI is where wildfire can travel from wildland vegetation into EA B and is where there is the highest concern for potential wildfire activity. To create the Community Wildfire Resiliency Plan, professional foresters visited public lands in the WUI to create accurate maps of wildfire risk. Although wildfire risk is not assessed for private land, the recommendations of the Community Wildfire Resiliency Plan are a resource for all residents of Electoral Area B.

The **Community Resiliency Investment Program** is a program funded by the government of British Columbia to reduce the risk of wildfires and mitigate their impacts on BC communities.

Wildland-urban interface is the area around communities where development is among or abuts forest, and consequently where development faces greater wildfire risk.

Recommendations follow the seven disciplines of FireSmart, the national program for community wildfire preparedness. The plan is shaped by community input from first responders, residents, and RDN or other local government staff. Read this plan to understand wildfire risk in your community, and what actions the RDN can take to support wildfire preparedness and prevention.



Photo 1. Home in the Wildland Urban Interface.

The first three sections of the plan following this introduction consider the context of EA B and present the findings of the wildfire risk assessment. The communities' planning context and background for the creation of the CWRP is presented in [Relationship to Other Plans](#) (p.6) A description of the community, including more detail on how the WUI is defined as well as a brief discussion of socioeconomic and environmental features within the plan area is contained in [Community Description](#) (p.10). The results of wildfire threat assessments and local wildfire risk mapping are presented in [Wildfire Risk Assessment](#) (p.35) This section also contains information on the historic fire regime and climate change factors that may influence future wildfire risk.

The fourth section bridges risk assessment findings and the seven FireSmart disciplines, providing an [Introduction to FireSmart](#) (p.59) for readers who may not be familiar with FireSmart programming and concepts. This section also contains advice for the RDN on how to organize FireSmart programming and initiatives under the role of a regional FireSmart Coordinator.

The next seven sections identify community resources and needs in each of the seven FireSmart Disciplines:

- [Education](#) (p.67). This section examines how the RDN can improve or enhance outreach with residents or communities to increase awareness of wildfire risk and support for wildfire management.
- [Legislation and Planning](#) (p.79). This section addresses the major pieces of law and policy that are relevant to wildfire management and discusses how they could be amended or expanded to support wildfire prevention and preparedness.
- [Development Considerations](#) (p.84). This section looks at the regulation of development by municipal bylaws. Influencing development patterns is a useful way to shape FireSmart communities for the long term. In EA B, these functions are performed by the Islands Trust.
- [Interagency Cooperation](#) (p.88). Making recommendations for the ongoing effort to engage multiple stakeholders and partner institutions is the focus of this section.
- [Cross-Training](#) (p.93). This section concerns opportunities and challenges in ensuring more wildfire training for relevant emergency response personnel and neighbourhood FireSmart representatives.
- [Emergency Planning](#) (p.97). This section considers how parallel emergency planning processes and procedures can incorporate wildfire risk and reflect wildfire preparedness.
- [Vegetation Management](#) (p. 101). This section discusses the costs and benefits of fuel management at the site, neighbourhood, and landscape-scale to reduce wildfire risk. Opportunities of high priority for FireSmart landscaping treatments are identified for critical infrastructure and neighbourhoods, or for the development of a fuel management prescription by a Registered Professional Forester.

These sections are followed by the [Action Plan & Implementation](#) (p.111), which provides notes about potential actions discussed in the preceding sections and prioritizes recommendations for implementation. Partnerships between the RDN and other agencies or groups are noted. The Action Plan is a quick start guide to improving wildfire resiliency in EA B. 30 recommendations to improve wildfire resiliency in the community are provided, organized by the appropriate FireSmart discipline and suggested priority.

[Appendices](#) (p.118) to the plan provide additional details, including a glossary of terms and a description of the technical process to model wildfire threat and risk.

Plan Goals

Wildfire is a feature of the landscape in EA B. Nestled within heavily forested islands, homes and communities are vulnerable to fire whether it is caused by nature or by human ignitions. The goals of the Community Wildfire Resiliency Plan respond to this reality in several ways and set an agenda that influences each following section of the plan. They represent *what the plan sets out to do*. Table 1 sets out the goals of the Community Wildfire Resiliency Plan.

Table 1. Goals of the Community Wildfire Resiliency Plan

Goals	
Public Health and Safety	Public safety is enhanced through all activities to prevent, prepare for, or manage wildfire.
Protection of infrastructure	Community infrastructure, including private property, public structures, and facilities, are protected from wildfire.
Interagency Co-operation and Policy	Wildfire management planning, preparedness, prevention, suppression, and education occurs in cooperation with all relevant agencies and neighbouring local governments and First Nations.
Public Awareness, Education and Advocacy	Public understanding, support and awareness of wildfire risk management is increased through effective education, advocacy, and communication.
Sustainable Planning	Growth and development planning considers wildfire risk and mitigation as best practices.
Environmental Protection and Enhancement	Ecosystems that support biodiversity and environmentally sensitive features are protected and enhanced by wildfire management activities.
Adaptive Management	The effectiveness of wildfire management initiatives is monitored and continuously improved by reviewing actions and decision-making processes.
Financial Responsibility	Wildfire resiliency initiatives are pursued within sustainable budgets. Where appropriate, the RDN will seek external partnerships to expand funding available for wildfire resiliency initiatives.

Plan Objectives

The following objectives provide context on *how the plan will achieve its goals*. The primary objectives are to:

- Provide an updated understanding of wildfire risk within the WUI based on the provincial data available and site assessments.
- Identify high and extreme risk areas where the RDN should prioritize action to reduce wildfire risk and/or protect homes and infrastructure.
- Examine opportunities to adjust RDN bylaws, policies, or planning protocol to support improved wildfire preparedness and prevention.
- Help build capacity in fire suppression and response through identifying potential supports for local fire departments.
- Engage community members with information on wildfire risk management and respond to community concerns.
- Consider where partnerships with residents, communities, organizations, or other governments may be needed to improve wildfire preparedness and/or address wildfire hazard.

Plan Development Summary

This Community Wildfire Resiliency plan is one in a series of seven, one for each electoral area, funded by the 2021 Union of British Columbia Municipalities Community Resiliency Investment Program Grant. The previous community wildfire plan for EA B was prepared over ten years ago and covered only Gabriola Island. The RDN issued a request for proposals in the spring of 2021 for the development of a new plan meeting the Province's updated standards. The contract for preparing the plan was awarded to Diamond Head Consulting Ltd. in April 2021. Field assessments took place in the summer of 2021, along with meetings with local fire response personnel and community stakeholders. Public information sessions were held on August 26th and October 24th, 2021, and incorporated question and answer sessions during which members of the project team responded to public concerns. These meetings were held online, to adapt programming during the COVID-19 pandemic. During the plan development phase, the RDN's Get Involved page for the project encouraged visitors to submit questions for the project team or explore additional resources about wildfire preparedness. A draft plan was submitted for review by community stakeholders in December 2021. With revisions from the community, the final plan is submitted for consideration by the RDN Board.

Relationship to Other Plans

The Community Wildfire Resiliency Plan is a strategic document that informs the Regional District of Nanaimo's (RDN) priorities for emergency services, operations, and community planning. The plan recommendations are not mandates, but suggestions that can be worked into the RDN's policies, programs, and activities. Implementation of the plan depends on changes to informal procedures, stated policy, new planning processes, and in some cases amendments to local government bylaws. The RDN's plans for government operations, emergency management and evacuation, corporate strategies, climate action, parks and urban forestry are all relevant to this plan. Electoral Area B (EA B) is unique in the RDN because of the role of The Islands Trust, which is a separate local government body with authority over community development planning and land use within the Gulf Islands. The plans of other governments, such as provincial or indigenous resource management plans, may also be of relevance to aspects of wildfire management.

Linkages to Existing Community Wildfire Plans

A Community Wildfire Protection Plan was prepared for Gabriola Island in 2008. Mudge and DeCourcy, along with other outlying islands, were not included in this plan, which was prepared under the stewardship of the Gabriola Volunteer Fire Department. Due to the isolated island location of EA B, nearby community wildfire plans are of limited informational value.

Table 2. Linkages to existing community wildfire plans.

Plan	Description	Relationship to CWRP
Community Wildfire Protection Plan – Gabriola Fire Protection Improvement District (2008)	This is the community wildfire plan currently in place for Gabriola Island. The plan established noted that large areas of the island were characterized by high and extreme fire risk and proposed improved fuel management, fire response capacity, planning tools, and public education to address high risk. Following the plan, the Gabriola Volunteer Fire Department initiated several FireSmart programs within the community, including education and yard clean up days. The plan did not consider outlying islands, including Mudge and DeCourcy, because these areas are not within the service area of the Gabriola Volunteer Fire Department.	The plan provides context for the present CWRP and informs recommendations for emergency response and community outreach. This plan may remain relevant for actions/goals internal to the Gabriola Volunteer Fire Department or specific to Gabriola Island.
Community Wildfire Protection Plan – City of Nanaimo (2016)	The City of Nanaimo borders EA B across the Northumberland and Stuart Channels and is separated from Mudge Island by less than 100 m at Dodd Narrows. The plan indicated the areas of the city closest to EA B are characterized by moderate potential wildfire behaviour.	The plan provides limited informational value on wildfire risk and hazard in nearby areas.
Community Wildfire Protection Plan – North Cedar Improvement District (2008)	EA B shares a marine border with Electoral Area A (North Cedar and area) south of the Dodd Narrows. The plan found areas of high and extreme wildfire threat near the coastline of Electoral Area A, suggesting potential wildfire behaviour in this zone. However, the informational value of the plan is limited by its age and the distance over water between the two electoral areas.	The plan provides limited informational value on nearby areas.

Linkages to Other Plans

EA B has a unique form of local government wherein the RDN, Islands Trust and the Gabriola Island Fire Protection Improvement District have discrete authority.

Table 3. Relationship of Community Wildfire Resiliency Plan to local government plans.

Plan	Description	Relationship to CWRP
DeCourcy Island Official Community Plan	This plan is prepared by the Islands Trust and provides goals and policies to regulate land use and development in the DeCourcy Planning Area and is supported by an enacting bylaw.	Several policies potentially impact wildfire management and risk, including policies for forest retention, park use and acquisition, and land subdivision.
Mudge Island Official Community Plan	This plan is prepared by the Islands Trust and provides goals and policies to regulate land use and development in the Mudge Planning Area and is supported by an enacting bylaw. The plan also provides additional community information regarding vegetation, access, and emergency response.	Several policies potentially impact wildfire management and risk. Policies 18 and 19 and Advocacy Policies 15-17 address fire hazard.
Gabriola Island Official Community Plan	This plan is prepared by the Islands Trust and provides goals and policies to regulate land use and development on Gabriola Planning Area and is supported by an enacting bylaw. As the largest of the three planning areas within EA B, Gabriola’s Official Community Plan contains more policies than the comparable plans for Mudge and DeCourcy. Section 9 establishes Development Permit Areas (DPA) that influence land subdivision and vegetation management.	Several policies potentially impact wildfire management and risk, including policies for land subdivision and waste disposal. The OCP does not contain a DPA for wildfire hazard.
Emergency Management Plan	The RDN has maintained a region-wide emergency plan since 1995. The plan is updated periodically and considers the organization and hierarchy within the RDN during an emergency event, as well as the setup of the Emergency Operations Centre. The related Hazard, Risk, and Vulnerability Analysis initiative established wildfire as an event of high likelihood and consequence in the RDN. The Emergency Management Plan identifies strategic wildfire response goals and objectives.	The Emergency Plan identifies processes and procedures the RDN will follow to secure infrastructure and provide emergency services to residents during a wildfire. The CWRP can inform emergency planning about wildfire risk, helping the RDN to make resource allocation and response decisions.

<p>RDN Hazard, Risk, and Vulnerability Analysis</p>	<p>The Hazard, Risk, and Vulnerability Analysis (HRVA) is a document prepared by the RDN to contextualize the likelihood and consequence of a variety of different emergency scenarios, including earthquake, flooding, and wildfire. The HRVA for the RDN indicates wildfire is an event of high likelihood and consequence in the region – ranking wildfire as the primary risk among several other potential natural disasters. This rating reflects the extent of the forest interface in the community and the frequency of fire ignitions.</p>	<p>The HRVA established wildfire as a high-risk event within the RDN and supports the Wildfire Resiliency Initiative. The CWRP responds to the HRVA by providing more detail on the nature of wildfire risk in the community and potential actions to manage risk.</p>
<p>Parks & Trails Strategy</p>	<p>The RDN is currently renewing its Parks & Trails Strategy, which provides a vision for Regional parks and trails. The strategy identifies priorities for land acquisition and park and trail improvements.</p>	<p>Parks management is important for community wildfire planning because of its connections to vegetation management and ignitions caused by recreational activities.</p>
<p>707 Community Park Management Plan</p>	<p>This plan addresses the proposed use, management, and recreational value of the 707 Community Park at the centre of Gabriola Island. The plan includes provisions relevant to wildfire prevention and response, including the installation of the park’s current signposted wayfinding system and fuel management (in development at the time of writing). The plan also describes ecological goals that any vegetation management program should consider.</p>	<p>The 707 Community Park Management Plan contains important guidance for ongoing or future wildfire resiliency initiatives focused on the park. The park is the largest contiguous area of forest land owned by the RDN within EA B.</p>
<p>Strategic Plan 2019-2022</p>	<p>The RDN’s corporate strategic plan is updated every three years and is the highest-level planning document for the Board of Directors. The Strategic Plan sets a vision for the RDN and identifies key actions for local government regarding the RDN land base and authorities.</p>	<p>The CWRP will reflect core principles of local government established in the Strategic Plan. In the future, wildfire resiliency can inform provisions for social well-being, environmental stewardship, and climate change within the Strategic Plan.</p>

In addition to local government plans, higher government land use plans can apply to all or specific portions of EA B. The Vancouver Island Summary Land Use Plan does not include EA B. Besides provincial land use planning, orders and notices established through the *Land Act*, *Forest and Range Practices Act*, *Oil and Gas Activities Act*, *Environment and Land Use Act*, and *Wildlife Act* can also influence the priorities and recommendations of the Community Wildfire Resiliency Plan due to constraints they may

place on the crown land base. The British Columbia Wildfire Service may also create landscape-level “tactical fuel management plans” or risk management plans for specific provincial landscape units. No such plans are currently in place for EA B.

Community Description

Area of Interest

The Area of Interest defines the community boundaries for the Community Wildfire Resiliency Plan. The Area of Interest represents how the Regional District of Nanaimo (RDN) is organized around its communities and where recommendations from the plan may apply. For this plan, the Area of Interest is Electoral Area B (EA B) of the RDN. EA B includes the island communities of Gabriola, Mudge, and DeCourcy as well as several outlying islands that have few or no permanent human inhabitants.

EA B is unique within the RDN in that it has three local governments with different responsibilities. The RDN has authority under the *Local Government Act* for the provision of local government services that the board considers necessary or desirable such as parks, waste, bylaw enforcement and inspections, and taxation to support services. In the case of EA B, planning and land use powers normally reserved for the RDN have been entrusted to the Islands Trust. The Islands Trust forms a secondary local government in charge of land use and development matters in the Gulf Island communities, with a mandate to preserve and protect the unique amenities and environment of the smaller islands. The Gabriola Island Fire Protection Improvement District forms the third local government and has responsibility for the provision of fire protection services.

Wildland-urban Interface

Within the Area of Interest, this plan pays special attention to a zone called the wildland-urban interface (WUI). The WUI is the area where combustible forest fuels are found adjacent to homes, businesses, farm structures, or other buildings and infrastructure. Since communities are surrounded by and include large areas of forest vegetation, most of EA B can be considered as part of the interface. This plan defines the WUI as the area within one km of a density of six buildings (or “structures”) per km². This buffer of “structure density” creates a ring around the most populated areas of EA B where the most buildings and people would be at risk if a wildfire were to occur. The distance of one km has been selected to align this Community Wildfire Resiliency Plan with guidance from the Province and BC Wildfire Service (BCWS), which use structure density classes to help plan wildfire response and prevention.

The shape and appearance of the WUI depends on the form of development that EA B. The WUI can be thought of as having two broad types that influence wildfire response. The first is simply called “interface” and refers to landscapes where the boundary between forests and developed areas can be seen at the scale of a neighbourhood or a community. Interface conditions imply a distinct boundary between homes and forests, and often result where development includes multiple-lot subdivision and land clearing, or where forests are separated from communities by farmland. The second type of WUI is called “intermix”, which refers to landscapes where the boundary between forests and urbanized areas is indistinct and may only be apparent at the scale of an individual property. In these landscapes, homes and infrastructure are set among forest vegetation. This kind of development is common in rural areas where subdivision or farming haven’t resulted in land clearing. Much of EA B is characterized by intermix conditions, with interface conditions limited to a few areas of commercial or agricultural activity. Figure 1 shows examples of these two conditions from EA B.

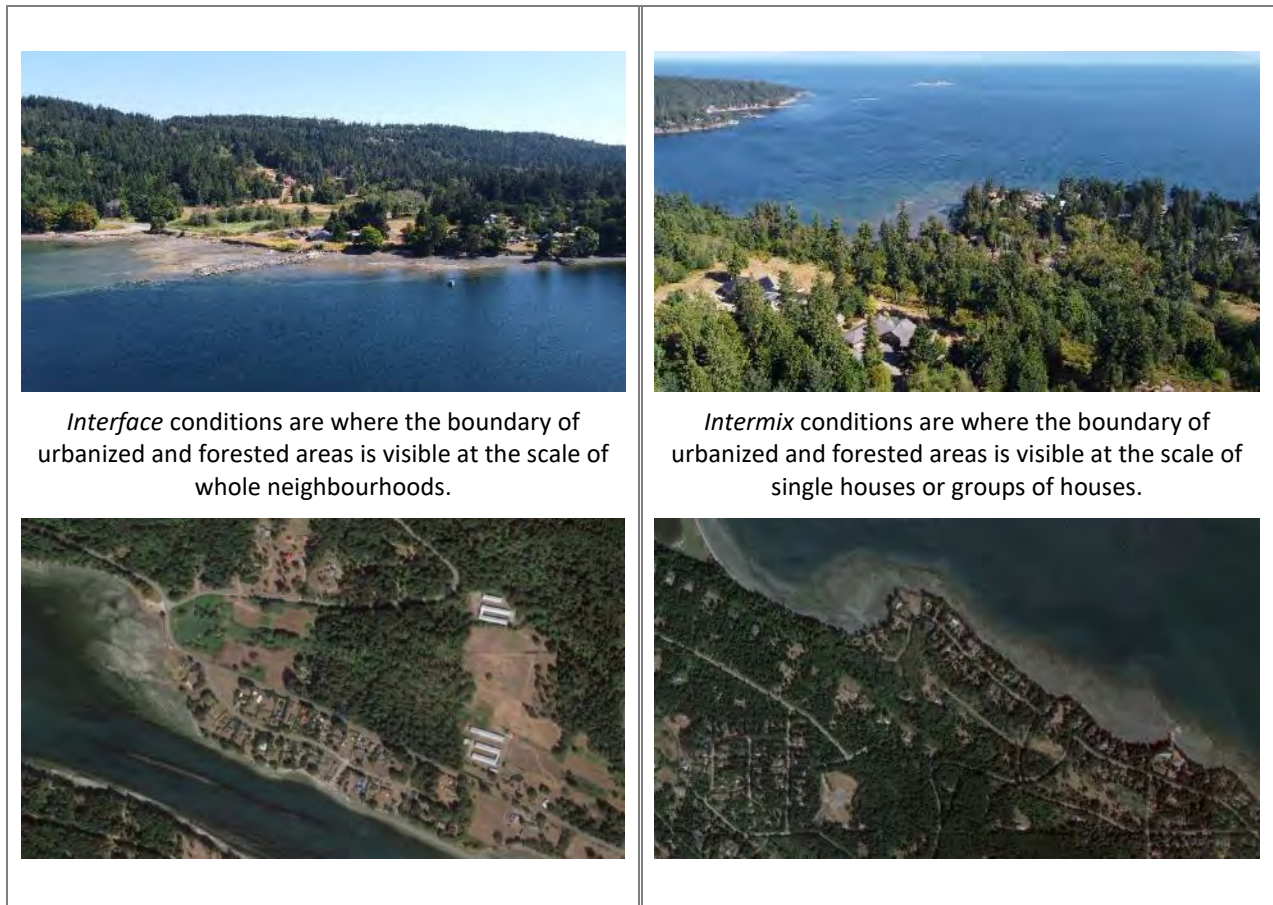


Figure 1. Visual comparison of "interface" and "intermix" conditions.

The shape of the boundary between homes and forests influences the pathways to home ignition and appropriate mitigation strategies. Forests and vegetation provide fuel to wildfires, although not all forests are equally hazardous. Homes in the intermix are surrounded by forest vegetation and are at risk of ignition through direct contact with flame, radiant heat from nearby fire, and wind-borne embers or firebrands. Homes in the interface directly border the forest boundary also face these three ignition sources, while homes toward the interior of a neighbourhood or subdivision remain at risk of wind-borne embers alighting on building surfaces or landscaping. Managing the landscape around buildings and using fire-resistant construction can help people living in the interface avoid damage to property during an oncoming wildfire. Since a significant number of wildfires are of human origin, managing the fuels between humans and forests also helps to contain human-caused fires before they spread into the surrounding landscape and become catastrophic events.

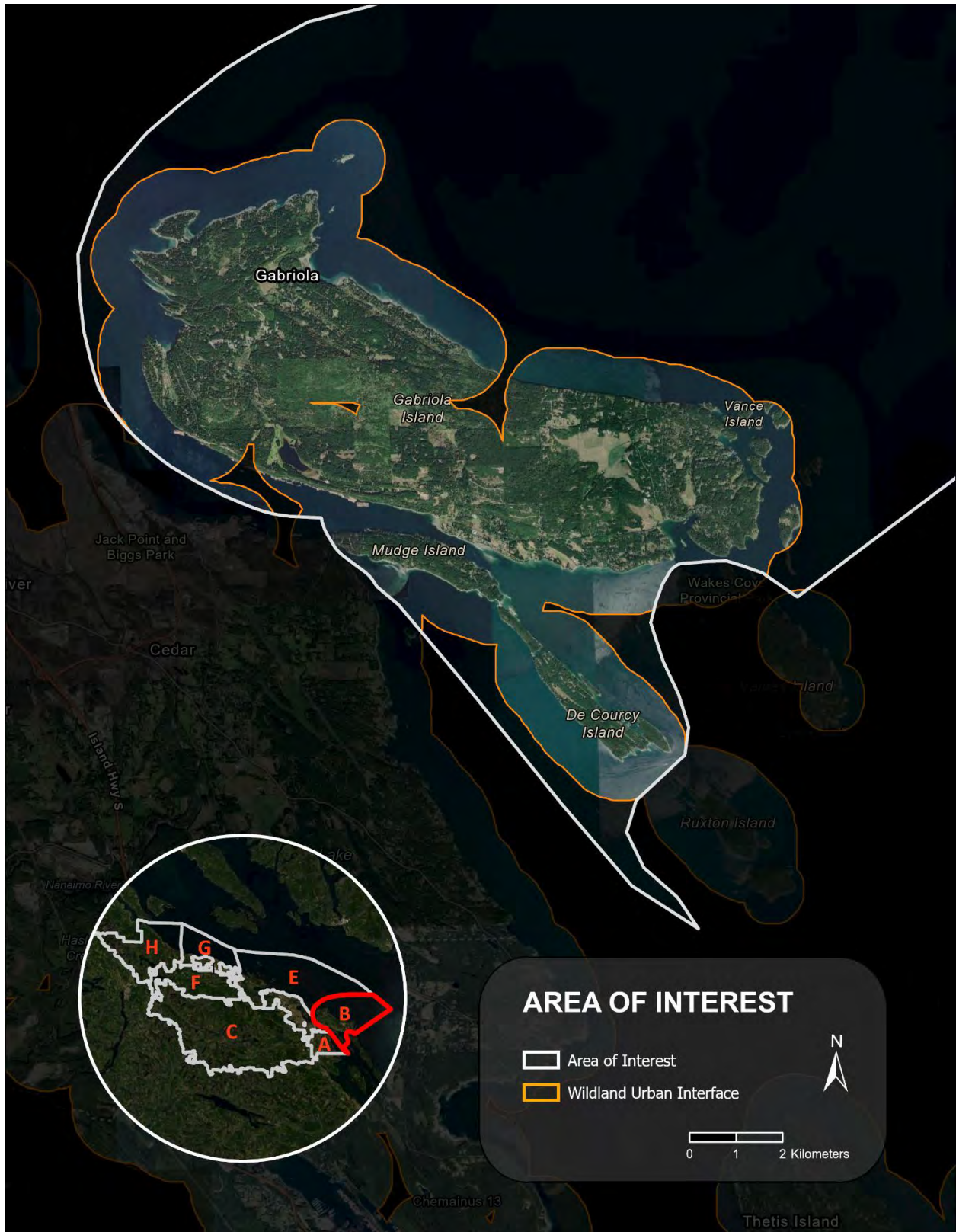


Figure 2. Area of interest for the plan and WUI.

Community Information

Demographics and Housing

The growth of EA B and how housing is developed can have a large impact on resilience to wildfire. This is because patterns of development influence wildfire risk, and a rising population puts additional demands on local emergency responders. If carefully planned, growth can help communities become resilient to wildfire by replacing outdated construction with modern building standards, introducing FireSmart development patterns, increasing the tax base, and adding new neighbours to shoulder the effort of community organizing and planning.

Most residents of EA B live on one of the three largest islands, Gabriola, Mudge, and DeCourcy. Gabriola Island is the largest island in terms of land area and population and is the only island served by BC Ferries. EA B constitutes a single census subdivision for Statistics Canada. The population of the islands at the 2021 Census was 4,500¹. Only population figures from the 2021 Census were available at time of writing. All other statistics presented in this section are from the previous census in 2016². Mudge and DeCourcy Islands, being smaller and without BC Ferries access, do not comprise their own census geographies and have estimated populations of fewer than 100 permanent residents each. The number of private dwellings on the islands in 2016 was 2,987, with just over 2,100 of these reported as being permanently occupied. The large proportion of seasonal residences (28% of the total) is well-known in island communities. The summer months can bring a few thousand more people to the islands as the result of seasonal occupancy and vacation rentals. Anecdotally, the number of permanent residents appears to have increased during the COVID-19 pandemic.

The Islands Trust completed a Housing Needs Assessment for its northern local trust areas, including Gabriola, in 2018. The boundaries of the local trust area are the same as those of EA B. The Housing Needs Assessment reports that although population declined between the 2011 and 2016 census periods, provincial health registration data show increasing population since 2016. The report estimates as many as 735 new households could arrive in EA B in the next 25 years³. This implies there will be substantial demand for new construction or development on the island during the life of the Community Wildfire Resiliency Plan.

The population of EA B has different demographics than the rest of the RDN or British Columbia. Homeowners greatly outnumber other residents in the community (83% of the population), partly due to a lack of suitable housing for renters or other forms of occupancy (17%). Residents are also older on

¹ Statistics Canada. 2022. (table). Census Profile. 2021 Census. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released February 9, 2022. <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E> (accessed April 10, 2022).

² Statistics Canada. 2017. Nanaimo B, RDA [Census subdivision], British Columbia and Nanaimo, RD [Census division], British Columbia (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E (accessed September 23, 2021).

³ Dillon Consulting. 2018. Housing Needs Assessment (Northern Region of Islands Trust). Released June 21, 2018. islandstrust.bc.ca/wp-content/uploads/2020/05/lpc_2018-06-21_northern_hna.pdf (accessed September 23, 2021).

average with a median age of 61 years, despite Gabriola Island continuing to attract young families. The Housing Needs Assessment indicates that EA B has fewer residents over the age of 80, implying that older people may not be able to find the care or housing that they need to remain on the island. Compared to the RDN, residents are also much more likely to live alone or with just one other person. One- or two-person households make up 85.5% of all households on the islands, with almost four in ten residents living alone. While income varies dramatically with household size, across all family types, EA B residents have less household income than their peers in the RDN or the rest of the province. This is true even when controlling for the high number of retired residents who often declare no or very limited income. The median household income on the islands is just under \$48,000 per year.

The islands' demographics will influence risk and appropriate emergency planning and response. On average, residents are older and belong to smaller households. A significant number of residents have limited incomes. This means residents may need additional support to implement prevention measures, connect with emergency planning processes, or receive direction from emergency responders during a wildfire. Table 4 compares key demographic attributes of EA B with the RDN and the wider province.

Table 4. Community Information for EA B.

Community Information	EA B	RDN	Province of British Columbia
Total Population (2021)	4,500	170,367	5,000,879
Land area (km ²)	57.76	2,038.04	922,503.01
Population density (persons/kM-2)	69.8	76.4	5.0
Number of private dwellings	2,987	73,622	2,063,417
Number of dwellings occupied by usual residents	2,143 (71.7%)	68,904 (93.6%)	1,881,969 (91.2%)
Average household income (\$)	62,927	77,868	90,354
Average household size (persons)	1.9	2.2	2.4
Households by tenure – owner	1,780 (83%)	50,930 (74%)	1,279,020 (68%)
Households by tenure – renter	365 (17%)	17,900 (26%)	599,360 (32%)
Prevalence of low-income, after tax (LICO-AT) (%)	9.0	8.6	11.0
Labour force participation rate (%)	46	55.2	63.9
Unemployment rate (%)	9.6	7.7	6.7
Median age (years)	61.3	51.1	43.0
<i>Data Sources:</i>	<i>Statistics Canada. 2022. (table). Census Profile. 2021 Census. Statistics Canada Catalogue no. 98-316-X2021001. Ottawa. Released February 9, 2022.</i>		
<i>Reported total population is from the 2021 Census.</i>	<i>https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E (accessed April 10, 2022).</i>		
<i>All other figures are from the previous 2016 Census,</i>	<i>Statistics Canada. 2017. Nanaimo B, RDA [Census subdivision], British Columbia and Nanaimo, RD [Census division], British Columbia (table). Census Profile. 2016</i>		

<p><i>which was the most recent available information at time of writing.</i></p>	<p><i>Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E (accessed October 7, 2021).</i></p>
---	---

Fire and Emergency Response

Fire response differs between Gabriola Island and the outer islands. Gabriola Island is served by the Gabriola Volunteer Fire Department, which is supported by the Gabriola Island Fire Protection Improvement District. The Improvement District levies fees for fire protection services and the Gabriola community can support primary and secondary fire halls and a fleet of several trucks, tankers, and support vehicles. As a registered fire department with the provincial Office of the Fire Commissioner, Gabriola Fire Department follows the National Fire Protection Association (NFPA) 1001 standard. This means that the department carries sufficient members and training to respond to structure-involved fires, given the ability of a sufficient number of volunteers to respond to a call. Currently, 38 firefighters are members of the department. The department is actively recruiting with a goal to reach 40 members so that 20 firefighters can be assigned to each fire hall serving either end of the island. Recently, the department achieved Superior Tanker Shuttle Accreditation from the Fire Underwriter Survey of Canada. This means that the Gabriola department can provide the equivalent of municipal water supply within its service area by using its equipment and training to draft and deliver water in place of hydrants. However, the accreditation does not guarantee response times or the availability of all water sources within the Improvement District. Some areas of Gabriola remain further from the fire halls or available water supply, complicating wildfire response.



Photo 2. Fire hall in southern Gabriola Island.

Mudge and DeCourcy Islands are not part of the Improvement District and lack registered fire protection services. However, both islands have volunteer fire brigades made up of residents, which follow the guidance of the Office of the Fire Commissioner’s *Fire Service Minimum Training Standards*. Brigades on the smaller islands are not certified to conduct interior firefighting and are limited to defensive actions in outdoor areas. Each island community has procured a variety of emergency and fire response equipment, including trucks, pumps, hoses and water storage, and hand tools. However, some of this equipment is reaching the end of its useful service life. Each island has pooled community resources to purchase and erect a dedicated fire hall to protect and store equipment. Mudge Island’s hall remains under construction at the time of writing.

On each island, residents forming a firefighting crew are the likeliest first responders to a wildfire. On Gabriola, the Volunteer Fire Department has the primary responsibility to respond to any fire within its service area. Outside the Improvement District, the authority with primary responsibility for wildfire response is the BCWS. The BCWS would respond to an event on the outer islands from its bases in Parksville or Cobble Hill, both on Vancouver Island.



Photo 3. Mudge Island on left, Gabriola Island on right.



Figure 3. Fire Protection District for the Gabriola Volunteer Fire Department.

Table 5. Major resources of the Gabriola Volunteer Fire Department and unofficial fire brigades.

Organization	Major Resources for Fire Response
Gabriola Volunteer Fire Department	<ul style="list-style-type: none"> - 38 members trained in accordance with NFPA 1001 practice requirements. - 12 response vehicles, including pumper and tanker trucks with proven capacity to deliver hydrant-equivalent water supply (Superior Tanker Shuttle Accreditation). - One truck fitted specifically for wildland fires, with an off-road platform and smaller width. - Several thousand feet of supply hose for drafting and attack line, generally loaded on separate vehicles and cached at the fire halls. - Chainsaws, hand tools, and other specialized wildland firefighting equipment. - Several cisterns are located around the island acting as an emergency water supply.
DeCourcy Island – Volunteer Fire Rescue Society (unregistered)	<ul style="list-style-type: none"> - 24 volunteers trained with S100 (Basic Fire Suppression and Safety), two volunteers trained with ICS 400 (Advanced Incident Command System) - One response vehicle & equipment trailer, fitted with a small tank, portable pumps, and supply and attack line. - Several thousand feet of supply hose and attack line, cached in several locations with portable pumps and hand tools - Four sprinkler protection kits (structural protection) - Several cisterns are located around the island acting as an emergency water supply, each location with a cache of hand tools and wajax bag.
Mudge Island – Mudge Island Citizens Society (unregistered)	<ul style="list-style-type: none"> - Fluctuating number of volunteers, generally 15-25. Several residents have completed S100 (Basic Fire Suppression and Safety) - Three response vehicles, including a 4WD “bush truck” fitted with a small tank, portable pump, and attack line; pumper truck (purchased from Gabriola Volunteer Fire Department); tanker truck (purchased from Columbia Fuels and repurposed). - Five portable pumps, with several hundred feet of supply hose and attack line. - Eight 2400 gal. cisterns are installed at strategic locations across the island for emergency water supply. - Three AEDs positioned in the north, central, and south island, as well as other first aid and basic transport equipment. - Variety of hand tools, including picks and shovels.

Values at Risk

Human Life and Safety

Protection of human life is the top priority in the event of wildfire in the urban interface. While an imperfect measure, wildfire planning in British Columbia uses the density of “structures”, typically buildings with civic addresses, as a proxy for population density. Areas with an average density of more than 6 structures per km² form the core of the WUI.

The relationship between structure density and wildfire risk can be complicated by local geography. Intermix areas tend to have a lower density of structures, leaving room for native forest vegetation between homes and buildings. This is often associated with higher risk for this form of development where relatively high-threat forest fuels predominate. Interface developments may have a low or high density of structures, depending on the landscape design and other land uses accompanying the construction of homes. At low structure densities, the layout of private property in intermix and interface areas may be quite similar: the difference is the yards of homes in intermix areas are treed while the yards of homes in interface areas will be substantially clear of native forest vegetation. While high structure densities are typically found toward the center of towns and settlements, recent decades have seen more homes be located on the outskirts of communities adjacent to forests. This has occurred for several reasons, including high land prices and the opposition of existing homeowners to new housing in their communities. This places more people at a higher risk of wildfire than building new homes in central locations.

Many residents of EA B are attracted to the island because of its rural atmosphere and the aesthetics of living close to the forest. This has resulted in widespread intermix development at low densities within the forest. Discrete interface areas are less common in EA B and generally occur only where farming has resulted in large areas of cleared land. Despite small areas of cleared land, Mudge and DeCourcy Islands are characterized completely by intermix development, with homes set amid almost continuous forest cover. Most residents of Gabriola also live in homes of this kind of development.

Development conditions and structure density affect all aspects of fire management response and can strongly influence fire behaviour. The connection between how communities are built and fire risk is discussed in greater detail in [Introduction to FireSmart](#) (p.59) and [Development Considerations](#) (p.84).

Human Health

In addition to the direct risks to life and safety, large uncontrolled wildfires can cause other human health impacts over a wide area. Residents of EA B are familiar with the negative impact of poor air quality from wildfire smoke, which has been experienced on BC's South Coast during several recent fire seasons. Heavy smoke disproportionately affects vulnerable populations of the elderly, people with pre-existing medical conditions like asthma, and people with low incomes⁴. Smoke can also worsen the outcome of acute respiratory diseases like COVID-19.

By focusing on the wildfire or smoke event as a discrete emergency, the long-term negative effects of wildfire on physical and mental health may be underated. People who have been evacuated, lost property, been injured, or seen loved-ones struggle with health issues during an emergency may have significant and lasting trauma that inhibits their day-to-day routine and makes ordinary tasks and experiences difficult. Mental health issues such as depression and anxiety can linger in a community that has experienced wildfire long after the original emergency⁵.



Photo 4. Smoke can reduce air quality and cause health problems.

⁴ BC Centre for Disease Control. 2021 (October). "Wildfire Smoke" [webpage]. bccdc.ca/health-info/prevention-public-health/wildfire-smoke. Accessed October 21, 2021.

⁵ Belleville, G., M.-C. Ouellet, & C.M. Morin. 2019. Post-traumatic stress among evacuees from the 2016 Fort McMurray Wildfires: Exploration of psychological and sleep symptoms three months after the evacuation. *International Journal of Environmental Research and Public Health*. 2019(16):1604 (14pp).

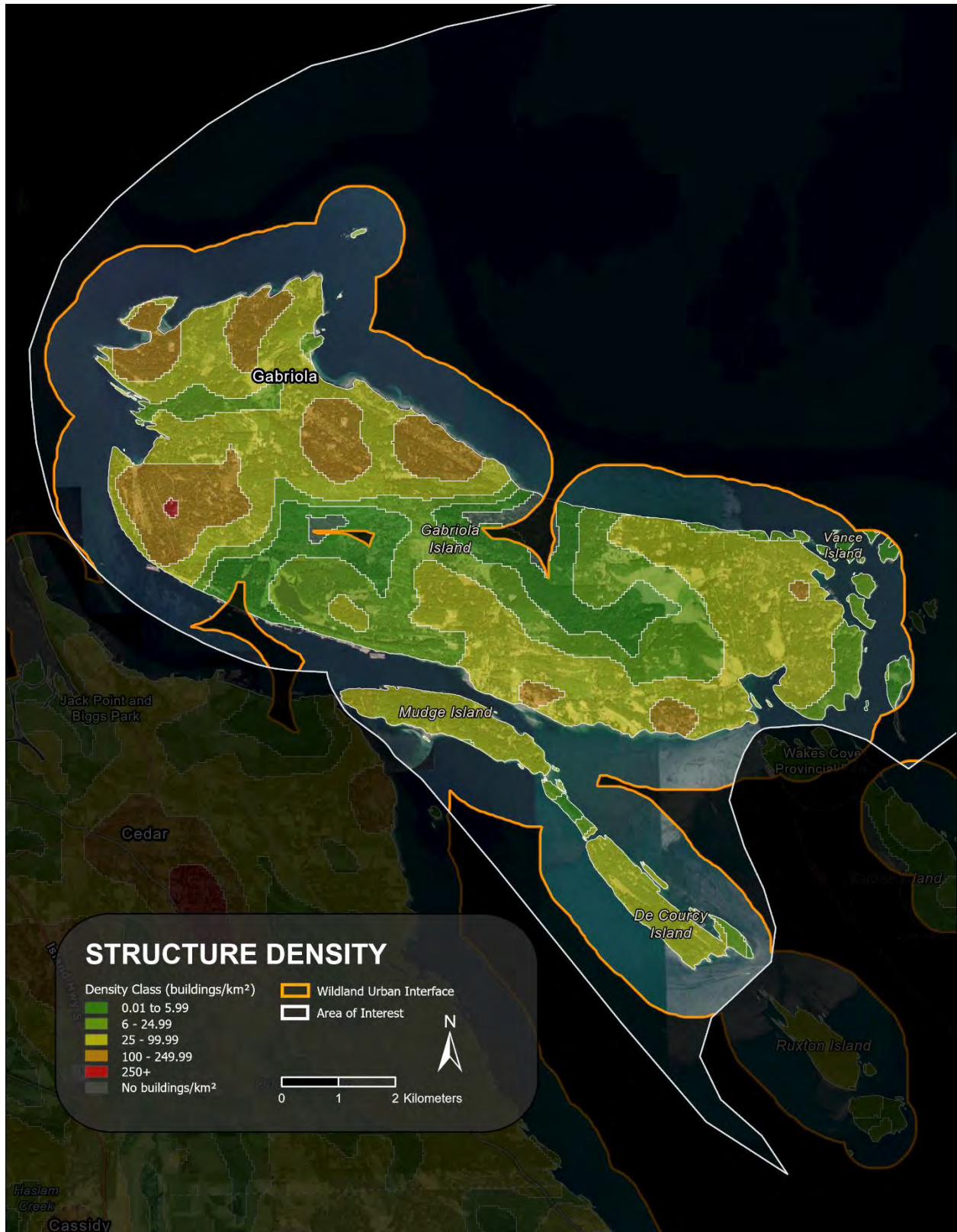


Figure 4. Structure density within the project area. The WUI represents a buffer of one km around areas of 6 structures per km² or higher.

Environment and Protected Areas

The islands of EA B are part of a unique ecosystem in Canada, the Coastal Douglas-fir biogeoclimatic zone. The mild, borderline Mediterranean climate allows animals and plants to thrive that are not found elsewhere in Canada. In addition, EA B's location amid the Salish Sea means the area also hosts travelling and resident marine wildlife whose habitats can be impacted by what happens on shore. Birds like the federally protected Marbled Murrelet, dependent on coniferous forests, cliffs, and marine fishing grounds, bridge the divide between land and sea each day.

12% of EA B is within parks and protected areas, though other public lands and suitable private lands increase the proportion of EA B that offers natural and semi-natural habitats. Of the Gulf Islands, Gabriola, Mudge and DeCourcy have a high proportion of area impacted by human land use. Just under 30% of the islands are classified as "converted for human use" by the Islands Trust, while a further 63% of natural land area has been "modified" or shows evidence of historic human disturbance⁶. 707 Community Park in central Gabriola Island is an example of a modified ecosystem, where forest cover has been impacted substantially by past land management.

Forested environments, regardless of their conservation status, contain vegetation that can fuel a wildfire. Performing wildfire threat assessments for forested public land is a key piece of the Community Wildfire Resiliency Plan development. Public land often comprises the few remaining large, contiguous forests in a community's WUI. The RDN has acquired a variety of community and regional parks to provide people with places to recreate and enjoy the nature of the islands. The Province has also established a handful of provincial parks on Gabriola Island and one on DeCourcy. The federal government holds large parcels of land in the center of Gabriola Island; these are currently the subject of treaty negotiations with Snuneymuxw Nation. The greatest areas of continuous forest cover on public land in EA B are in the adjacent Coats Marsh Regional Park and 707 Community Park, as well as federal lands which include the Elder Cedar (S'ul-hween X'pey) Nature Reserve and other areas used informally for recreation.

⁶ Islands Trust. 2019 (December). Gabriola Island Local Trust Area Profile. islandstrust.bc.ca/wp-content/uploads/2019/12/Gabriola-Island-LTA-Profile.pdf

Wildlife, Species at Risk, and Protected Ecosystems

The BC Conservation Data Centre (CDC) records BC's most vulnerable vertebrate animals and vascular plants, each of which is assigned to a provincial red or blue list according to their provincial conservation status rank. Species or populations at high risk of extinction are placed on the red list and are candidates for formal endangered species status. Blue-listed species are considered vulnerable to human activity and natural events. One occurrence of blue-listed species and three occurrences of red-listed species are known within the area of interest. An additional three red-listed ecological communities are also known. See Table 6 for a summary of these species and communities. Figure 5 depicts publicly available locations of these species and ecological communities.

Table 6. Species and ecological communities with designated provincial conservation status.

Occurrence ID #	Name	Type	Conservation Status
11	<i>Hosackia pinnata</i> (Bog bird's-foot lotus)	Plant	Red
478	<i>Limnanthes macounii</i> (Macoun's meadow foam)	Plant	Red
1210	<i>Erynnis propertius</i> (Propertius Duskywing)	Animal (insect)	Red
8180	<i>Populus tremuloides</i> / <i>Malus fusca</i> / <i>Carex obnupta</i> (Trembling aspen-crabapple-slough sedge)	Ecological community	Red
8625	<i>Pseudotsuga menziesii</i> / <i>Mahonia nervosa</i> (Douglas-fir / dull Oregon grape)	Ecological community	Red
14102	<i>Abies grandis</i> / <i>Mahonia nervosa</i> (Grand fir / dull Oregon grape)	Ecological community	Red
14103			
14699	<i>Megascops kennicottii kennicottii</i> (Western Screech-owl, sub. kennicottii)	Animal (bird)	Blue

In addition to provincial conservation status, several specific wildlife species with federal protections under Canada's *Species at Risk Act (SARA)* are known or believed to inhabit the project area. These include the Little Brown Myotis, southern resident Killer Whale, Marbled Murrelet, Red-legged Frog, and Western Screech-owl. Of these *SARA*-listed species, only the Marbled Murrelet has designated critical habitat within the project area.

Wildfire can have positive and negative relationships with biodiversity, depending on the scale of time and space. This landscape developed in the context of sporadic wildfire, with plants and animals that have adapted to wildfire disturbance^{7,8}. In the Salish Sea lowlands, Indigenous people used prescribed wildfire pre-colonization to maintain desirable meadow forage and food plants like camas^{9,10}. Wildfires can support biodiversity by re-establishing a diversity of forest ages and tree sizes, the infrastructure of diverse ecosystems, within an area. Conversely, large, high-intensity fires can reduce biodiversity by destroying ecosystems and habitat features over large areas. Despite this, large fires can also play an important role in preserving the long-term health of an ecosystem by acting as a check on the proliferation of forest pathogens and other diseases of animals and trees. Because of urban development, climate change, and extensive modification of ecosystems, it is important to protect remaining reserves of high-biodiversity habitat or ecological communities from loss to wildfire when possible, or ensure wildfire affecting these areas is of a scale and intensity that supports the ecological community as a whole.

⁷ Murphy, S. F., M. G. Pellatt, & K. E. Kohfeld. (2019). A 5,000-year fire history in the Strait of Georgia Lowlands, British Columbia, Canada. *Frontiers in Ecology and Evolution*. 10 April 2019.

⁸ Lucas, J. D. & T. Lacourse. (2017). Holocene vegetation history and fire regimes of *Pseudotsuga menziesii* forests in the Gulf Islands National Park Reserve, southwestern British Columbia, Canada. *Quaternary Research*, 79 (3)-366-376.

⁹ Beckwith, B.R. (2004). The Queen Root of this Clime: Ethnoecological Investigations of Blue Camas (*Camassia quamash*, *C. leichtlinii*; Liliaceae) Landscapes on Southern Vancouver Island, British Columbia. PhD dissertation, University of Victoria.

¹⁰ Turner, N. J., D. Duer, & D. Lepofsky. (2013). Plant management systems of British Columbia's First Peoples. *BC Studies*, no. 179 (Autumn 2013), 107-133

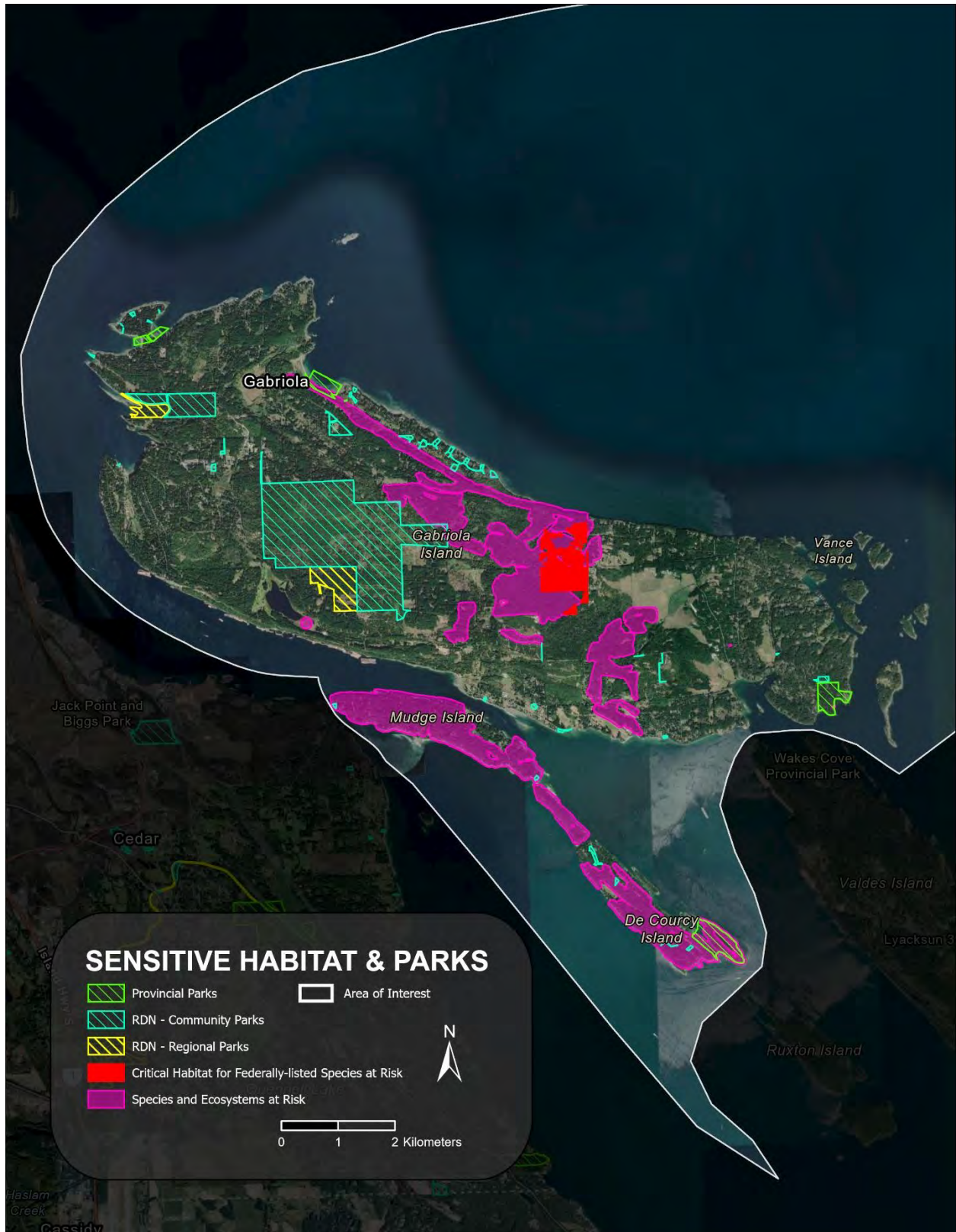


Figure 5. Protected areas and known locations of protected species or habitat.

Cultural and Archaeological Values

The landscape of EA B contains thousands of years of indigenous history and culture. This lengthy history between Indigenous peoples and the land has fostered a relationship that continues up to the present day. The area now within EA B includes lands in the core territory of the *Snuneymuxw* First Nation and Nations of the Hul'qu'minum Treaty Group. Indigenous people have lived in this landscape since time immemorial and continue to advocate for the return of unceded lands and settlement of modern treaties which would restore parts of their territories. Actions to advance wildfire management in indigenous traditional territory must involve local nations to ensure land management is in line with indigenous values and stewardship priorities.

The protection of pre-colonization cultural sites is supported by the Province through the *Heritage Conservation Act*. This *Act* allows the Archaeology Branch of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development to maintain a spatial database of archaeological and historical (post-colonization) sites related to indigenous culture and history. These can include cache pits, trails, fishing sites, cooking features, lithics (stone tools), grave sites, and findings of human remains. Because of the sensitive nature of many of these sites, their locations cannot be published. Within EA B, 166 archaeological sites are known. Activities with physical impacts on the land, such as fuel management, within 50 m of these sites must engage a qualified archaeologist to ensure sites are adequately protected under the *Act*.

Wildfire can cause loss of cultural values by causing damage to ecosystems and soils as well as historic and archaeological remains. While physical damage to cultural sites as the result of wildfire management is unacceptable, activities like fuel modification can help preserve cultural values by reducing the likelihood of high intensity, damaging wildfire. In other cases, wildfire management activities like prescribed burning or clean-up of fine fuels can be planned to align with or even enhance cultural values and practices.

Hazardous Values

During a wildfire, some land-uses or economic activities are associated with higher risk because they involve flammable materials, high temperature machinery, or chemicals hazardous to human health if improperly handled but are nonetheless important to the economic and social function of the community. In larger communities, hazardous values include railways, industrial facilities, gas stations, military installations, and landfills. In EA B, the most significant stores of hazardous values are likely to be fuel or other supplies located within critical infrastructure and public buildings. As the risks associated with storing flammable materials can never be fully eliminated, any properties with a propane tank or stores of fuel are the location of potentially hazardous values. These include the Gabriola Fire Halls, the gas station and other commercial buildings on North Road, the Gabriola Golf and Country Club, and several waterfront commercial properties with docks or marinas on Gabriola, Mudge, DeCourcy, and smaller islands. The Gabriola Island Recycling Organization facility on Tin Can Alley in the Gabriola townsite may contain hazardous chemicals from time to time, as this location acts as a shipment point for domestic and commercial recycling waste of all kinds from EA B to off-island processing facilities. During a wildfire, any known or suspected location of hazardous values presents a danger to emergency responders and the public.

Other Resource Values

Wildfires can be large, landscape-scale events that create long-term impacts on sections of the economy that rely on forest resources or access to land, including eco-tourism, forest harvesting, fish and game, and mineral extraction.

Eco-tourism and simple appreciation for forests are reflected in the number of tourism-dependent businesses and a high number of vacation properties that characterize EA B. A loss of mature forests to wildfire in EA B would be felt emotionally by residents and visitors and may be measurable in reduced property values or overnight stays. Forest harvesting and non-timber forest products are minor components of forest land use in EA B. Forest harvesting occurs on the private land base, most often as a prelude to development (land clearing). No commercial forest harvesting takes place on public lands. While eco-tourism and forest harvesting are often seen as being in conflict, it is important to remember that well-planned forest management supports long-term ecosystem health, conservation of non-timber forest products, and contributes activity to the economy. Wildfire is challenging particularly for holders of small private land parcels or forest tenures, who are less resilient to landscape-scale disturbance.

Mineral extraction is limited to a single small gravel and aggregate facility on the south side of Gabriola. Gravel pits are less vulnerable to wildfire than other resource activities because they are typically fuel free environments with few pieces of permanent infrastructure.

Critical Infrastructure

Critical infrastructure are the publicly owned assets, whether by the RDN, the Province, local Improvement District, or First Nation, that underpin the health and safety of the community and allow governance to take place. Critical infrastructure also includes public assets identified in a Hazard, Risk & Vulnerability Assessment undertaken by a local government. In developing the Community Wildfire Resiliency Plan, RDN-identified facilities deemed critical to the delivery of emergency services (like evacuation planning or fire protection) were considered, regardless of whether these facilities are owned by the RDN. The nature of life in unincorporated communities means that the RDN is directly responsible for few if any of these pieces of critical infrastructure. Additional sites and facilities have been included in consideration of field review by the consulting team and input from community members.

Electrical Power

Electrical power is provided to most of the EA B by overhead connections from the City of Nanaimo to Mudge Island and then onward to Gabriola. The electrical distribution network relies almost exclusively on above-ground transmission lines fastened to wood utility poles. Wooden poles are vulnerable to fire, and in many locations, these lines are within a few metres of forests. Power lines are also a source of ignition because branches and foliage that fall onto charged electrical lines can readily catch on fire. BC Hydro inspects and manages vegetation along its utility corridors. DeCourcy Island is not connected to the provincial power grid. All properties on DeCourcy are powered by renewable energy sources or gas/diesel generators.

Because of the islands' isolated setting, many properties on Mudge and Gabriola Island also have backup sources of power, including wind, solar, and gas/diesel generators. In situ power generation is less vulnerable to a wildfire disrupting the electrical distribution network in another part of EA B but remains vulnerable to fire nearby. In 2019, BC Hydro installed a secondary circuit serving Gabriola and Mudge Islands to improve capacity and reduce outage time during scheduled maintenance. However, the network remains vulnerable to external events, like storms and wildfire.

Electrical networks can be compromised in the event of a large wildfire. Not only can wildfire ignite electrical infrastructure but burned trees can fall on lines and disrupt service. Ensuring emergency operations have access to a sufficient supply of backup power is an important part of wildfire preparedness.

Communications Infrastructure

Primary connections to telephone and internet service in most of EA B are provided via the same overhead connection from Nanaimo via Mudge Island. Residents on DeCourcy Island rely on satellite or cellular connections to internet and telephone services.

Cellular telephone service and text-based messaging services are frequently residents' primary means of communication with each other and the RDN. Cell service is provided by the three major Canadian telecommunications companies to all parts of EA B. Smaller providers may have incomplete network coverage in EA B. Cellular service coverage is provided by one primary tower located on Gabriola Island's southwestern ridge. Secondary towers are located at Decanso and Silva Bays, also on Gabriola Island. All towers within EA B are maintained by Telus Communications and are located on private land.

Radio communication is an important part of emergency response in EA B. The Gabriola Volunteer Fire Department Fire Hall No. 1 incorporates a broadcast transmitter for maintaining land-mobile communications between the Department and crews responding to an emergency. Fire Hall No. 1 also has amateur (ham) radio broadcast capacity.

Public Buildings and Facilities

A small number of institutions and public buildings are crucial for maintaining the function of government and community services. These buildings can include municipal halls or offices, operations centres, fire halls, schools, hospitals, and transportation facilities. Ensuring the safety of public buildings and institutions during a wildfire is important for ensuring the effectiveness of emergency response and, post-event, the continuation of community life. During an emergency, these facilities may also be used as muster locations, evacuation facilities, or relief and supply points. Table 7 lists the facilities of critical importance to the RDN's emergency plans.

Table 7. Public facilities and buildings within EA B.

Facility or Building Name	Location	Description
Gabriola Fire Hall No. 1 (Albert Reed Memorial Fire Hall)	730 Church Street, Gabriola	Modern fire hall operating as the primary hall for Gabriola Volunteer Fire Department, situated near the Gabriola commercial centre
Gabriola Fire Hall No. 2	2400-block South Road, Gabriola	A second, older hall for Gabriola Volunteer Fire Department on the east side of the island.
BC Ambulance Station	725 Church Street, Gabriola	Double-bay ambulance station providing paramedic service to Gabriola Island.
Gabriola Island Ferry Terminal	350 North Road, Gabriola	Single-berth ferry terminal owned and operated by BC Ferries. Co-located with the RDN emergency wharf.
Gabriola RCMP detachment	525 South Road, Gabriola	Police detachment serving Gabriola, Mudge, DeCourcy, and outlying islands.
Gabriola Elementary School	680 North Road, Gabriola	Community school enrolling students K-7. The largest public facility on Gabriola.

In addition to buildings maintained by public authorities or BC Ferries, there are several facilities maintained directly by community members that serve a public function and are important to protect during wildfire. These include the Gabriola Health Centre, community halls on Gabriola and DeCourcy Islands, the El Verano Boat Launch on Gabriola Island, and several smaller docks and wharves scattered around EA B. Water access is critical to the outer islands and many pull outs are located where the ocean foreshore meets road rights-of-way administered by the Ministry of Transportation and Infrastructure. Community volunteer maintenance of these locations is the norm. The RDN does not own any structures on Mudge or DeCourcy Islands, though MICS and DICA have both sponsored the construction of community facilities on each island. Wildfire can destroy or disrupt access to places and services that residents of EA B rely on.



Photo 5. The BC Ferry terminal is the main public access to Gabriola Island.

Water Supply & Waste Treatment

Sources of freshwater are limited in EA B. Most residents rely on independent wells, supplemented with aboveground cisterns used to collect rainwater or hold water delivered by tanker trucks. Excessive pumping of groundwater can lead to saltwater intrusion of wells in some locations. There are very few permanent surface bodies of freshwater in EA B, though surrounding properties often have licenses to use these resources. In recent years EA B, along with other Gulf Islands communities, have experienced severe water shortages during the summer dry period due to a combination of reduced summer precipitation, warmer temperatures, and increased use. Human waste on the islands is entirely managed through septic systems.

Wildfire has a complex relationship with water supply. Fires tend to increase surface runoff by removing insulating, absorbent organic matter at the soil surface and increasing the so-called “splash impact” of raindrops on newly exposed mineral soils¹¹. This impacts the rate of groundwater recharge, as well as affecting surface water sources with sedimentation and excess mineral nutrients downslope of burned areas.¹² There have been cases where debris flows that have damaged homes and infrastructure were attributed to wildfire damage to soils¹³. The temperature and duration of heat in the soil can also impact the rate of groundwater recharge. At low to moderate temperatures, fire can create a water repellent layer in the subsoil that restricts infiltration, while at higher temperatures this layer may form but then be weakened or removed^{14,15}. In EA B, protecting the drinking water supply and existing septic systems means protecting local hydrology from the potential impacts of wildfire.

¹¹ Paige, G., & Zygmunt, J. (2013). The Science Behind Wildfire Effects on Water Quality, Erosion. *Living with Wildfire in Wyoming*. (p. 31-34). University of Wyoming: Laramie, WY.

¹² Emelko, M., & Sham, C. (2014). Wildfire Impacts on Water Supplies and Potential for Mitigation: Workshop Report. (p. 36). Waterloo, ON: Canadian Water Network and Water Research Foundation.

¹³ Jordan, P., K. Turner, D. Nicol, & D. Boyer. (2006). Developing a risk analysis procedure for post-wildfire mass movement and flooding in British Columbia. *1st Specialty Conference on Disaster Mitigation, 23-26 May 2006, Calgary, AB, DM-013* (pp. 1-10). Montreal, QC: Canadian Society for Civil Engineering.

¹⁴ Robichaud, P. R., J.W. Wagenbrenner, F.B. Pierson, K.E. Spaeth, L.E. Ashmun, & C.A. Moffet. (2016). Infiltration and interrill erosion rates after a wildfire in western Montana, USA. *Catena* 142 (2016) 77-88.

¹⁵ Wieting, C., B.A. Ebel, & K. Singha. (2017). Quantifying the effects of wildfire on changes in soil properties by surface burning of soils from the Boulder Creek Critical Zone Observatory. *Journal of Hydrology: Regional Studies*. 13 (2017) 43-57.

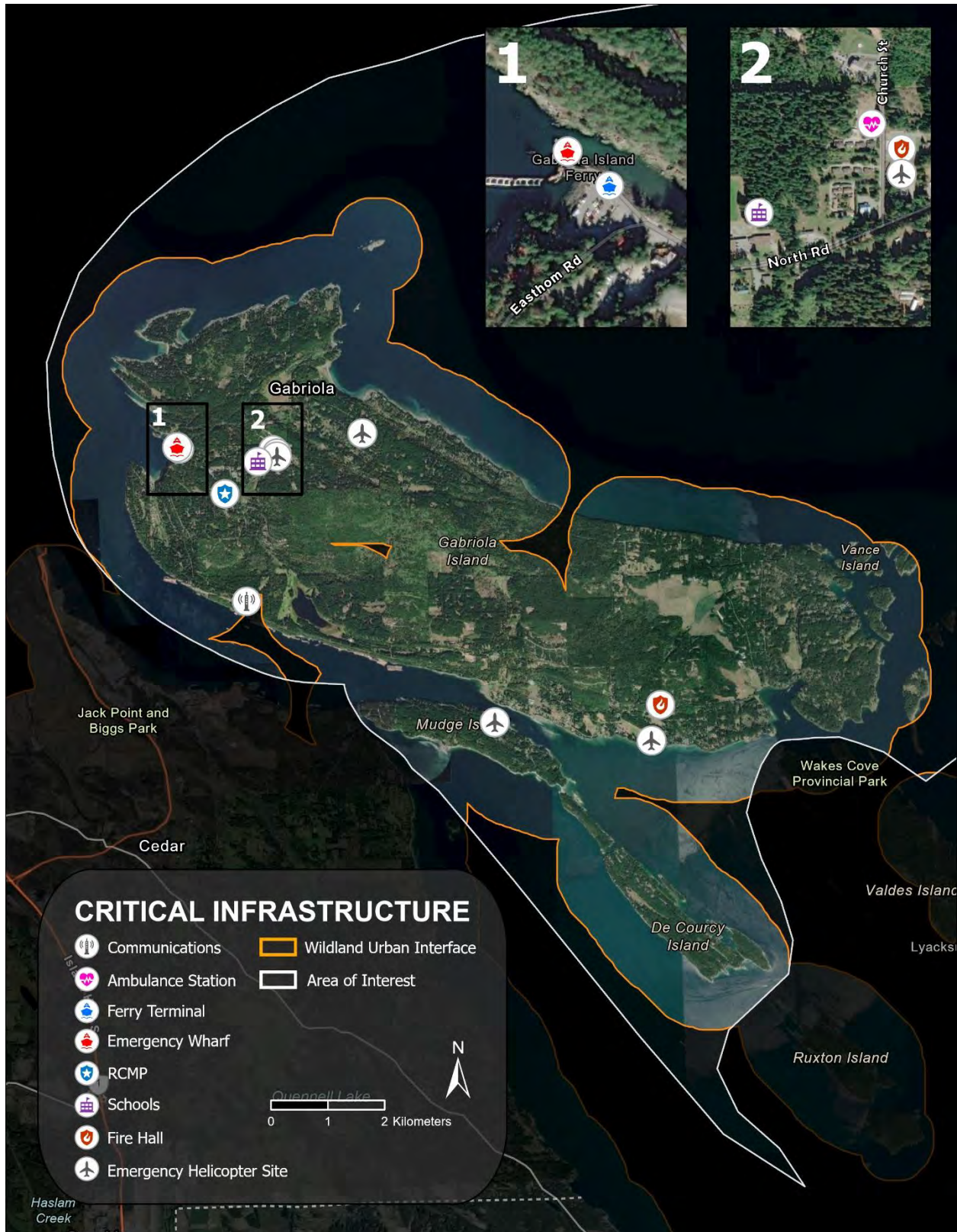


Figure 6. Public facilities considered critical infrastructure.

Wildfire Risk Assessment

Crucial to building resiliency in EA B is understanding where wildfire risk is the highest, so that investments made by the Regional District of Nanaimo (RDN) are effective, sensible, and balanced with other community values and interests.

In this plan, the terms **wildfire threat** and **wildfire risk** refer to different components of EA B's vulnerability to wildfire. Both threat and risk have been modelled using data collected from forests in Electoral Area B (EA B). Wildfire threat refers to the potential fire behaviour that a natural area could sustain. Rating wildfire threat means looking at the factors of fuel loading, type, and distribution, slope and aspect, and weather conditions. Wildfire threat has no relationship to how close a forest is to populated areas or other values. Wildfire risk builds on wildfire threat by considering the proximity of forests to populated areas and other values.

Wildfire threat is a ranking of potential fire behaviour based on fuel conditions, weather conditions, slope, aspect, and other biophysical factors. This can also be referred to as wildfire behaviour potential.

Wildfire risk is a measure of the probability of a wildfire occurring combined with the consequences or impacts it would cause.

Wildfire Environment

This section describes the components of wildfire threat in EA B. These components are topography, forest fuels (vegetation), and weather.

Topography

Topography influences wildfire behaviour in several ways. In hills or mountains in the northern hemisphere, fuel loading is often less on south and west aspects because these are the "warm" aspects with higher amounts of solar exposure and consequently drier microclimates less supportive of vegetation. Higher fuel loading is found on cooler north and east aspects, which at EA B's latitude are more protected from direct solar exposure. Therefore, while warm aspects burn more frequently on average, during the most extreme fire weather cooler aspects can often support more severe fire behaviour. On any considerable slope, wildfire spread is faster in the uphill direction. Hot air from a fire below will rise uphill, preheating forests above the head of the fire and drying fuels in advance of the flame. On steep slopes, flames also bathe the nearest upslope fuels to accelerate combustion. For these reasons, areas of steeper slopes are expected to have higher potential wildfire behaviour.

Gabriola, Mudge, and DeCourcy Islands feature steep southern slopes into the ocean, generally forested with some breaks of rocky outcrop or sheer bluffs. Gabriola, as the largest island, has the most varied terrain. The island is ringed by steep slopes into the ocean or small flats at the coastline, which reduce in height toward the east end. The centre of the island is mostly a series of rolling hills and plateaus, with the highest points approximately 160 m above sea level being concentrated in the south, central, and western parts. Public land on the island is generally found on uplands away from the coast, though several parks do occupy small portions of the coastal slopes and fringe.

Mudge Island has heights of up to 70 m above sea level and features steep, bluffy terrain on its southern shore facing Dodd Narrows and Stuart Channel. DeCourcy has the most subdued topography of the three main islands in EA B, with southwest-facing bluffs reaching 20-40 m in height. On the northeast of the island, Pirates Cove Marine Provincial Park occupies a small forested knoll.

Fuels (vegetation)

Forest fuels are the dead and living vegetation and organic soil matter within and surrounding EA B. Fuel conditions vary with the composition of tree species, live and dead proportions, the density of understory shrubs and other plants, and other ecosystem characteristics. Fuels dominated by coniferous trees and shrubs are typically more flammable than deciduous forests due to their relatively low moisture content. Some plants produce volatile chemicals that readily burn, such as oils produced by scotch broom or gorse. Grasses burn quickly due to the large ratio of surface area to volume in their leaves, and often dieback during dry seasons in a process called curing. Deciduous broadleaved fuels, conversely, are more resistant to ignition due to their higher moisture content. Deciduous fuels may be left unburned during a wildfire that torches surrounding coniferous forests.

Forest fuels belong to one of four layers. First are ground fuels – this is the organic matter in the soil (soil carbon). Next are surface fuels, which includes all the dead branches, leaf litter, and low plants on or just above the surface of the ground. Above this, ladder fuels are the large shrubs, branches, and small trees that extend between the surface fuels and the overall height of the tree canopy. Lastly, crown fuels are the foliage, branches, and other vegetation lodged within the tree canopy.

Forest fuels belong to one of four layers. First are ground fuels – this is the organic matter in the soil (soil carbon). Next are surface fuels, which includes all the dead branches, leaf litter, and low plants on or just above the surface of the ground. Above this, ladder fuels are the large shrubs, branches, and small trees that extend between the surface fuels and the overall height of the tree canopy. Lastly, crown fuels are the foliage, branches, and other vegetation lodged within the tree canopy.

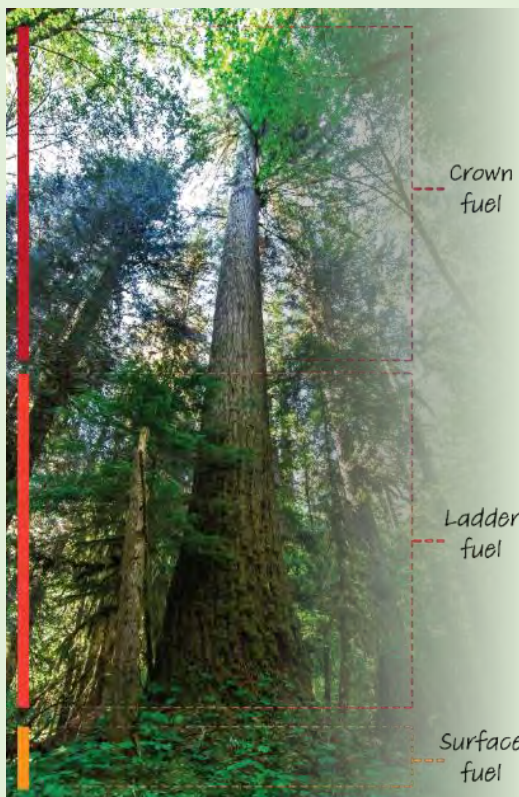


Photo 6. Forest fuel layers.

The combination of fuels from each of these layers is a strong influence on how quickly wildfire can grow and build intensity. The difference in behaviour between high-intensity and low-intensity fires is significant for preparedness planning and response. For example, BCWS ground crews will action a fire burning with an intensity of more than 2,000 kilowatts per metre. This is a measure of energy being put out by the heat of an advancing fire. In forested environments, fires with high intensities can climb into tree crowns via ladder fuels. If conditions are right, ignition in the tree canopy will become an active ***crown fire*** – one where fire is spreading along the ground and through the crown simultaneously. These fires consume whole forests, from the ground to the tops of the trees, send embers far ahead on the wind to light new blazes, and are too dangerous to fight directly.

Crown fire is a wildfire that involves fuels in the tree canopy. It can be “active”, meaning fire is advancing through tree crowns simultaneously with surface fire spread, or “passive”, meaning surface fire intensity is great enough to cause torching of single trees or small tree patches.



Photo 7. A wildfire with active crown fire.

Crown fire becomes more likely where hazardous coniferous fuels have low **vertical** and **horizontal separation**. Amid the amazing variety of forests, some combinations of species, sites, and climates naturally produce ecosystems that have less separation between the fuel layers (vertical separation) or neighbouring tree crowns (horizontal separation). The fuel characteristics of forests also change drastically over time as the ecosystem develops. In Canada, a standardized system of assigning real forests to 16 simplified fuel types is used to help model wildfire threat and risk. These are the fuel types of the Canadian Fire Behaviour Prediction System. Although the fuel types were developed with the rest of Canada in mind, practice in British Columbia and applied research by the Canadian Forest Service and BCWS has resulted in several standard rules for assigning forests fuel types.

Vertical and **horizontal separation** refer to fuel distribution within a forest and are used to help classify forests into standardized fuel types.

Here on the warm coast of the Salish Sea, most of the native coniferous forests are represented by the C-5 fuel type. This represents a coniferous forest with a relatively high horizontal and vertical separation of fuels, where a high intensity of surface fire would be required under normal weather conditions to create an active crown fire. As a result, C-5 forests on flat ground are typically rated to have moderate wildfire threat (potential wildfire behaviour). Young forests are typically denser and may have less separation between fuel layers and neighbouring tree crowns. As such, young coniferous forests have mostly been assigned the C-3 fuel type, which is associated with a high wildfire threat. Other common fuel types are M-2 (mixedwood) and D-1 (deciduous). Stands with a high proportion of deciduous trees are expected to have reduced wildfire threat. The wildfire threat in M-2 stands is significantly affected by the proportion of conifers found in them.

Table 8 provides a breakdown of fuel types by total area.

Table 8. Summary of fuel types within EA B.

Fuel Type Name	Area (ha)	General description
C-3	176.0	Young, dense stands of the native conifer Douglas-fir, generally less than 40 years in age and less than 12-15 m in height.
C-5	3,738.8	Mature, low to moderate density stands of the native conifer Douglas-fir, generally over 40 years in age and over 15 m in height.
D-1/2	883.5	Deciduous stands with fewer than 25% coniferous composition.
M-1/2	374.0	Mixedwood stands having between 25 and 75% coniferous and deciduous composition.
N	3.3	Non-fuel areas – pavement, rock, extensive sand.
O-1a/b	602.8	Grass fuel types, also used to represent agricultural fields and large lawns.
W	15,347.7	Bodies of water, including freshwater and the ocean.

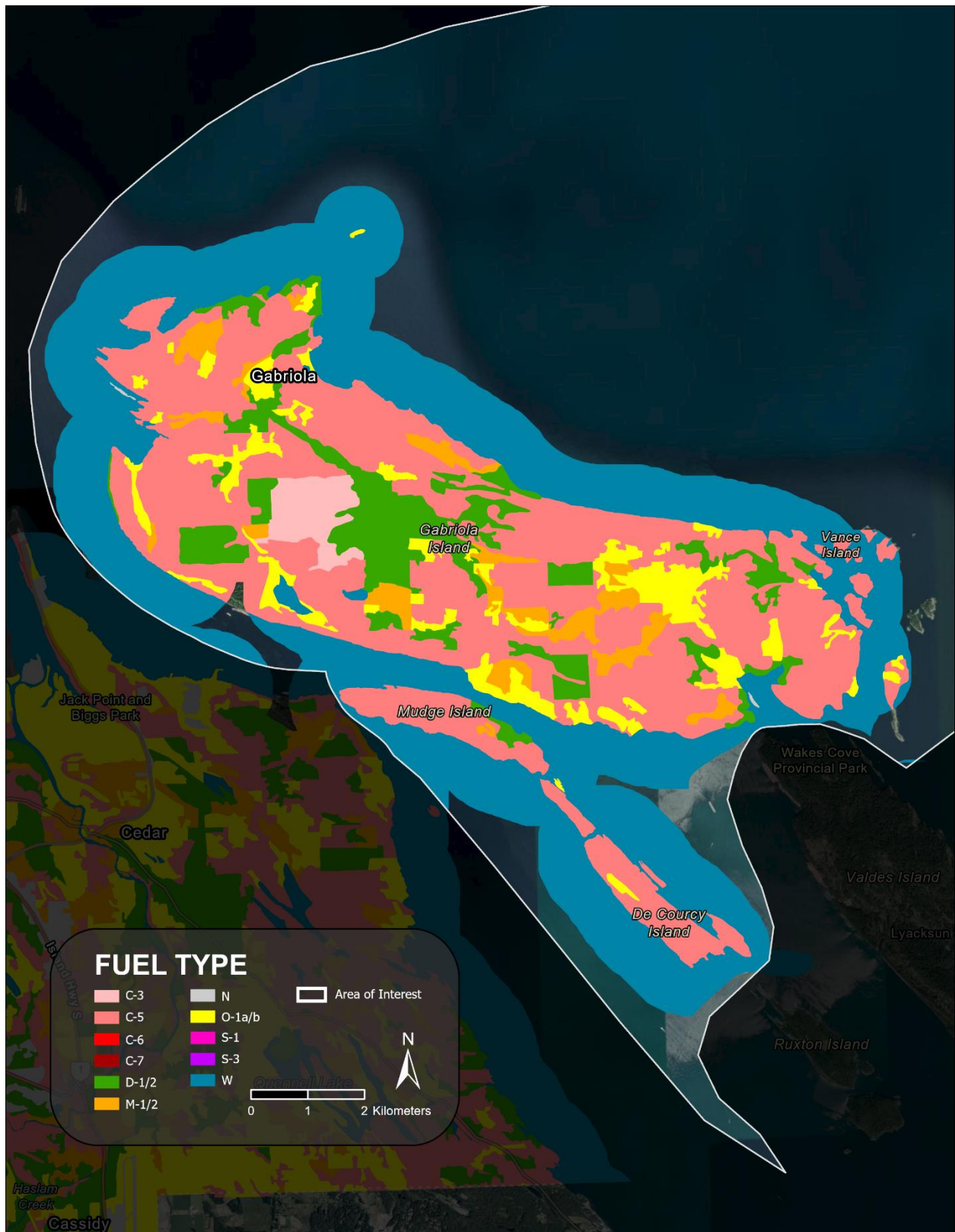


Figure 7. Fuel types in the area of interest.

Weather

Weather in EA B is strongly influenced by the surrounding ocean. Sea breezes cool air during the summer and increase local humidity. Average daily highs for Gabriola Island have ranged between 6°C (December) and 24°C (July & August). Most precipitation arrives in fall, winter, and spring, with sharply reduced precipitation in July and August. Snow is rare and may fall only once or twice per year. Due to subdued elevation, isolation, and mild climate, the ecosystems found in EA B receive no supplementary moisture from snowmelt.

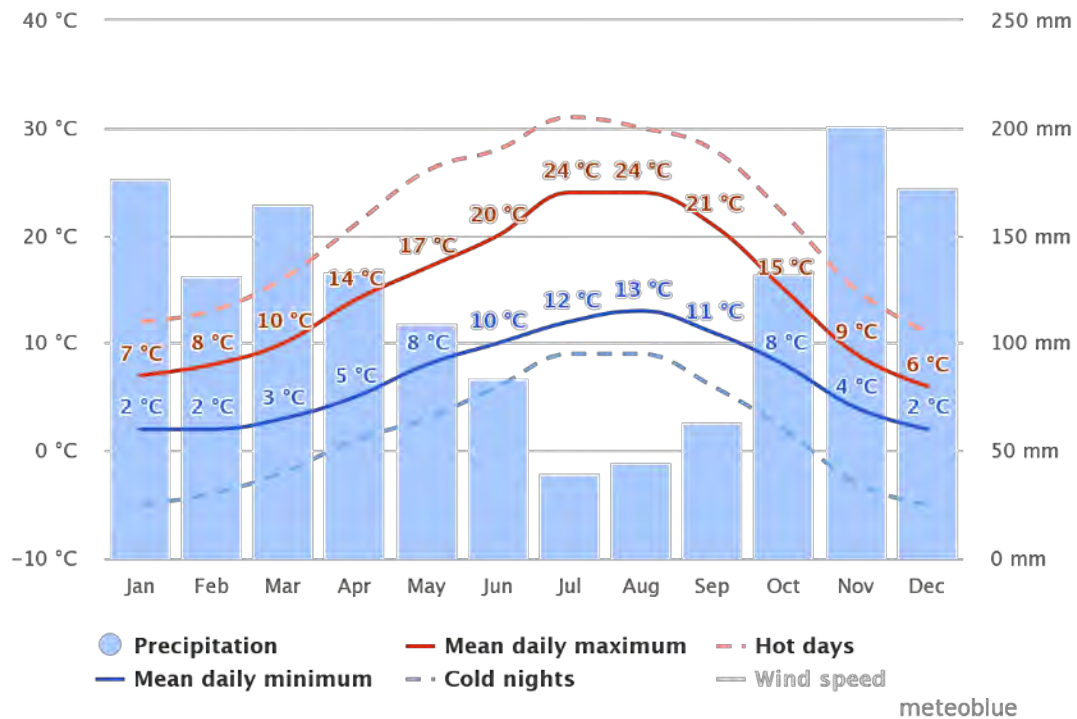


Figure 8. 30-year modelled climate averages for Gabriola Island (meteoblue).

The Salish Sea directs winds throughout the year. Winter is the windiest time of year when the North Pacific storm track sends high winds and moisture to EA B from the south. These events are often experienced on the islands as strong southeasterly winds. Storms also come from the northwest, though these tend to be weaker. Occasionally, EA B is on the receiving end of cold easterly outflow winds that channel through the valleys of the Lower Mainland and across the Strait of Georgia. While fire risk is very low during wet winter months, wind events are notable because they contribute to surface fuel loading by bringing woody debris and needles to the forest floor. These fuels then dry out to become tinder for the next fire season.

Winds are subdued in the summer months when EA B experiences high air pressure and mostly stable skies. The peak fire season is characterized by many warm, blue sky days. Typically, EA B exceeds average temperatures when high pressure over the BC Interior forces warm, dry air down to the coast. These events lower the relative humidity, raise temperatures, and increase the potential for fire ignitions. During severe fire seasons, they also bring smoke to EA B. Further south in Washington and Oregon similar east-to-west summer airflows have been linked historically to catastrophic fire seasons with hundreds of thousands of ha burned¹⁶.



Photo 8. The Salish Sea plays a key role in determining the weather experienced in EA B.

¹⁶ Abatzoglou, J.T., D.E. Rupp, L.W. O'Neill, & M. Sadegh. (2021). Compound extremes drive the western Oregon wildfires of September 2020. *Geophysical Research Letters* 48(8):

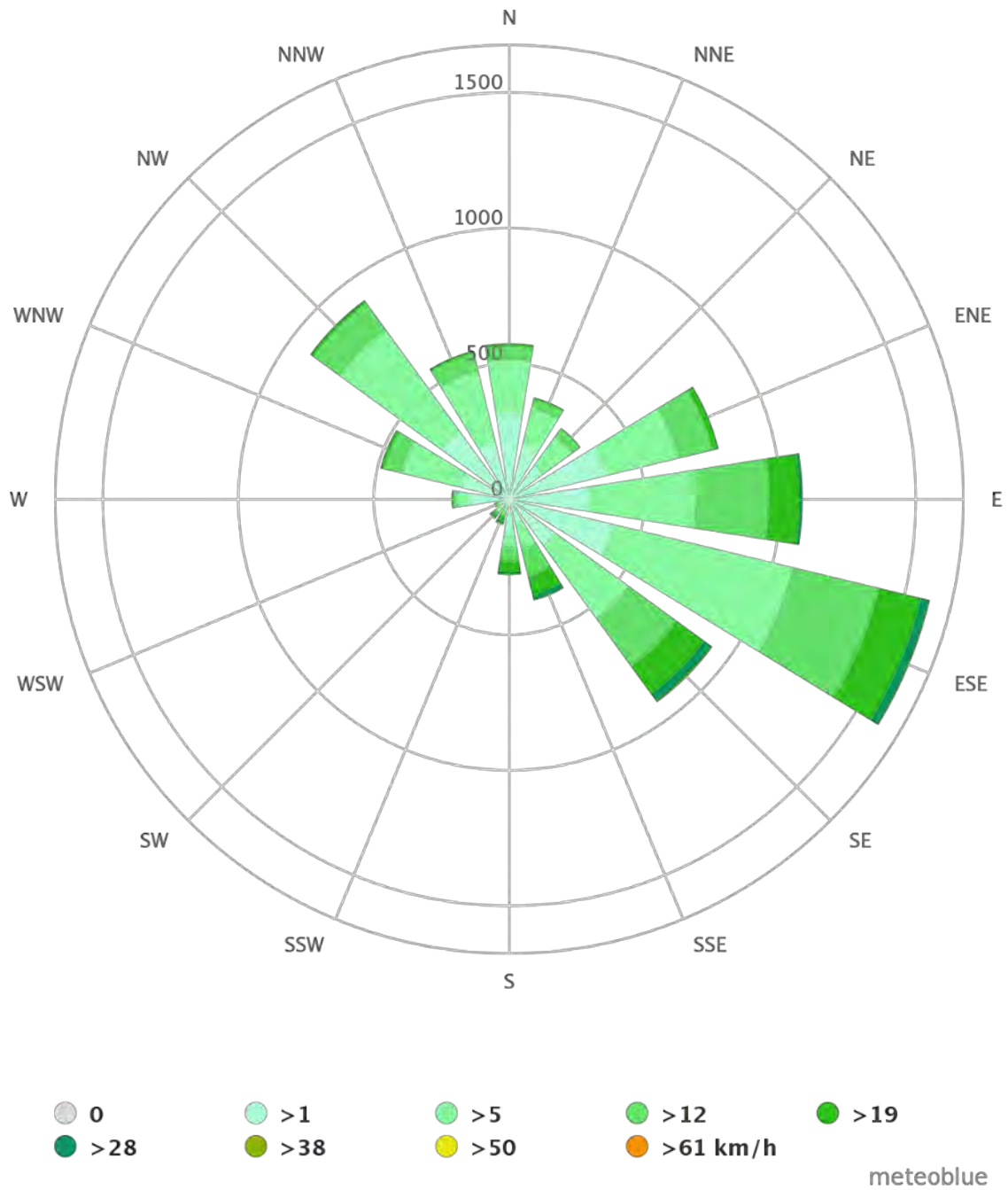


Figure 9. Wind rose diagram for Gabriola Island (meteoblue). The diagram shows cumulative hours (the wind rose radius) at an average windspeed from each cardinal direction during the average year (1990-2020).

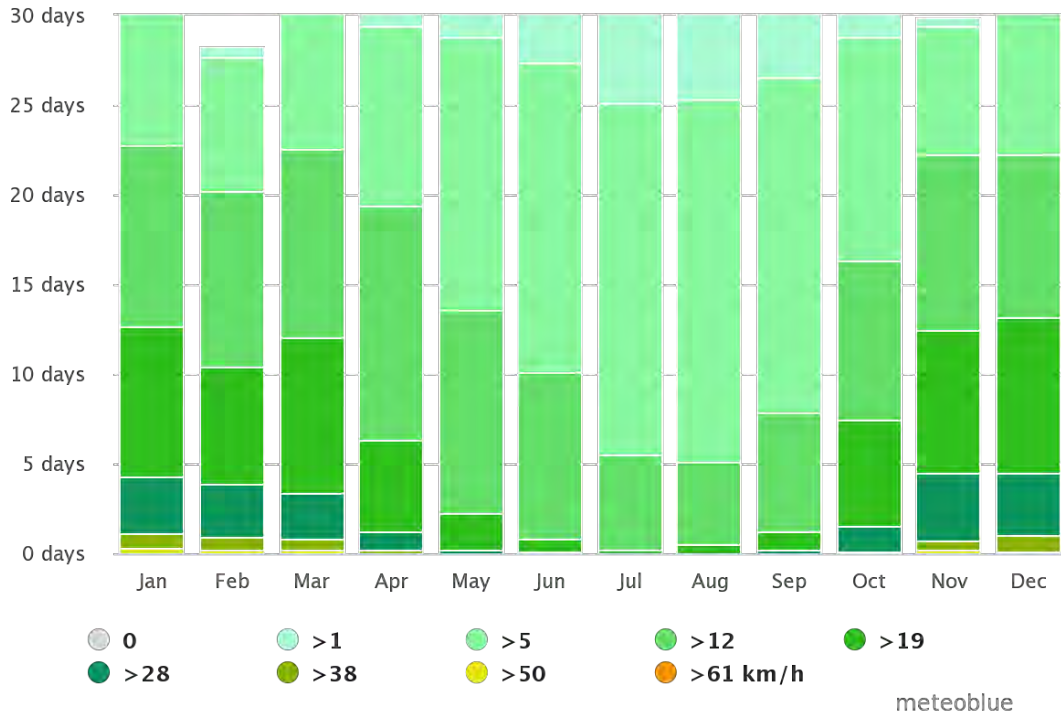


Figure 10. Windspeeds by month experienced for Gabriola Island (meteoblue).

Fire Weather Rating

Fire Weather Rating is the use of weather measurements to assess likely fire behaviour for a defined forecast period. The BC Wildfire Service (BCWS) monitors weather throughout the province. Fire weather is an essential component in most fire prediction models and is used to help determine a community’s landscape-level wildfire threat. In Canada, temperature, relative humidity, wind, and 24-hour precipitation are tracked daily and recombined to calculate several index components of fire weather. While these variables are tracked annually, during most of the rainy season weather measurements fail to meet thresholds for the publication of calculated fire weather indices. The Canadian Forest Fire Danger Rating System carries rules about when in the year fire weather ratings need to be updated daily so the public and emergency responders can plan activities to mitigate fire risk. This is an estimate of fire season, which is the period in the year during which wildfire activity is reasonably foreseeable. Historically wildfire season begins May 1 and lasts until September 30.

Table 9 shows weather averages during the core fire season (May-September) for the nearest BC Wildfire Management Branch weather station, which is located at the Nanaimo Airport (Cedar). Data shown covers the twenty-year period between 2000 and 2020, inclusive. Comparison statistics from 2018 and 2021 are presented separately to illustrate weather during recent years with elevated fire danger. The statistics show fire season weather is characterized by an extended period of hot, dry conditions in EA B. In 2018 and 2021, years that featured highly active wildfire seasons in the rest of the province, a prolonged drought occurred throughout July and August alongside higher-than-average temperatures.

Table 9. 20-year average weather (2000-2020), from BCWS Cedar (59).

	Weather Attribute	May	Jun	Jul	Aug	Sep
2000-2020	Maximum Daily High (°C)	28.0	31.3	34.5	33.1	28.4
	Daily Average High (°C)	15.9	18.8	22.0	22.1	19.3
	Monthly Average Rainfall (mm)	44.3	39.4	19.8	24.7	43.1
2018	Maximum Daily High (°C)	28.4	34.2	34.4	33.8	27.8
	Daily Average High (°C)	19.5	19.5	25.4	24.2	17.7
	Monthly Rainfall (mm)	4.6	43.8	1.6	2.4	104.2
2021	Maximum Daily High (°C)	25.2	41.3	35.0	37.4	27.8
	Daily Average High (°C)	17.2	23.5	26.1	24.7	18.8
	Monthly Rainfall (mm)	18.8	39.0	0	4.8	115.0

Climate Change and Wildfire Behaviour

Climate change is causing changes to temperatures and precipitation patterns that impact forest health and wildfire risk. In 2021, EA B faced a late-June heatwave that brought temperatures rarely recorded and touched off a long summer of drought. The 2021 “Heat Dome” was assessed by climate scientists to have been made 150 times more likely by anthropogenic climate change¹⁷. The Pacific Climate Impacts Consortium has modelled anticipated climate impacts for each regional district in British Columbia using the RCP 8.5 (high emissions) greenhouse gas emissions scenario¹⁸. The estimates present what the climate could soon look like if little action is taken to reduce greenhouse gas emissions. By the 2050s, the RDN could see annual average temperatures increase by 2.7°C. Rainfall is expected to increase by 7% annually and by 3.9% in summer. Despite this, PCIC projects the dry season in EA B will lengthen. This is because as temperatures warm, more rainfall is needed to counteract the effect of increased evaporation and transpiration from soil and plants. The average figures for temperature and precipitation conceal an expected increase in the frequency of extreme events, such as the June 2021 heatwave. A shift to more intense rainfall events could counterintuitively contribute to predicted dryness because intense precipitation events more often exceed the water infiltration capacity of soils and cause increased surface runoff rather than downward recharge of soil moisture.

Predictions for warmer, drier summers are ingredients for a longer wildfire season. Patterns observed in other parts of BC and North America suggest that hotter, drier conditions are likely to result in an overall

¹⁷ Philip, S.Y., S.F. Kew, G.J. van Oldenborgh, W. Yang, G.A. Vecchi, F.S. Anslow, S. Li, S.I. Seneviratne, L.N. Luu, J. Arrighi, R. Singh, M. van Aalst, M. Hauser, D.I. Schumacher, C.P. Marghidan, K.I. Ebi, R. Bonnet, R. Vautard, J. Tradosky, D. Courmou, F. Lehner, M. Wehner, C. Rodell, R. Stull, R. Howard, N. Gillett, & F.E.L. Otto. (2021). Rapid attribution analysis of the extraordinary heatwave on the Pacific Coast of the US and Canada June 2021. World Weather Attribution. [Unpublished]. Accessed October 21, 2021. worldweatherattribution.org/western-north-american-extreme-heat-virtually-impossible-without-human-caused-climate-change/

¹⁸ Pacific Climate Impacts Consortium. 2021. Plan2Adapt [Online tool]. Accessed October 21, 2021. services.pacificclimate.org/plan2adapt/app/

increase in wildfire frequency^{19,20}. Warmer temperatures in spring and fall will extend the duration of the fire season, extending periods of wildfire hazard throughout more of the year²¹.

Climate change affects the fuel environment as well as fire weather ratings. Climate change affects forest health by subjecting trees to different climatic conditions than those they have grown in, which can induce stress and create the conditions for outbreaks of insects and tree diseases²². More frequent or prolonged droughts reduce tree health and vigour, which also increases susceptibility to pathogens and pests²³. Declining forest health tends to increase forest fuel loads because it increases tree mortality and morbidity relative to normal levels. Forest health damage agents can be biotic, like mountain pine beetle, or abiotic, like an unusual windstorm or frost. For example, in the Coastal Douglas-fir biogeoclimatic zone the widespread decline of western redcedar has been observed due to drought stress. This has increased fuel loads in some cedar forests, particularly the fine fuel load of small branches and dropped foliage that contributes to increased surface fire intensity. At the same time, longer growing seasons may increase fuel production by allowing more photosynthesis.

Despite uncertainty about the pace of climate change and the drive toward mitigation, BC's fire season has lengthened in recent years. The moist winter climate creates high volumes of foliage and woody material which are potential fuels during summer droughts. It is reasonable to expect that climate change impacts on forest health and weather patterns will increase wildfire intensity and frequency.

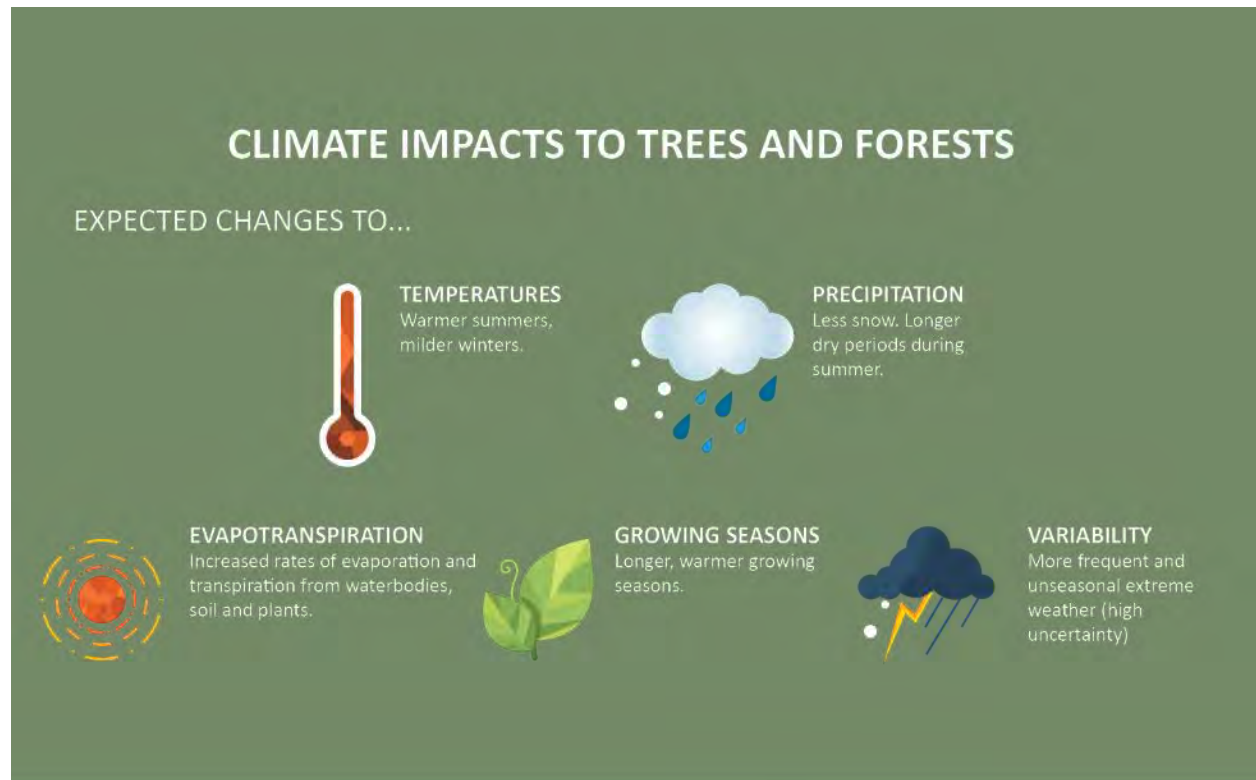
¹⁹Kirchmeier-Young, M.C., N.P. Gillett, F.W. Zwiers, A.J. Cannon, & F. Anslow. (2019). Attribution of the influence of human-induced climate change on an extreme fire season. *Earth's Future*, 7: 2-10.

²⁰Taylor, S., Régnière, J., St-Amant, R., Spears, J., & Thandi, G. (2010). High resolution simulations of fire weather indices and wildfire risk in British Columbia with climate scenarios. Victoria: Canadian Forest Service.

²¹Abatzoglou, J., & Williams, A. (2016). Impact of anthropogenic climate change on wildfire across western US forests. *Proc Natl Acad Sci USA* 113(42):11770–11775.

²²Woods, A. J., Heppner, D., Kope, H. H., Burleigh, J., & Maclauchlan, L. (2010). Forest health and climate change: A British Columbia perspective. *The Forestry Chronicle*, 86(4), 412-422.

²³Sturrock, R., Frankel, S., Brown, A., Hennon, P., Kliejunas, J., Lewis, K., Woods, A. (2011). Climate change and forest diseases. *Plant Pathology*, 60(1), 133-149.



...MAY CAUSE:



Figure 11. Potential impacts of climate change on wildfire behaviour.

Fire History

Climate and Ecosystems

EA B within a zone of near-Mediterranean climate characterized by cool, wet winters and warm summers with long dry periods. This climate helps shape the **biogeoclimatic ecosystem classification (BEC)** and **fire regime**. The Biogeoclimatic Ecosystem Classification system is used in British Columbia to describe ecosystems by vegetation, soil, and climate. The entire province is divided into regional or landscape-scale classifications called zones, which each present a dominant vegetation community as the result of interactions between soils, climate, and current ecology. It is apparent that wildfire is a disturbance with a likelihood that is directly related to the kind of ecosystems found here. The pattern of returning fire in the landscape is called the fire regime. Understanding fire regime helps us contextualize risk in EA B and appropriate responses for management.

Biogeoclimatic ecosystem classification (BEC) is the province-wide system used to relate climate, physical geography, and plant communities.

Fire regime is the pattern of returning fire in a landscape, dependent on climate, ecological, and anthropological factors.

EA B is entirely within one BEC zone, the Coastal Douglas-fir Zone (CDF). This BEC zone occurs in the rainshadow of the Insular (Vancouver Island) mountains and is the driest, mildest area of British Columbia’s temperate coastal rainforest. The CDF is characterized by warm, dry summers with an extended fire season. Table 10 compares climate averages for the CDF with the next most similar BEC category, the Coastal-Western Hemlock (very dry maritime) subzone (CWHxm).

Table 10. Climate maximums and minimums for weather stations in the CDF and the next most similar BEC category (CWHxm).

Biogeoclimatic Classification	Avg. Annual Precipitation (mm)	Avg. Summer Precipitation (mm)	Avg. Annual Temperature (°C)	Summer Heat to Moisture Index*
CDFmm	1038	198	9.8	89
CWHxm1	1427	285	9.3	62

Compared with nearby forests in the CWHxm, forests of EA B have less annual and summer precipitation and less snowfall. Aridity during the early fire season is increased on forested islands by the lack of any water from montane snowmelt. These relatively dry conditions result in the characteristic forests of pure Douglas-fir (*Pseudotsuga menziesii*), broken up by patches of broadleaved arbutus (*Arbutus menziesii*) on rocky outcrops. In wetter areas, these forests can be mixed with red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera* var. *trichocarpa*), bigleaf maple (*Acer macrophyllum*), grand fir (*Abies grandis*), and western redcedar (*Thuja plicata*).

Disturbance Regime

All ecosystems are influenced by periodic disturbances that vary in size, severity, and frequency. Examples of common disturbances include wildfire, windthrow, ice and freeze damage, water, landslides, insect, and disease outbreaks as well as human-caused events such as logging. Historically, agents of disturbance were viewed as unhealthy and a threat to the integrity of the forest as a timber

resource. Today, foresters and ecologists alike recognize the role of periodic disturbance in maintaining healthy and diverse forests and ecosystems.

All BEC subzones have been separated into natural disturbance types (NDT) according to the Forest Practices Code Biodiversity Guidebook. These natural disturbance types are classified into five categories based on the size and frequency of natural disturbances that occur in those ecosystems:

- NDT 1 Ecosystems with rare stand-initiating events
- NDT 2 Ecosystems with infrequent stand-initiating events
- NDT 3 Ecosystems with frequent stand-initiating events
- NDT 4 Ecosystems with frequent stand-maintaining fires
- NDT 5 Alpine Tundra and Sub-alpine Parkland ecosystems

The Coastal Douglas-fir Zone is considered to belong to NDT 2 – ecosystems with infrequent stand-initiating events. This means that, before colonization, new forests in this area would have sprouted after fires of moderate to severe intensity. “Stand-initiating” refers to the act of destruction that removes the existing forest and frees up space and resources for a new forest stand to grow in its place. Species like Douglas-fir are relatively shade-intolerant, meaning they cannot grow competitively under the shade of other trees. For this reason, the landscape of the CDF needs stand-initiating fire disturbance to reset ecosystems and allow new trees to grow. Pre-colonization **fire return intervals** in Coastal Douglas-fir forests are estimated to be 200 years. Fires would have been of moderate size (20 to 1000 ha) with unburned areas resulting from local geography and chance. Forests would have taken the appearance of a mosaic of even-aged stands with scattered veteran, fire-scarred trees²⁴. Site-specific studies have shown through charcoal analysis that the fire interval was more frequent than 200 years in some coastal Douglas-fir forests^{25, 26}.

Fire return interval is the time between fires in a defined area, typically measured at the landscape scale.

²⁴ Province of British Columbia. (1995). Biodiversity Guidebook. *Forest Practices Code of British Columbia*, p. 22.

²⁵ Murphy, S.F., M.G. Pellatt, & K.E. Kohfeld. (2019). A 5,000-year fire history in the Strait of Georgia lowlands, British Columbia, Canada. *Frontiers in Ecology and Evolution* 7(90).

²⁶ Lucas, J.D. & T. Lacourse. (2013). Holocene vegetation history and fire regimes of *Pseudotsuga menziesii* forests in the Gulf Islands National Park Reserve, southwestern British Columbia, Canada. *Quaternary Research* 79(2013): 366-376.

Changes in fire return interval

Fire return intervals are not homogeneous in time or across the landscape, and most of all they reflect the cultural norms and practices of human society. Ecologists believe the present landscape of Douglas-fir forests and other mixed tree species took shape in the past 4500 years, following a period of pronounced warmer climate that allowed Garry oak (*Quercus garryana*) to enter the region from the south²⁷. The influence of indigenous land management is evident in charcoal and pollen records from the Coastal Douglas-fir zone, showing a practice of cultural burning with low severity fire that caused Garry oak meadows to persist despite a cooling of the climate, more favourable to closed-canopy Douglas-fir forests²⁸. These cultural burns were small fires set in the spring and fall to reduce the build-up of debris in forests, clear productive meadows of new conifer trees, and enhance valuable food crops and game forage among other purposes. Indigenous burning was seen as threatening by settlers, despite settlers using fire to clear land for farming. Cultural burning was restricted by the colonial government's Bush Fire Act of 1874. This ushered in a period of increasing government control over the land base and oppression of indigenous people and cultural practices. The 20th century was dominated by a "put-it-out" philosophy that emphasized the suppression of all fires in a bid to protect the timber resource and forest communities. The effectiveness of this approach is now being questioned as British Columbia's worst fire seasons accumulate in recent decades.



Photo 9. Wildfires in southern Vancouver Island are increasing in intensity and frequency.

²⁷ Hebda, R.J. (1995). British Columbia Vegetation and Climate History with Focus on 6 ka BP. *Geographie physique et Quaternaire*, 49(1), 55-79.

²⁸ Brown, K.J., N.J.R. Hebda, G. Shoups, N. Conder, K.A.P. Smith, J.A. Trofymow. (2019). Long-term climate, vegetation and fire regime change in a managed municipal water supply area, British Columbia, Canada. *The Holocene* 29():1411-1424.

Recorded fires in the project area

On the coast, large fires in recent history have been caused by human activities. Forest stands in many areas of coastal British Columbia originate after several hot, dry years between the 1880s and 1920s, during which land clearing, lumbering, railways, camping, and mining activities provided many sources of ignition²⁹.

The BCWS provides information on historic fires throughout British Columbia. Since 1950, there have been 83 wildfires recorded by the Wildfire Service in EA B. 23 of these were classified as “nuisance fires”, which are fires that did not spread to surrounding vegetation but were nevertheless called into the Wildfire Service. The remaining 60 fires did spread to vegetation and required fire suppression. The largest escaped fire during this period occurred in 1956 and burned 36.4 ha on Mudge Island.

The Wildfire Service also keeps longer reaching information on large fires. Between 1920 and 2020, six large fires (> 10 ha) occurred in EA B (including the 1956 fire on Mudge Island). All these fires occurred before 1957 and burned a total of 822 ha, led by a significant fire in 1938 which consumed 657 ha of south-central Gabriola Island.

Table 11. Large fires (>10 ha), 1920-2020.

Year	Size (ha)	Location
1923	52.2	Gabriola Island
1930	13.2	Gabriola Island
1930	15.5	Gabriola Island
1930	50.4	Gabriola Island
1938	657.4	Gabriola Island
1956	36.4	Mudge Island

Since 1950, the average size of fires is just over 0.9 ha, but this is distorted by a small number of escaped, larger fires. Since 1950, fires larger than one ha have only occurred in 1956, 1958, and 1989. The median size of fires during this period has been 0.1 ha, or slightly smaller than a standard residential lot. This means that a large number of ignitions are not becoming large fires and is a good indication of historic suppression success during the period since 1950.

Table 12. Historical fires by community since 1950.

Community	Number of fires*	Total area burned (ha)*	Median fire size (ha)*	Largest fire size (ha)
Gabriola Island	41	5.7	0.1	0.5 (1954)
Mudge Island	17	37.4	0	36.4 (1956)
DeCourcy Island	5	0.2	0.009	0.1 (1975, 1979)
Outlying islands	20	13.2	0.1	8.9 (1958)

*Includes nuisance fires. Only fires reported to BCWS are represented.

Human intervention in the forest, both deliberate and unintentional, has impacted the fire regime in this area. Every fire recorded in the BCWS data since 1920 has been caused by humans except for two of

²⁹Parminter, J.V. (1978). An Historical Review of Forest Fire Management in British Columbia. [Thesis]. Vancouver: University of British Columbia.

unknown cause. Prohibition of indigenous cultural practices, growing opposition to slash-burning in expanding communities, and effective fire suppression have all limited fire behaviour since the major fires of the early 20th century. While there are still many ignitions in the interface owing to campfires, recreation, and other human causes, most are immediately extinguished by firefighters, community members, or unsuitable weather conditions.

Urban development in the forest interface has impacted forest stands by compacting soils, changing how water flows through the landscape, and opening stands to new wind and sun exposure. While these physical impacts can decrease forest health³⁰ and contribute to forest fuel conditions, the larger impact of urban development is to increase the potential sources of ignition within the forest by placing people, machines, and buildings -- and the activities that involve sources of heat or energy -- close to forest fuels. Warmer, drier conditions caused by climate change in combination with more sources of ignition are increasing the risk associated with the interface of these temperate rainforests.

³⁰ Zipperer, W.C. & R.V. Pouyet. (1995). Urban and suburban woodlands: a changing forest system. Syracuse, NY: United States Forest Service, US Department of Agriculture.

Provincial Strategic Threat Analysis

The Provincial Strategic Threat Analysis is a wildfire risk mapping exercise conducted at a provincial scale. This analysis is intended to be used as a starting point for assessments of local wildfire threat, which can then be refined and focused at a local scale through a Community Wildfire Resiliency Plan. The Provincial Strategic Threat Analysis includes several spatial layers, including wildfire threat and fuel typing. The Community Wildfire Resiliency Plan involves updating these components of the Provincial Strategic Threat Analysis by integrating local weather and making field corrections to fuel typing for public land in the Area of Interest.

The analysis includes information and maps that describe fuel types, historical fire density, the potential for embers to land in an area (spotting impact), head fire intensity, and a final calculated wildfire threat score. Scores are then used to assign locations within the province into one of 10 Fire Threat Classes. Threat Class 7 is a threshold used to describe where the most severe wildfire behaviour is expected. Areas of the province that fall into these higher classes are most in need of wildfire planning and mitigation. Areas rated as Class 7 or higher are where fire intensity, frequency and spotting can potentially cause catastrophic losses in any given wildfire season wherever ratings overlap with values at risk. Class 6 areas are also considered prone to dangerous crown fires at lower frequencies.

This analysis was completed at a coarse-scale to allow efficient processing of large areas. The Provincial Strategic Threat Analysis identified the majority of the public land area as a moderate threat (95% of public land). Overall, 76% of EA B's land area is privately owned and cannot be rated by this analysis.

Table 13. Summary of wildfire threat from Provincial Strategic Threat Analysis

PSTA Threat Rating (class)	Area (ha)*	% of land area
Extreme (9-10)	0	0%
High (7-8)	0	0%
Moderate (4-6)	1,272	23%
Low (1-3)	66	1%
No Data (Private Land)	4,228	76%
Water	24,345	N/A

*Minor differences in area totals between PSTA data and other tables result from different data resolutions.

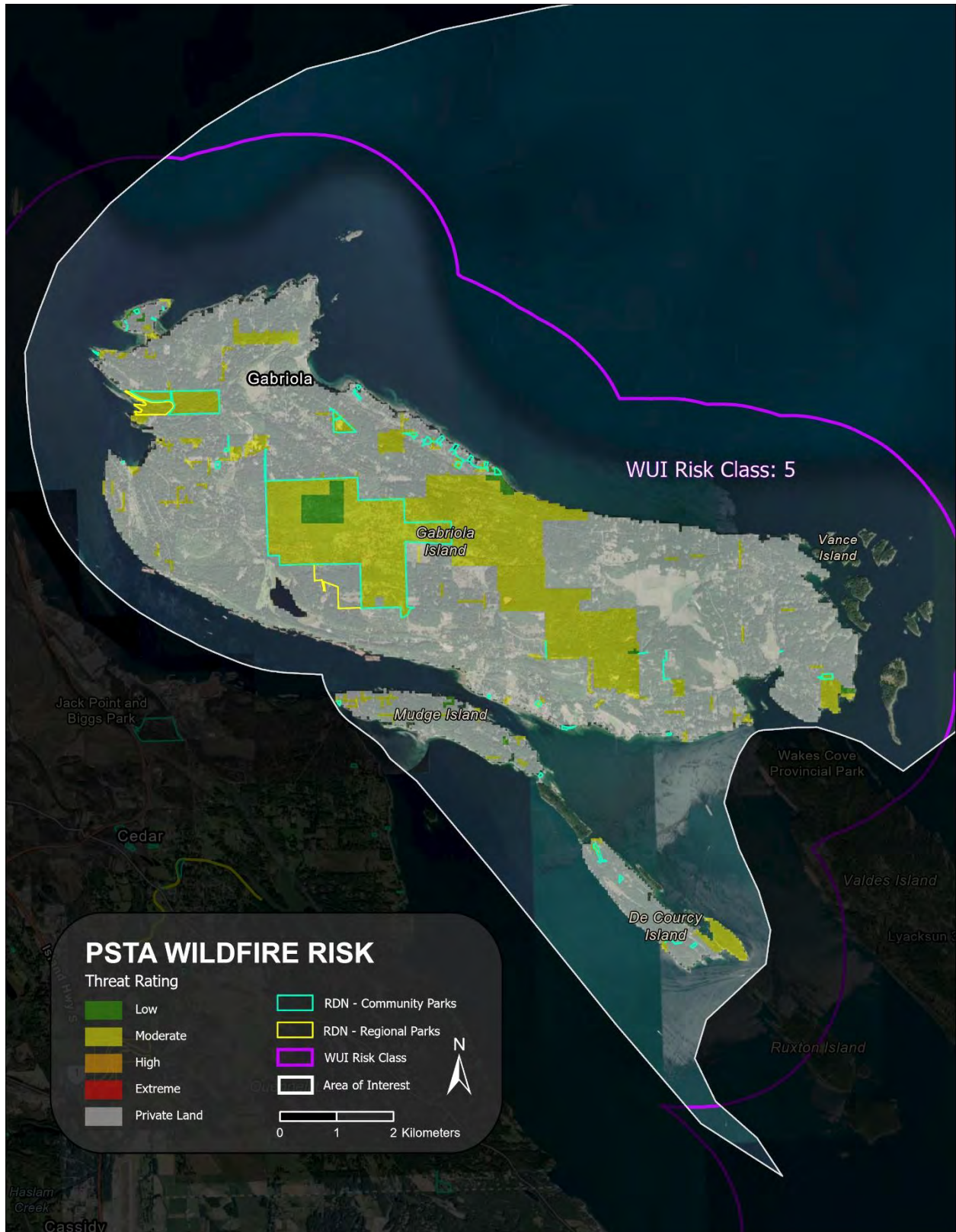


Figure 12. Wildfire threat ratings from Provincial Strategic Threat Analysis (PSTA)

The Provincial Strategic Threat Analysis is completed as a province-wide spatial layer with a 50-metre pixel size. This tool is useful for higher-level wildfire analysis and strategic emergency planning but lacks detail to support a local analysis of wildfire risk. Often errors or mismatches are identified when focusing on a specific area within this dataset. A key component of the Community Wildfire Resiliency Plan process is refining provincial data into maps of local wildfire threat based on local topography and validation of provincial fuel type information.

Wildfire Threat Assessment

Field checks of provincial data on public land were completed in July and August of 2021. These site visits were focused on parcels owned, leased, or otherwise maintained by the RDN within the wildland-urban interface (WUI), though other public lands were also visited. The goal of these site visits was to assess the wildfire threat, ground-truth the provincial data, and identify feasible potential fuel treatment areas. Sites were identified for assessment in advance using desktop analysis which considered the following:

1. Provincial Strategic Threat Analysis – High and Extreme wildfire threat areas
2. Structure Density – areas near high structure densities
3. Critical infrastructure – sites identified in collaboration with the RDN as critical for emergency response and governance.
4. Crown and municipal land – only public land was visited. Privately owned land was not visited.
5. Locally identified areas – areas recommended for field checks by RDN staff and fire department personnel.

A total of 11 wildfire threat plots and eight walkthrough assessments were conducted within the area of interest. Figure 13 shows the wildfire threat and risk results from the local threat assessment. Appendix C provides a detailed summary of the technical process for determining this local wildfire threat score.

Table 14. Summary of wildfire threat and risk from the local threat assessment.

Wildfire Threat	Area (ha)	% of land area	Wildfire Risk	Area (ha)	% of land area
Extreme	0.68	0%	Extreme	80.4	1%
High	312.48	5%	High	163.5	3%
Moderate	1363.8	24%			
Low	6.76	0%			
Very Low	4.0	0%			
No Data (Private Land)	4088.7	71%	No Data	4088.7	71%

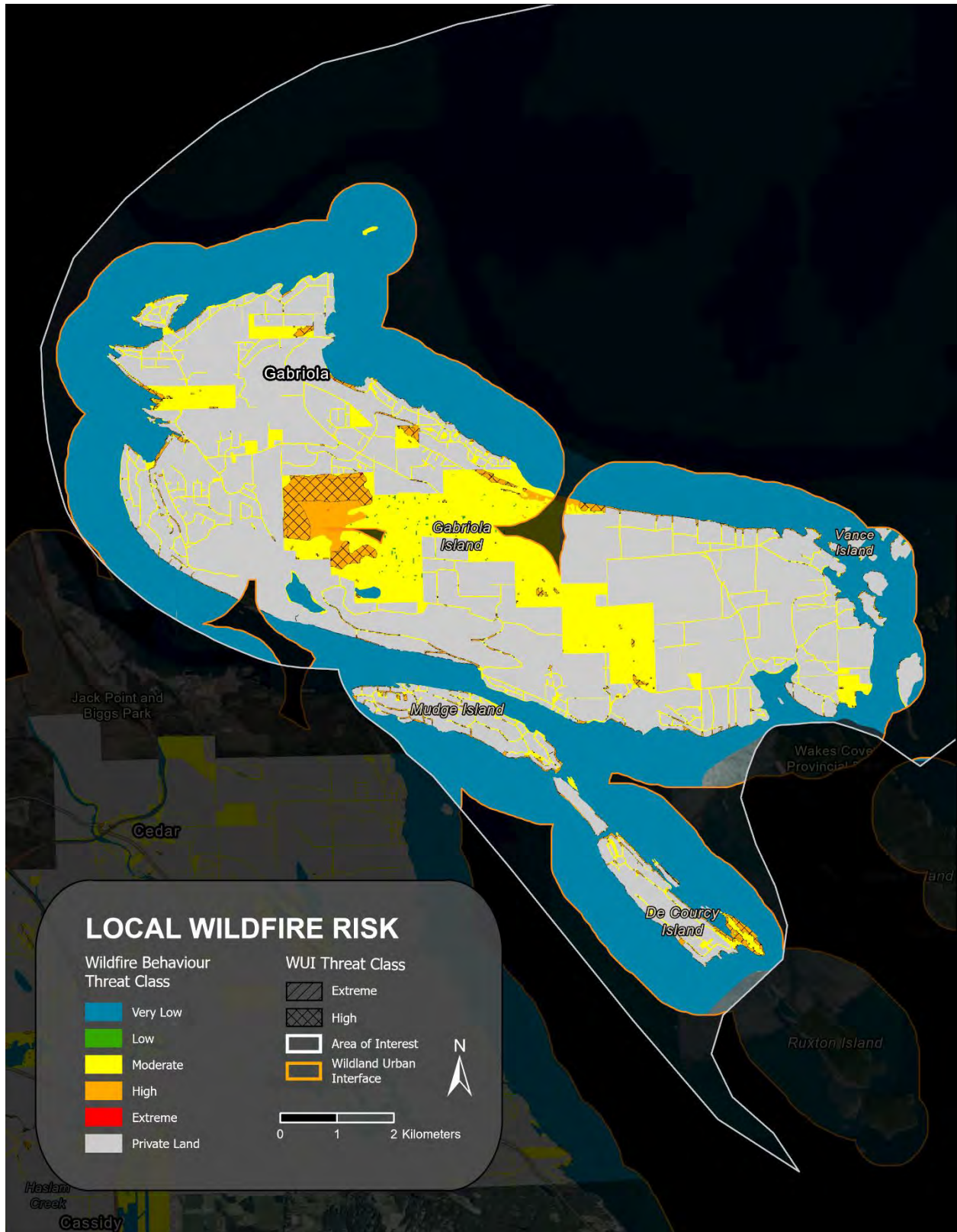


Figure 13. Wildfire threat and risk resulting from the local threat assessment.

Local Wildfire Risk Summary

Wildfire risk expresses wildfire behaviour is expected to threaten homes and other values. Risk is estimated based on the local wildfire threat assessments and conduct a geospatial analysis to intersect areas with high and extreme wildfire threat with the proximity of structures and critical infrastructure. Areas of higher wildfire threat within 500 m of identified values are assigned high or extreme risk.

Overall, wildfire risk in the community is moderate to high. The potential wildfire behaviour in the landscape is generally moderate, with scattered forests posing a high or extreme threat of wildfire behaviour. There is an extensive WUI throughout EA B that is mostly characterized by “intermix” conditions and a lack of clear boundaries between forests and homes. There is a high potential for severe wildfire to occur in this WUI posing a risk to property and life.

Moderate threat characterizes EA B wherever mature to old-aged coniferous forests are found on gentle ground. Moderate threat also characterizes most mixedwood areas, where stands have between 25-75% deciduous composition in the overstorey or main forest canopy. Areas associated with moderate wildfire threat are capable of supporting fire during a typical fire season but have a reduced likelihood of supporting a fire of high intensity. These forests require extreme fire weather and ignition conditions before they are expected to support active crown fire. Climate change may increase the likelihood of severe fire behaviour in these areas by raising fire weather indices above seasonal averages.

High threat is driven by different factors depending on location. In areas characterized by high threat, forests are likely to support intermittent crown fire in the hot, dry conditions brought by a typical fire season. The area of high wildfire threat in 707 Community Park is the largest contiguous area of high wildfire threat in EA B and includes a significant portion of high-risk due to adjacent residences. High threat in the park is caused by the younger, dense coniferous vegetation (fuel environment) found there.

Other, smaller areas of high wildfire threat are associated with mature coniferous fuel types on steep slopes. This effect increases with slope steepness and is typically minor on slopes of 20% gradient or less. In steeper areas, slope contributes to anticipated fire behaviour by preheating uphill fuels and causing more “bathing” of uphill fuels in flame due to slope geometry. High threat areas driven by slope are found on public lands on the north side of Gabriola Island and in the perimeter of Pirates Cove Marine Provincial Park on DeCourcy Island, where slopes are typically over 45%. These areas are somewhat discontinuous and may be broken by changes in terrain or the fuel environment.

High threat areas driven by fuel type and by topography may be found in forests on private land that are not included in the scope of this plan.

Wildfire Risk on Mudge and DeCourcy

Most of the public land in EA B is found on Gabriola Island. The only significant area of public land on outer islands is Pirates Cove Marine Provincial Park on DeCourcy Island. Although this limits the visibility of wildfire risk on Mudge and DeCourcy, much of the islands are forested with mature conifers which support moderate to high wildfire threat. Areas of high risk on these islands are likely limited to steeper slopes, as is the case in Pirates Cove Marine Provincial Park.

Neighbourhoods of Higher Relative Risk

A complete understanding of risk requires us to consider the other factors affecting the trajectory of a potential wildfire. These include the availability of access routes to and from affected areas for the public and emergency responders, as well as the availability of water supply for firefighting and level of training or response within communities that are geographically isolated from each other.

On Gabriola Island, there are a greater number of routes from one location to another. Roads on the north and south perimeter of the island form backbone of the road network and offer potential secondary access for cross-island travel during an emergency. The perimeter roads, including the recently finished Spruce-Church connector, provide access to coastal and inland subdivisions that more frequently had only one public access. The largest of these neighbourhoods is the Sandwell-Whalebone area, which is located on the north coast of Gabriola and relies on Barrett Road for its connection to the island's transportation network. Other small neighbourhoods with similar characteristics include Spring Beach/Islands View Drive, Seymour Road, Canso Drive, Malaspina Drive, and Orlebar Point. Each of these neighbourhoods is characterized by intermix conditions where forests have an indistinct boundary from urban development and homes have a single point of access to the rest of the island.

With Superior Tanker Accreditation, the Gabriola Volunteer Fire Department has met a water delivery standard in all parts of Gabriola Island within a certain timeframe. Remote areas that are far from water sources remain at relatively higher risk than other areas; however, these areas are typically within undeveloped lands. It is also important to consider that the accreditation does not consider the potential for a major wildfire event to ignite multiple structures or close a particular water source or road.

Mudge and DeCourcy Islands, being smaller in size and population, do not have redundancy in their public road networks. Most points on each island are connected to the remainder of the island by one other route. Because of the small size and linear shape of the islands, a major wildfire in one part of either would be likely to impede cross-island access by land, regardless of the number of available routes. Both islands are characterized by intermix conditions where the boundary between forest vegetation and development is indistinct, and both islands rely on unregistered community fire brigades for fire protection. In light of these factors, it is unlikely that wildfire risk differs meaningfully between the different parts of either island. Water supply for community brigade firefighting is distributed on both islands. Both islands have amassed several dozen thousand gallons in additional water supply and distributed it in cisterns. Sufficient training for emergency response and the availability of enough community volunteers for initial firefighting and scene control on these islands is thought to be of greater influence in risk than water supply.

Hazard, Risk, and Vulnerability Assessment

Hazard, Risk and Vulnerability analysis is undertaken by local governments in British Columbia as part of their efforts to develop an Emergency Management Plan. This process results in a report which rates different kinds of disasters and emergencies by their likelihood and consequence and deals with similar concepts to wildfire threat (the potential for a disaster to occur) and wildfire risk (the consequences of that potential disaster). The RDN completed its most recent Hazard Risk and Vulnerability Analysis in 2019. This analysis found that wildfire was the natural hazard of top concern in the RDN, being an event of both high likelihood and significant anticipated consequences. Wildfire had the highest combined risk score of all hazards assessed, ahead of overland flooding, drought, severe winds, earthquake, and many other categories. The results of the Hazard, Risk and Vulnerability Analysis are one of the primary reasons the RDN has undertaken to study wildfire risk in this Community Wildfire Resiliency Plan.

Introduction to FireSmart

FireSmart is a nationwide program for wildfire preparedness and prevention. Each province has established a committee to prepare FireSmart guidance for landowners, residents, developers, local government, and emergency responders to help them understand wildfire risk and preparedness concerns and to support implementing actions to manage wildfire risk. FireSmart is a system of knowledge shared throughout Canada’s wildland-urban interface (WUI) – training is available for individuals to become ambassadors for wildfire preparedness in their communities.

FireSmart is organized into seven “disciplines” or topic areas that address different aspects of wildfire preparedness:

- [Education](#) (p.67)
- [Legislation and Planning](#) (p.79)
- [Development Considerations](#) (p.84)
- [Interagency Cooperation](#) (p.8867)
- [Cross-Training](#) (p.93)
- [Emergency Planning](#) (p.97)
- [Vegetation Management](#) (p.101)

The following seven major sections of the Community Wildfire Resiliency Plan discuss each of these disciplines in turn and consider recommendations the Regional District of Nanaimo (RDN) may pursue to improve wildfire preparedness. Where available, examples of programs, initiatives, policies, or actions that fit within each discipline are provided along with further sources of information. See the [Action Plan](#) (p.111) or a summary of recommendations and suggested priorities.

The Community Wildfire Resiliency Plan uses FireSmart terminology to discuss risks and recommendations in your community. If you are unfamiliar with FireSmart, this section provides an overview of FireSmart concepts and ideas. For additional detail, you may wish to review the resources of BC’s FireSmart Committee to better understand the program’s focus and language. You can find this information online at firesmartbc.ca.

FireSmart – How it Works

FireSmart programming and materials make recommendations for building and landscaping based on wildfire science. The focus of this program is on homes, but recommendations are generally applicable to any building in the WUI. During a wildfire, homes are ignited by:

- Sparks or embers landing and accumulating on vulnerable surfaces such as roofs, verandas, eaves, and openings. Embers can also land on or in nearby flammable materials such as bushes, trees or woodpiles causing a fire close to a structure.
- Extreme radiant heat from flames up to 30 m away from a structure that melts or ignites siding or breaks windows.
- Direct flame from nearby forest vegetation.



Figure 14. Pathways to home ignition in the WUI.

FireSmart assessments divide the area around the home into three “priority zones”, which radiate out from the structure and reflect the different ignition pathways.

The Non-Combustible Zone is the area immediately adjacent to a structure, out to 1.5 m. A non-combustible surface should extend around the entire structure and any attachments, such as decks. Creating a non-combustible surface can be as easy as clearing vegetation and combustible material down to mineral soil.

Zone 1 is the area within 1.5 and 10 m of the home or building. In this area life and property are at higher risk from radiant heat. It has been shown through analysis of recent large-scale wildfires that the most important factors in protecting structures are the exterior construction materials and immediate landscaping next to homes³¹. FireSmart guidance emphasizes the use of non-combustible or fire-resistant building materials for decks and outbuildings along with landscaping plans that reduce the potential for direct exposure of the home to radiant heat or flame in this area. Cleaning up debris, garbage, or storage from around the home is also of primary importance in this area.

Zone 2 includes the area from 10 m to 30 m from a structure. Wildfire in forests within this zone can subject the building to radiant heat and may produce an ember shower onto the building. Forest fuels are generally treated aggressively in this area to prevent a crown fire from establishing and reduce the intensity of radiant heat and ember production. Treatments may include removal of ground fuel, thinning of trees, and lift pruning of retained trees.

Zone 3 includes the area from 30 m out to 100 m. People and structures are at risk from ember transport associated with a wildfire in this area. FireSmart guidance in this area can recommend forest stand thinning, fuel management, and the designation of access and egress. The goal in this area is to prevent a crown fire, but the distance from the home means fuel management is generally not as aggressive as treatments in Zone 2.

³¹ Westhaver, A. 2017. Why some homes survived: Learning from the Fort McMurray wildland/urban interface fire disaster. *Institute for Catastrophic Loss Reduction* (ICLR) research paper series – number 56. (March 2017).

FireSmart Zones

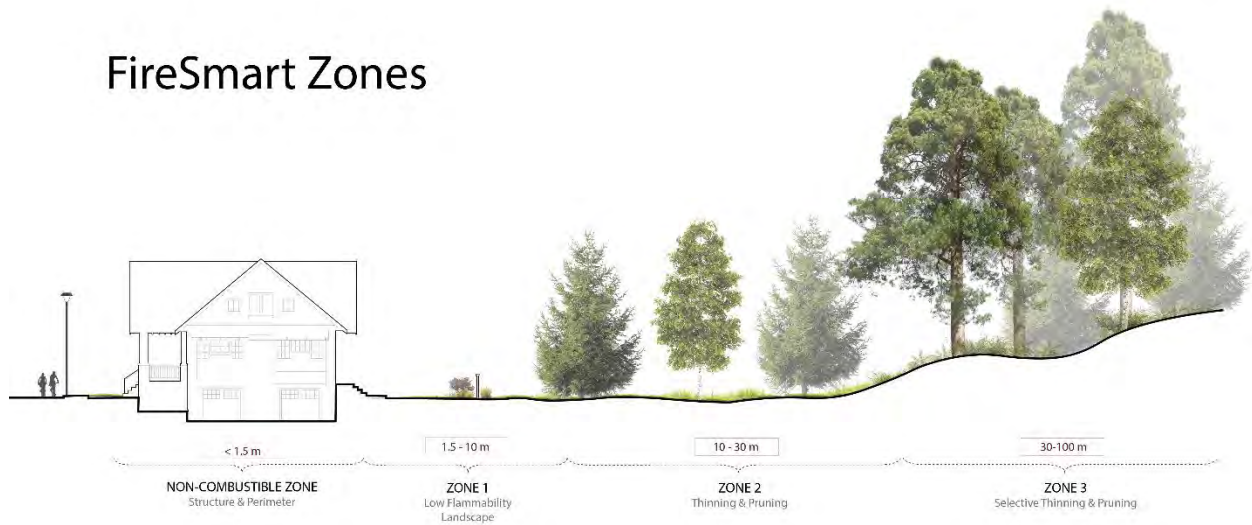


Figure 15. The FireSmart zone system.

The fire resistance of homes in the interface can be improved by achieving FireSmart standards for building materials, ignition sources and combustible fuels within each of these zones. If a wildfire does threaten the area, suppression capability is improved with good access to the interface area, defensible spaces around values, and a good water supply.

FireSmart – Goals and Objectives

The overall goal of FireSmart is to encourage private landowners to adopt and conduct FireSmart practices to minimize potential wildfire damage to life and property. Specific objectives include:

1. Reduce the potential for an active crown fire to move through private land.
2. Reduce the potential for ember transport through private land and structures.
3. Create landscape conditions around properties where fire suppression efforts can be effective and safe for responders and resources.
4. Treat fuels adjacent to structures to reduce the probability of ignition from radiant heat, direct flame contact, and/or ember transport.
5. Implement measures that reduce the probability of ignition of structures, infrastructure, and other assets.

Key Aspects of FireSmart for Local Government

FireSmart is the chosen frame for the Province’s support of community wildfire planning at a local government scale. The Province supports local governments to prepare Community Wildfire Resiliency Plans and conduct other FireSmart initiatives via the Community Resiliency Investment Program. The Community Resiliency Investment Program is administered by the Union of British Columbia Municipalities. This program allows local governments to access additional funding for wildfire risk management. The program encourages local government to:

- Update or develop a Community Wildfire Resiliency Plan.
- Develop policies and practices for FireSmart design in public projects.
- Conduct FireSmart risk assessments on public buildings and critical infrastructure.
- Amend high-level strategic community plans to accommodate wildfire risk analysis.
- Train employees in fire management and emergency response.
- Collaborate across jurisdictions on wildfire matters.

Table 15 summarizes FireSmart activities that are eligible for Community Resiliency Investment Program funding, as of the 2021 program year. Eligible activities are reviewed annually. The RDN should ensure its proposals consider the applicable program year and guide, and requirements may vary by application year.

Table 15. FireSmart activities eligible for Community Resiliency Investment (CRI) program funding (2022).

FireSmart Discipline or Program Area	Activity
1. Education	<ul style="list-style-type: none"> • Promotion of another eligible activity. • Organize and host public information meetings relating to another eligible activity. • Promote and distribute FireSmart educational materials and resources. • Support the organization of a Wildfire Community Preparedness Day. • Support the organization of a Neighbourhood Champion Workshop, community FireSmart day, or other related events, workshops and open houses. • Support neighbourhoods to apply for the FireSmart Canada Neighbourhood Recognition Program.
2. Community Planning	<ul style="list-style-type: none"> • Develop or amend a Community Wildfire Resiliency Plan.

FireSmart Discipline or Program Area	Activity
	<ul style="list-style-type: none"> • Develop FireSmart policies and practices for the design and maintenance of public assets and lands. • Complete FireSmart assessments for publicly owned critical infrastructure.
3. Development Considerations	<ul style="list-style-type: none"> • Amend Official Community Plans or land use, engineering, subdivision, and public works bylaws to incorporate FireSmart principles • Revise landscaping requirements in zoning and development permit documents. • Establish Development Permit Area for Wildfire Hazard. • Include wildfire prevention and suppression considerations in the design of subdivisions • Amend referral processes for new developments to ensure multiple departments, including fire services and/or emergency management personnel, are included.
4. Interagency Co-operation	<ul style="list-style-type: none"> • Develop, coordinate, and/or participate in a Community FireSmart and Resiliency Committee • Participate in multi-agency planning tables for fire and/or fuel management. • Provide Indigenous cultural safety and humility training to emergency management personnel to more effectively partner with and assist Indigenous communities. • Attend the annual FireSmart BC conference.
5. Emergency Planning	<ul style="list-style-type: none"> • Develop and/or participate in cross-jurisdictional meetings and tabletop exercises focused on wildfire preparedness and suppression, such as seasonal wildfire readiness meetings. • Assess community water delivery ability as required for suppression activities. • Assess structure protection inventory. • Use and/or promote Emergency Management BC Wildfire Preparedness Guide for community emergency preparedness events focused on wildfire.
6. FireSmart Training and Cross-Training	<ul style="list-style-type: none"> • Support neighbourhood representatives or local government staff to become certified as Local FireSmart Representatives and support certified staff to become facilitators. • Wildfire Mitigation Specialist training for the FireSmart Home Partners Program. • Cross-train fire department members (registered departments) to include structural fire and interface fire training (subject to course/credential eligibility). • Cross-train emergency management personnel to provide ICS-100 (Incident Command System and WRR Basics Course)
7. FireSmart Projects for Critical Infrastructure	<ul style="list-style-type: none"> • Modify landscapes & construction in line with the recommendations identified in a FireSmart assessment and document hazard score reduction following completion.
8. FireSmart Activities for Residential Areas	<ul style="list-style-type: none"> • Conduct Home Ignition Zone Assessments for individual residential properties or homes. • Develop a rebate program for residential property owners that complete eligible FireSmart activities (limited to 50% cost-sharing up to \$500 per property). • Undertake Neighbourhood Wildfire Hazard Assessments and support the development of FireSmart Neighbourhood Plans for specific areas. • Provide off-site green waste debris disposal for residential property owners who have undertaken FireSmart activities.
9. Fuel Management	<ul style="list-style-type: none"> • Undertake planning and development for fuel management on public land, consistent with the BC Wildfire Service Fuel Management Prescription Guidance Document. • Undertake required professional assessments to support plan development. • Implement new fuel management treatments on publicly owned land, or fuel management maintenance activities supported by a prescription.

FireSmart Discipline or Program Area	Activity
	<ul style="list-style-type: none"> • Off-site debris disposal for approved fuel management or maintenance activities. • Additional money is available for one “demonstration” fuel management project of no more than 5.0 ha in a public and accessible location with an educational component.
10. Additional Items (as they directly relate to eligible activities)	<ul style="list-style-type: none"> • Incremental staff and administration costs, including term contracts for a FireSmart Coordinator, Community FireSmart Resiliency Committee Coordinator, Qualified Local FireSmart Representative or Wildfire Mitigation Specialist, or summer/co-op students. • Consultant/contractor costs, including professional planners and foresters. • Public information costs.

The Role of a FireSmart Coordinator

Navigating all the aspects of FireSmart can be challenging for local government and private landowners. Local governments often lack the capacity to implement the FireSmart programming in addition to existing departmental responsibilities. To help with this issue, the Community Resiliency Investment Program allows a local government to apply for term contract funding for a FireSmart Coordinator. Given the size and population of the RDN, and the diverse responsibilities of the Emergency Services Department, having a dedicated FireSmart Coordinator for the Region is desirable. This position could be housed within the Emergency Services department, working with the Emergency Planning Coordinator and ultimately reporting to the Manager, Emergency Services. This position would create new capacity for FireSmart programs and enable the RDN to have more contacts with members of the public. The primary responsibilities of this coordinator are summarised in Table 16.

Table 16. Potential Roles of the FireSmart Coordinator

FireSmart Activity Category	Role of FireSmart Coordinator
Education	<ul style="list-style-type: none"> • Support the development of a detailed communications strategy for FireSmart • Develop and conduct a public education program, including meetings or information sessions, public signage, and social media. • Distribute FireSmart materials through community partners and online.
Community Planning	<ul style="list-style-type: none"> • Support neighbourhoods to apply for FireSmart Canada Neighbourhood Recognition, including by supporting facilitation and FireSmart events and demonstration projects. • Complete FireSmart assessments for critical infrastructure. • Conduct education for the RDN's planning staff on wildfire risk and FireSmart principles.
Development considerations	<ul style="list-style-type: none"> • Comment on wildfire issues within a development permit process on behalf of the Emergency Services department, when referrals are received from the Islands Trust.
Interagency co-operation	<ul style="list-style-type: none"> • Coordinate FireSmart initiatives between electoral areas and external partners as applicable, such as by representing the RDN in working groups or committees.
Emergency planning	<ul style="list-style-type: none"> • Provide comment on wildfire issues during emergency plan and response preparation.
FireSmart Implementation	<ul style="list-style-type: none"> • Coordinate retrofits and vegetation management for critical infrastructure. • With homeowners' consent: <ul style="list-style-type: none"> ○ Conduct Home Ignition Zone Assessments for residential properties or homes. ○ Help communities develop FireSmart Neighbourhood Plans. • Coordinate chipping days or bin programs to facilitate vegetative debris disposal.
Other	<ul style="list-style-type: none"> • Report on program implementation, progress, and community feedback regarding FireSmart. • Prepare grant applications

Having a FireSmart Coordinator working under the permanent staff in the Emergency Services department is particularly important in translating FireSmart language and principles into the context of the RDNs communities. This arrangement provides program continuity and a longer-sighted review of the RDN's messaging. Previously, attempts at establishing FireSmart neighbourhood committees have lost momentum when homeowners became discouraged by the strict appearance of the FireSmart Home Ignition Zone assessments. Ensuring that permanent staff continue to carry primary responsibility for the Region's FireSmart vision and message is one way to guard against this happening again. Ideally, permanent staff will be able to provide an incoming hire for this position with a clear understanding of the RDN's program priorities, key messages, and approach to FireSmart. Some of these elements have begun to be developed by this Community Wildfire Resiliency Plan in the following sections.

Education

Education is first among the seven FireSmart disciplines. This is because the impact of education is enhanced awareness of wildfire risk and prevention, which encourages individuals to act on private property while also building public support for initiatives by government. An education component is currently mandatory for applications to Community Resiliency Investment Program grants for wildfire preparedness.

Recommendations attached to the Education discipline are meant to promote a sense of understanding, empowerment, and eventually shared responsibility. The goal of initiatives in this discipline is to create citizens, emergency responders, and government officials who can explain and act on wildfire risk in their communities. Because over 80% of the land base in the community is privately owned, education is also the primary tool available to local government for influencing wildfire risk outside of core authorities. By sharing the knowledge and techniques of FireSmart building and landscaping design, the Regional District of Nanaimo (RDN) encourages residents to assess and address risk factors on their own properties. Education is not just about emergency management personnel sharing information with residents. It's also about representing a vision of a FireSmart community that can inspire the RDN's own departmental operations and feature in its communications with other public authorities and First Nations.

The RDN should plan its education activities to support the existing FireSmart programming in the island communities. The communities have a wealth of knowledge among dedicated individuals who are already acting to manage wildfire risk. On Gabriola Island, the Gabriola Volunteer Fire Department has hired a FireSmart Coordinator to engage with members of the public, run programming, and conduct home hazard assessments. On DeCourcy Island, the volunteer fire rescue society conducts advocacy and training for full-time and seasonal residents. The Mudge Island Citizens Society provides similar services on Mudge. The RDN can support local organizations by collaborating during grant applications for FireSmart activities and working with members of the community societies to develop and implement initiatives.

Factors for Success

Vision of a FireSmart community

Public engagement is one of the most challenging aspects of community wildfire planning. Ordinary people may not have the knowledge and resources necessary to mitigate risk before a wildfire occurs.. For public engagement to be effective, the RDN needs to reframe managing wildfire risk as a collective undertaking with community and individual benefits. During engagement for this project, several stakeholders and residents expressed that interest in FireSmart declines when people are confronted with what seems like an impossible task – the task of making a forested community FireSmart. The RDN needs to present a vision of FireSmart that works for the community and still adequately represents the forest character of the area. To do this, public messaging and materials should emphasize that any action to reduce fire hazard can have value. Building a FireSmart community takes time, and a focus should be made on promoting the FireSmart process rather than identifying deficiencies in the community.



Photo 10. Education is a key part of developing a FireSmart community.

Audience for communications

A second factor in the effectiveness of education initiatives is appropriate targeting of different audiences. In a diverse community like Electoral Area B (EA B), there are several ways for the RDN to consider targeting its FireSmart messaging and activities. Appropriate audiences for communications development depend on:

- **Different community areas.** This plan shows that the wildfire threat and risk varies around EA B. Additionally, some areas share a common point of access, reliance on a particular water source, proximity to fire suppression resources, or other qualitative characteristics of risk that make it sensible to consider them as a group for the purposes of outreach. The three most basic audiences using an areas approach would be residents of Mudge, DeCourcy, and Gabriola Islands. Within Gabriola, it is possible to identify smaller neighbourhoods for targeting communications. Subareas become more important for communicating evacuation plans and procedures. These could include the Sandwell-Whalebone area, the north island (Taylor Bay Road – Berry Point Road and surrounding areas), the southwest island (south and west of Gabriola townsite, including the commercial area), the south island (inland and coastal areas primarily accessed by South Road), and greater Silva Bay (including Drumbeg Park, Peterson Road, and properties primarily accessed by North Road).
- **Seasonal vs. full-time residents.** While most homes are occupied year-round, a significant number of properties are occupied seasonally. The prevalence of seasonal residents in some communities means that homes are unoccupied for weeks or months at a time. Absences during the fire season are of particular importance because the timely response to an ignition depends on it being reported to the appropriate authorities. Seasonal properties may also have less frequent landscape or building maintenance, making them more susceptible to wildfire. Because of this, it may be desirable for the RDN to target FireSmart information during the year's shoulder seasons in spring and fall when most owners are transitioning in or out of residence and conducting annual maintenance activities.
- **Age and household size.** Smaller average household sizes and higher average ages are characteristic of the community. Ensuring that small households and seniors are informed about wildfire risk is important to building resilience. Some members of these households may have difficulty with the manual labour involved in FireSmarting a property or may need physical assistance to evacuate during an emergency. The RDN may be able to tailor FireSmart outreach to smaller households and seniors to help address these concerns.
- **RDN staff.** RDN staff in various departments work to provide services for the residents of EA B. Promoting FireSmart awareness among staff is an important part of improving policy within other departments and achieving cross-department support for initiatives of the Emergency Services department. The RDN is fortunate to have deep knowledge of wildfire risk and prevention within its parks department, where several staff members have backgrounds in forestry or with the BC Wildfire Service (BCWS). The RDN can work to ensure its departmental managers share the same understanding of FireSmart. The Emergency Services department can lead internal training and information sharing to ensure core personnel are familiar with the FireSmart program and principles.

- **Planning and development authorities.** The RDN does not have authority over important land use and planning functions under EA B’s system of local government. Connecting with representatives of the Islands Trust to brief them on the RDN’s FireSmart activities and provide information on FireSmart community planning can help improve the understanding of wildfire risk in the community over time.
-

Information placement

The third factor for effective education is information placement. Both the timing and location of information provided to the public can influence the size of the audience for outreach and the imprint of the information presented. Timing of active outreach should respond to the cycle of life in EA B, with in-person contacts and community events timed to correspond and respect the calendar of festivals, school, and summer holidays that make the community unique. Informational contacts regarding RDN projects, such as fuel management, should take place during the shoulder season when people have more time to dedicate to their review. Education can also be undertaken through passive outreach, through initiatives such as updating RDN webpages and informational signage in key parks. This factor also includes targeting the use of existing RDN resources wherever possible. Today, most people expect resources to be presented in digital and physical formats on request, so resources of both types should be considered. To leverage existing resources means to incorporate FireSmart information into places that are already being managed and maintained by the RDN, and can include physical locations like popular parks, or digital property like the RDN’s website and social media identities. To increase the reach of emergency information during a wildfire, the RDN can continue to promote its subscription alert system, VoyentAlert!.



Photo 11. Example of existing informational signage from Gabriola Fire Department.

Strategic communications

The final factor in successful public engagement around wildfire issues is the careful planning and documentation of a Communications Strategy for each FireSmart initiative undertaken. A strategy may be one or more documents comprising the RDN’s plan to engage with specific populations or groups. The strategy can be available to the public or intended for internal use only. The purpose of such a strategy is to identify goals for an education initiative, several key messages for increasing public awareness of wildfire and FireSmart and expected outcomes of the proposed activity. Planning should be used to focus and correctly scope all RDN communications on wildfire within EA B, including printed and digital media and during in-person or online events.

Table 17. Potential key messages for a wildfire communications strategy

Potential Key Messages for Public Communications
<ul style="list-style-type: none"> • The communities of EA B are set intimately within the forest, making them vulnerable to wildfires. • The wildfire risk in coastal forests during the fire season is high. • Predicted and observed climate change in the region is consistent with more aggressive wildfire behaviour. • Private landholders have a large role to play in protecting life and property by adopting FireSmart practices for building and landscape maintenance and by being knowledgeable about local emergency plans. • There are resources to support private landholders and neighbourhoods in becoming more FireSmart. • The RDN can help reduce wildfire risk by strategically managing forest fuels on public land within and adjacent to communities.

Initiatives to Consider

Creating opportunities for passive outreach

In developing initiatives within the Education discipline, the RDN should seek to leverage its existing resources and programs, where residents already come into contact with local government. Passive outreach means presenting and providing information about wildfire risk in a variety of formats that are received by residents in a self-directed fashion. The resources the RDN can use to create these opportunities include its digital and physical properties, human resources, and community liaisons.

Today, digital resources may be preferred and/or seen by more people. At a minimum, the Community Wildfire Resiliency Plan should be made public on the RDN's website. Currently, the RDN has a dedicated public engagement platform, *Get Involved*, where it is anticipated this plan and related resources developed during community engagement will be provided. Additional material can include videos of the recorded community presentations, slide decks, or interactive maps dedicated to summarizing the planning process and results. These resources can be advertised using the RDN's social media, or by appending a temporary completion announcement and link to outgoing RDN emails. Physical copies of the Community Wildfire Resiliency Plan are unlikely to be desired by most residents. However, some people prefer to review physical documents and may wish to obtain a copy. A limited number of the Community Wildfire Resiliency Plans could be printed and made available through mail by request.



Get Involved RDN!

rdn.bc.ca/get-involved-rdn

The RDN's major resource on the islands is its network of community and regional parks. In 707 Community Park and Coats Marsh Regional Park, the RDN recently completed the installation of a wayfinding system that presents trail information and facilitates location identification for park users and emergency responders. In Descanso Bay Regional Park, the RDN maintains signage and facilities for the public campground. In both properties, as well as the Cox Community Park adjacent to Descanso Bay, the RDN can initiate passive education by installing wildfire awareness signage and educational material in high-traffic locations, including trailheads. Popular recreational areas are high-traffic, high-visibility locations where people are already thinking about forests and may be seeking additional information about the environment – this is a good opportunity to make connections between forests and fire in familiar environments.

Relatedly, provincial funding requirements specifically support education initiatives aimed at increasing public awareness of fire risk management activities within the other FireSmart disciplines. Planned fuel management in area parks, or FireSmart landscaping of facilities such as the Descanso Bay campground, could be used as a focus of education initiatives, with signage or self-guided tour routes developed to engage visitors to these park properties. This component of provincial funding is focused on proposed activities, so any activity-related education materials should be planned in advance and included as a part of an application for implementation funding.

Expanding access to FireSmart information and services

Currently, Gabriola Volunteer Fire Department has a FireSmart Coordinator position funded through the Community Resiliency Investment grant program who liaises with community members about prevention and preparedness and conducts home assessments to help residents understand where the risk to their home comes from. The RDN should investigate ways to provide this service for residents of Mudge Island and DeCourcy Island. It may be possible to enter into a service agreement with the GVFD to arrange visits to the outer islands by the GVFD Fire Smart Coordinator for this purpose. If this cannot be arranged, the RDN's Emergency Services department currently has certified Local FireSmart Representatives who could potentially undertake assessments on the outer islands. It may be efficient to hire a RDN FireSmart Coordinator who is fully dedicated to these engagement initiatives and administrative work related to future grant applications. This position can be funded through grants and shared among other Electoral Areas. Regardless of who is available to conduct assessments, the RDN can coordinate with representatives of the Mudge Island Citizens' Society and DeCourcy Island Community Association to advertise and schedule an assessment "blitz" on each island. Conducting multiple assessments at once will help reduce the cost of delivering this program to residents of the outlying islands.

Hosting a community wildfire preparedness or clean-up day

Some initiatives that promote practical demonstrations of FireSmart are also eligible for provincial funding within the education discipline. The RDN can promote wildfire awareness while achieving FireSmart benefits simultaneously by organizing a community clean up or “Wildfire Community Preparedness Day” event. These are public events where members of the public are invited to come and conduct light work around a community park or facility while receiving information about FireSmart. Activities can include removing debris from the vicinity of buildings or pathways, pruning shrubs and bushes, removing invasive species, and raking leaves or needles. The RDN would be responsible for identifying target vegetation for the clean up and bagging and chipping or removing waste. The events can include an educational component, such as a presentation about FireSmart landscaping. Delivering these events could be part of the role of a new regional FireSmart Coordinator. Community clean ups can be a good way to create regular engagement with locals and may be a pipeline for future engagement by RDN parks managers on other initiatives related to broader stewardship of park properties.

Suitable locations for such an event depend on community interest as much as with identified fuel hazard concerns. In many cases, these areas are of marginal impact to landscape wildfire risk and should therefore be combined with a program of more comprehensive fuel management. Because clean up days are focused primarily on education and demonstration of FireSmart principles in a small area, they do not follow the stricter guidelines for locating areas for fuel management. High-use areas are often ideal locations because they allow for corresponding opportunities for passive outreach related to the project completion. The Descanso Bay campground is an example of an ideal location for an event of this type, based on its high use, the utility of conducting debris clean up in the campground, and the good potential for future signage or continuing engagement. Linear corridors, such as community trails, are also often good locations for community clean up events because they contain easy-access areas and are frequently near homes.

Undeveloped park lands are often less suitable for these activities due to access, safety, and environmental concerns. One exception to this is areas where fuel management is planned or has occurred. A Community Wildfire Preparedness Day could include a tour or field trip of proposed fuel management areas either before or after treatment to better explain the principles at work in fuel management, how areas are selected, and how values can be or have been protected during treatment to reduce wildfire risk.

Encouraging neighbourhood FireSmart recognition

Through FireSmart Canada, groups of neighbours can access grant funding independently of the RDN for FireSmart activities. The RDN can support these initiatives by helping connect interested residents and providing information on the FireSmart Community Recognition process, requirements, and benefits. This process is meant to be led by interested neighbours and not by government. The process starts when a neighbourhood representative contacts FireSmart Canada to organize a site visit by a Local FireSmart Representative. The Local FireSmart Representative is someone who has completed FireSmart Canada training certification to assess wildfire hazard in the wildland-urban interface (WUI) and can support the neighbourhood FireSmart planning process. Before and concurrent with hazard assessments, leading neighbours should be organizing in their community to increase participation and the number of home assessments. The end goal of this organization is the formation of a neighbourhood committee to receive the hazard assessments and steward the creation of a FireSmart Neighbourhood Plan on the advice of the Local FireSmart Representative. The Neighbourhood Plan will assess wildfire hazard on participating properties and identify actions specific to the area for improvement. Participating residents can schedule the implementation of the plan and apply for and maintain Community Recognition with the help of their Local FireSmart Representative.

The RDN can assist some parts of this process, such as by providing sign-up support through direct mail to area residents where a neighbourhood board is nascent. The RDN's existing Neighbourhood Emergency Preparedness Program groups may be a springboard for this kind of activity. The RDN can also help advertise a new neighbourhood initiative through its social media and online channels. There are grant funding opportunities available through the Community Resiliency Investment program that the RDN can apply for to offer half-day FireSmart Neighbourhood Champion training for interested residents and/or distributing FireSmart material to households facing barriers to this information, such as low-income households, seasonally occupied households, or residents with limited internet proficiency. In areas where neighbourhood organization is underway, the RDN may be able to help facilitate a start-up event by including costs on its application to the Province for grant funding. Criteria for providing this support should be developed so that serious initiatives with widespread interest in the community are prioritized for resources.



firesmartcanada.ca/programs/neighbourhood-recognition-program/

Identifying potential neighbourhoods for FireSmart planning

FireSmart planning and outreach to communities should reflect neighbourhoods of similar levels of risk and access. The intermix character of EA B means that most neighbourhoods are exposed to at least moderate risk of wildfire from surrounding forests. Areas without registered fire protection may see greater benefits from such a program; regardless, all neighbourhoods can benefit from increased participation in FireSmart. Neighbourhoods that may make suitable sub-areas based on shared access, identity, and geographic profile are listed in Table 18.

Table 18. Potential sub-areas for FireSmart planning and neighbourhood initiatives.

Name	Wildfire Risk Rating*	Area Description	Fire Protection	Recommended FireSmart Activities
Mudge Island	M	224 ha forested island south of Gabriola and east of the City of Nanaimo. Approx. 350 properties in private ownership, less than half thought to be permanently occupied. Access by charter or private boat.	Unregistered (Mudge Island Citizens' Society))	The creation of FireSmart neighbourhood plans are recommended for these areas. The RDN should liaise with representatives of the fire brigades to assess interest in this initiative. The plans would include communications and engagement goals and a strategy for FireSmart assessments of private property and community park lands. The plan would be led by neighbourhood committees with the RDN acting as a local government representative and providing support such as coordination with BCWS, BC Parks, and Islands Trust. The RDN may also include eligible neighbourhood FireSmart activities in its grant applications.
DeCourcy Island	M/H	185 ha forested island south of Gabriola and east of Electoral Area A. Approx. 150 properties in private ownership, about half thought to be permanently occupied. Popular recreational area at Pirates Cove Marine Provincial Park. Access by charter or private boat.	Unregistered (DeCourcy Island Community Association – Volunteer Fire Rescue Society)	

Name	Wildfire Risk Rating*	Area Description	Fire Protection	Recommended FireSmart Activities
Gabriola Village-Southwest	M/H	The commercial townsite of Gabriola and nearby subdivisions from Rollo McClay Park to the SW coast of the island. Contains important community buildings such as Fire Hall No. 1, the community health centre, Gabriola Elementary School, and the BC Ferries Descanso Bay terminal & RDN emergency wharves.	GVFD	These neighbourhoods contain forests assessed to have a higher wildfire threat. The creation of FireSmart plans is a higher priority for these neighbourhoods because of their proximity to areas of high threat and concentration of community amenities and infrastructure. The RDN should consult the Gabriola Volunteer Fire Department before initiating FireSmart communications or outreach in these areas, to avoid duplication.
Gabriola Whalebone	M/H	Small-lot residential subdivision on the NE coast of the island, separated from other neighbourhoods by a forested escarpment. Single access via Barrett Rd.	GVFD	
Gabriola Silva Bay	M	Properties generally accessed by North Road and Peterson Roads in the east part of the island.	GVFD	These areas have few or no areas of higher wildfire threat or are located upwind of areas of higher threat. These areas may benefit from FireSmart planning but are of lower priority. The RDN should consult the Gabriola Volunteer Fire Department before initiating FireSmart communications or outreach in these areas, to avoid duplication.
Gabriola South Road	M	Properties generally accessed by South Road, including inland and coastal subdivisions, between Petersen Road and the Gabriola Golf and Country Club.	GVFD	
Gabriola North (Malaspina-Orlebar)	M	Properties accessed by Taylor Bay Rd, Berry Point Rd, and the Church-Spruce Connector north of the Gabriola commercial core.	GVFD	

*Ratings reflect modelled wildfire threat on public land in each area. Ratings are L(ow), M(oderate), H(igh), E(xtreme).

Expanding participation in Voyent-Alert!

During a wildfire emergency, the RDN has several means by which it will publish an evacuation alert or order. The most direct of these is the free, sign-up based multi-platform Voyent-Alert! system. Voyent-Alert! lets registrants receive emergency notifications via app, SMS (text message), voice call, or email and opt-in to notifications by the RDN concerning service notices, such as solid waste rescheduling or park closures. Because it allows messages directly to user devices, landlines or emails, Voyent-Alert! is a crucial piece of technology for advising residents about wildfire. Because it is an opt-in service, Voyent-Alert! is advertised by the RDN to improve participation. Placing invitations to join Voyent-Alert! should be part of any communications between the RDN and the public regarding this Community Wildfire Resiliency Plan.

Collecting feedback from the community on an ongoing basis

The RDN can strive to match FireSmart initiatives with the level of interest shown by its communities. The *Get Involved* page for Wildfire Resiliency currently allows residents to contact a project representative to ask questions and provide feedback. In some cases, more structured feedback can be helpful, such as when evaluating the success of a FireSmart plan or community event such as a chipping day. It should be a clear part of any education initiative or communications that feedback on wildfire prevention and preparedness is welcome. Short surveys related to specific community activities or a generic survey with guides for response topics and content can be created using the *Get Involved* platform to collect and organize public feedback. The *Get Involved* platform allows a variety of survey tools, from simple to complex, and can also incorporate visual media into survey presentations. Advertising opportunities for feedback and identifying “who is listening” should be incorporated into the strategy for any education initiative.

Legislation and Planning

This discipline considers the bylaws, regulations, and policies or acts of higher levels of government that create the legal environment around wildfire risk. Idea development in this section aims to address how the Regional District of Nanaimo (RDN) conducts its own business, including management of parks, waste, and infrastructure, to mitigate wildfire risk. In this section of the plan, higher-level acts and policies providing important scope to the RDN's authority and ability to regulate are discussed, as are regulatory levers at the RDN's disposal.

Federal Acts and the Community Wildfire Resiliency Plan

The Government of Canada makes laws concerning matters of national interest. Natural resources, land management, and emergency response are generally the authority of the provinces, which means relatively few federal acts and policies are directly relevant to the recommendations of this Community Wildfire Resiliency Plan. The Government of Canada is a significant forest landowner in Electoral Area B (EA B) and holds authority over a large portion of central Gabriola Island between 707 Community Park and Silva Bay, including the Elder Cedar (S'ul-hween X'pey) Nature Reserve. These lands are being held while treaty negotiations between the Snuneymuxw, Canada, and British Columbia are ongoing. This limits the RDN's ability to address wildfire risk on these lands.

The Federal legislation with the greatest implications on wildfire management are the acts that protect animals, plants, and ecosystems, including the *Fisheries Act* and *Species at Risk Act*. These acts confer protection by prohibiting damage and assessing penalties. Activities that remove vegetation, such as fuel management, may trigger reviews under either act if a protected species or habitat is compromised. Any fuel management prescription must consider whether federally protected species or habitats will be impacted and how these impacts can be avoided. These Acts also affect how local governments apply bylaws and development permit requirements.

Provincial Acts and the Community Wildfire Resiliency Plan

The Province has core authority over lands, natural resources, and municipalities, making it the source of local government jurisdiction and a primary influence on forest and land management, including wildfire. Provincial legislation that affects the other FireSmart disciplines includes the *Building Act* and *Building Code*, *Emergency Program Act*, *Environmental Management Act*, *Forest and Range Practices Act*, *Local Government Act*, and *Wildfire Act*. Regulations under each of these enactments, such as the Open Burning Smoke Control Regulation, provide legal guidance and objectives for aspects of community development, land management, wildfire prevention, and emergency response.

In EA B, the *Islands Trust Act* is also of importance. This act places responsibility for community planning within Local Trust Areas of the Gulf Islands with a distinct local government authority, the Islands Trust, that operates in parallel to the RDN. The Gabriola Island Local Trust Area covers the same populated islands as EA B. The three main islands within the trust area each have official community plans and zoning or development bylaws maintained by the Islands Trust. Under the *Islands Trust Act*, the RDN is prohibited from adopting bylaws, issuing permits, or undertaking work contrary to the bylaw of the local trust committee. Because of this, the RDN has a reduced ability to influence physical hazard to private property through adopting FireSmart reforms to development and zoning bylaws or Official Community Plans.

Role of the RDN

The RDN's role is to manage wildfire within its jurisdiction in unincorporated areas. Areas of authority in EA B include the provision of services for waste management, including green waste or vegetation debris, the maintenance and management of community and regional parks, the administration of bylaw enforcement, and other key areas identified by the *Local Government Act*. The RDN works mainly under a special service model and provides only those services that the elected representatives of the unincorporated areas have determined are needed and can be funded by their communities. For this reason, delivering new bylaws or additional programming may require levies or taxes to be sustainable.

Factors for Success

Ensuring public support and social equity

Changes in law or policy properly result from changes in public expectations over how the community governs itself. Therefore, education around wildfire risk and the benefits of FireSmart often precedes initiatives in other disciplines. Without public support, a change to policy or bylaw may not only fail but be unjust. Ideally, new bylaws or public policies will have widespread public support, so that policy changes reflect the whole community. It is important to consider the equity implications of new policies before they are enacted, including whether all groups impacted by a new policy have been adequately heard by the decision-making process.

Recognizing the RDN's jurisdiction

Another factor in the success of a policy initiative is recognizing the RDN's scope of authority. As discussed, the situation of EA B is unusual in that the RDN (or local government) lacks authority over the planning of land use and development in the community. While promoting FireSmart design is a key principle of any Community Wildfire Resiliency Plan, the RDN's role will rely on actions in other disciplines, such as outreach with representatives of the Islands Trust, support for neighbourhood and community involvement in FireSmart, and leveraging RDN assets like the public park system. Policy changes within the scope of the RDN's authority include the development of an area-specific Burn Bylaw for EA B, managing the use of RDN-owned park land, and developing the capacity for bylaw or policy enforcement.

Considering the need to enforce new bylaws or policies

The enforceability of a policy or bylaw is a major part of its effectiveness. While the average person follows the rules, many may not know of policy changes or mistakenly believe policy does not apply to them. Some may break rules intentionally if it is convenient or financially rewarding. New bylaws or policies can also result in a rise in the number of nuisance calls that do not have merit but drain the resources of local government. Conducting analysis before a policy change can help decision-makers think about whether contacts about non-compliance will be both manageable in terms of volume and feasible in terms of staff training and expertise. Policies that require additional investments in training or equipment to allow enforcement should be carefully considered to ensure they fit within the community's vision and goals.

Initiatives to Consider

Develop a local burn bylaw

Currently, EA B has multiple burn regulations. On Gabriola, the Gabriola Volunteer Fire Department regulates open burning under the bylaws of the Fire Protection District. Provincial restrictions from the Environmental Management Act continue to apply. The Gabriola Volunteer Fire Department promotes the status of fire bans digitally on their website and social media, and on a series of signs positioned around the island and requires burn permits for all open burning larger than 0.5 m². The department also conducts inspections of burn piles before issuing permits.

Provincial burning regulations apply outside of the Gabriola Fire Protection District. Mudge Islands Citizens' Society and DeCourcy Island Community Association – Volunteer Fire Rescue Society share information on provincial fire bans with community members. It is within the authority of the RDN to establish a Burn Bylaw to regulate the location and kinds of fires that require a permit or are prohibited during part or all of the year. While firefighters did not identify the absence of a burn bylaw as a special issue of concern, unattended fires on rural property are a concern for residents. A burn bylaw could help control ignition in locations where full-service fire response is not available, as on Mudge and DeCourcy. BC Parks has banned campfires in Pirates Cove Marine Provincial Park on DeCourcy and may have valuable insight into enforcement and effectiveness of such a measure.

The downside of a burn bylaw is it could increase the number of nuisance calls, a burden for enforcement resources. Developing educational materials about appropriate burn times and how to follow provincial regulations could be a more effective way to reduce the hazard from unattended rural fires. Further conversations with local representatives of community firefighters on Mudge and DeCourcy should occur before this ignition control measure is pursued. Developing a burn bylaw may require the RDN to assess fees on property to support education and enforcement of local fire bans.

Adopt restrictions on activities or uses of regional park lands

The RDN may be able to reduce ignition likelihood on its public lands by adopting restrictions on use. Sources of ignition include cigarette butts, hot vehicles and motors, cooking fires, bonfires, firecrackers and fireworks, discarded items, and deliberate arson. Residents on Gabriola have expressed concern about the potential for unauthorized camping and sheltering in RDN parks. It is important to collect information about problematic uses of park land to ensure appropriate targeting of prohibitions. The RDN's parks department should begin to identify in its service records where problematic uses occur within areas of higher wildfire threat. Improving reporting on social issues as they relate to wildfire risk is a key part of improving decision-making.

Restrictions could be developed to be:

- Time-dependent – in place only during periods of high or extreme fire danger
- Space-dependent – applying to locations with identified high or extreme fire risk
- Both

When designing a prohibition or ban it should be noted that fire threat shown in this plan represents the potential fire behaviour during 90th percentile fire season weather conditions. These are the days that represent periods of high or extreme fire danger, typically at the peak of summer. While worrisome, ignitions during the cool and wet parts of the year are unlikely to result in spreading wildfires. The impacts of climate change have and will affect the 90th percentile weather values used to estimate potential fire behaviour, which is a reason to support cyclical review of this Community Wildfire Resiliency Plan and consider any growth in problematic uses.

Assess wildfire hazard on RDN-owned properties

The RDN is currently working towards an update of the Parks and Trails Strategy that will identify policies for park managers and levels of service, which act as targets for the frequency of park operations. The RDN can adopt internal policies to make sure parks and RDN-owned property and facilities receive wildfire hazard assessment at an appropriate level of service. For park properties, which constitute the most significant direct asset of the RDN in EA B, these service targets may be included in an updated Parks and Trails Strategy.

The assessment tools for bare (forested) land and RDN facilities vary. For forested land and parks, the appropriate assessment tool is the most recent provincial standards for Wildfire Threat Assessment. These assessments constitute the practice of professional forestry and should be completed by a registered forest professional with the appropriate expertise. For facilities and infrastructure, the appropriate standard is likely the FireSmart Critical Infrastructure Assessment, which provides a hazard score to reflect vulnerability (risk) of the capital asset in the context of the immediately surrounding fuels. Critical infrastructure and permanent structures in parks should receive this assessment alongside stand-level wildfire threat assessment. While there is no legal requirement that FireSmart assessments be completed by accredited professionals, a Local FireSmart Representative or Wildfire Mitigation Specialist is recommended for these assessments.

An appropriate level of service for both kinds of assessment is the same cycle recommended for review and update of the Community Wildfire Resiliency Plan – once every five years. New assessments exceeding this schedule are advisable if changes in forest health or the environment are believed to have adversely affected the forest fuel components of wildfire threat and FireSmart.

The RDN is currently working towards an update of the Parks and Trails Strategy that will act as an overarching strategy for land acquisition in the ten-year timeframe. Regarding potential expansions of facilities or the park system, the RDN can adopt a policy that the wildfire hazard associated with new properties is assessed as part of the process to acquire or lease new land and facilities.

Conduct FireSmart assessments for publicly owned critical infrastructure

The RDN can complete FireSmart Home Ignition Zone or Critical Infrastructure assessments as appropriate for publicly owned buildings and pieces of critical infrastructure. This is supported by the Community Resiliency Investment program to allow local governments to develop a FireSmart program for their critical infrastructure. With assessments in place, the RDN could apply for implementation funding to complete re-landscaping or even exterior renovations of its facilities designated as critical to support emergency response up to a per structure maximum of \$50,000.

Adopt policy to employ FireSmart building and landscape design on all new RDN facilities

As part of a FireSmart program for its properties and critical infrastructure, the RDN should require within its major departments that all projects involving building or landscaping be carried out in consideration of FireSmart design principles. Completed facilities are opportunities to educate members of the public about FireSmart building and landscaping techniques. FireSmart design principles are sometimes seen as conflicting with policies that support wood construction, such as the RDN's Wood First policy. However, FireSmart design need not restrict the use of wood as a structural member or architectural flourish in designs. FireSmart design focuses on reducing the use of small-piece wood in finishing applications, such as shakes, shingles, and facing boards. Wood products that have been permanently treated to achieve a certain level of fire performance can typically be used as facing materials with a minor impact on FireSmart hazard scoring. Similarly, large-diameter wood elements such as heavy timbers or modern innovations like glulam can also typically be used with minor impacts on hazard scoring. FireSmart design avoids the use of unrated wood products or construction assemblies in the interface. The Gabriola Volunteer Fire Department's Hall No. 1 on Church Street is an existing example that FireSmart construction can be both beautiful and functional while maintaining a connection to the landscape through the limited use of wood elements.

Create a program to reduce or eliminate green waste tipping fees for FireSmart projects

Many residents have informed the team behind the Community Wildfire Resiliency Plan that the biggest impediment for them to FireSmart their home's landscaping is the difficulty and expense of removing green waste. The RDN has supported "Red Bin" days in the past that bring green-waste bins to central community locations where disposal of debris is provided free of charge for eligible materials such as small conifers and dead branches. This kind of initiative is supported by the Community Resiliency Investment Program.

The RDN maintains the Regional landfill (located in the City of Nanaimo), which receives green waste for a tipping fee. It is within the RDN's regulatory authority to facilitate access to the Regional landfill to dispose of green waste from FireSmart activities. The Community Resiliency Investment Program supports this kind of application, which may involve rebating, reducing, or eliminating tipping fees for green waste. It is recommended that the RDN investigate this option to assess whether the landfill at Nanaimo can receive additional green waste. A further consideration is that the reduced tipping rate should be available only for waste generated by FireSmart activities. One way to promote this connection would be to require residents to present a FireSmart assessment for their property when dropping off waste. Another means could be to register residents for reduced tipping fees at the time of the FireSmart Assessment and allow free loads of green waste up to a weight maximum or until a predetermined date. In either case, the departments would need to collaborate to ensure attendants at the landfill are given clear instructions on the eligibility and quantity of green waste for reduced fees.

Development Considerations

Role of the Regional District of Nanaimo

While in other Community Wildfire Resiliency Plans this topic also addresses building codes and guidance for new development, the Regional District of Nanaimo (RDN) does not have authority over planning or development in the Islands Trust Area. As a result, this section restates the recommendation to liaise with the Islands Trust (as above in *Legislation and Planning*). The main purpose of this section is to contain a general discussion of development issues as they relate to fire resiliency. Some of these ideas may be useful to RDN staff in their contacts with the Islands Trust. Currently, none of the planning bylaws adopted for Gabriola, Mudge, or DeCourcy Island explicitly consider wildfire hazard as a factor affecting development. The Gabriola Official Community Plan contains one policy-relevant to fire hazard – that “the RDN is encouraged to support recycling of organic debris to reduce fire hazard”³².

Bylaws that affect zoning, land use, subdivision, and construction have large impacts on the future fire safety of communities. This is why there have long been building codes in North America to ensure buildings are constructed to acceptable standards. In recent decades, attention has been placed on the design of development, buildings, and landscaping as they influence the risk of wildfire in the wildland-urban interface (WUI). The National Fire Protection Association (NFPA), a US-based international organization, has developed codes and standards for the recommended design of subdivisions and buildings in the WUI, NFPA 1141 and NFPA 1144. NFPA 1141 addresses the design of subdivisions and fire protection infrastructure at the neighbourhood scale, while NFPA 1144 considers the appropriate materials and requirements for building and landscaping on individual properties. These standards are updated from time to time and reissued in new editions. Several municipalities in British Columbia have used these standards to help bring FireSmart into planning review and enforce compliance. The Province may in the future develop regulations within the National and BC Building Codes that address wildfire hazard to development in the WUI.

³² Gabriola Official Community Plan, Bylaw No. 166, *Climate Change Adaptation and Greenhouse Gas Emission Reduction Advocacy Policies*, Policy XI, p. 61.

Subdivision Bylaws

FireSmart principles in FireSmart’s Non-Combustible Zone (0-1.5m) and Zone 1 (1.5-10m) are often the focus of regulations in municipalities that consider wildfire hazard in their subdivision (or relevant zoning and development) bylaws. This is because, in many suburban municipalities, development in the interface is characterized by small-lot residential development in which the future management of off-site areas is impractical, unfeasible, or undesirable. Guidelines for subdivision in the interface often support the creation of a “fuel-free zone” within Priority Zone 1, meaning vegetation and landscaping in this area are intended to be of low flammability and non-combustible or fire-resistant building materials are preferred.

In unincorporated areas of a RDN, including Electoral Area B (EA B), the Ministry of Transportation and Infrastructure is the authority responsible for subdivision approvals, referring applications for subdivision to local authorities (typically including the RDN and Islands Trust) as part of its process. The Islands Trust has been empowered to place additional requirements on the subdivision of land through its bylaws, to better suit community circumstances. Subdivision and development control in rural residential areas can support FireSmart by ensuring developments have a buffer of 10 m between homes and coniferous vegetation, adequate fire design (including turnarounds, cisterns, or local hydrant networks where warranted), and lot layout that either provides or plans for future secondary access to neighbourhoods depending on size. In more rural areas with larger lot sizes, where portions of Priority Zones 2 (30m) and 3 (100m) are also located on-site, there are benefits to maintaining FireSmart guidance for landscaping and development in these areas in addition to Zone 1. NFPA 1141 contains industry-accepted guidance on the design of subdivisions in the WUI.

Subdivision control is a highly effective tool for ensuring new neighbourhoods or developments are set up to be FireSmart. Amending rules around subdivision may also be more acceptable to the public because they apply only to new multi-lot development and not all new construction.

Development Information, Development Permits, and the Official Community Plan

Development Approval Information

The BC Building Code sets the minimum acceptable standards for structures. However, the code does not contain guidance special to the development of homes and buildings in the WUI. For this reason, the *Local Government Act* provides that Official Community Plans (developed in EA B by the Islands Trust) can contain special areas where additional regulations on development apply. There are two mechanisms available to local government under these powers. The first is “development approval information” (S. 484-487), which allows local governments to delineate areas where applicants for rezoning, development permits, and temporary use permits may be required to provide supplementary information. This can include wildfire hazard information, such as a wildfire hazard assessment of the subject property. This is one way for local governments to collect information about wildfire hazard on private land which is not available in this Community Wildfire Resiliency Plan. The Islands Trust has established development approval information areas and Development Permit Areas (DPA) within the Gabriola Official Community Plan to support its environmental policies and DPAs.

Development Permit Areas

The second mechanism steps beyond development approval information and allows local government to designate DPA(s) within the Official Community Plan (S. 488-491). Because DPAs are used to enforce special standards on design and construction, the purposes of the DPA must be justified. Many local governments in British Columbia have used these provisions to establish “Wildfire Hazard” DPAs which rely on the accepted purpose of “protecti[ng] development from hazardous conditions” stated in the *Act*.

A DPA has two core components: a map, indicating the properties to which the DPA applies, and guidelines that describe the requirements that must be met during development. Like development approval information areas, local government can also require wildfire hazard assessments on private land as a required submission for a development permit. This introduces an optional third component, professional reliance, whereby local government relies on professional hazard assessment and recommendations to adapt DPA guidelines to the circumstances of a specific property.

The DPA map will be adopted by amendment to the Official Community Plan and must show the properties within the DPA. Many communities with existing wildfire hazard DPAs distinguish their mapping between areas of high and extreme risk and provide guidance tailored to this risk. While this approach is made possible by the mapping prepared for the Community Wildfire Resiliency Plan, it is unlikely to provide fair or effective results in a landscape dominated by intermix conditions on private land. Another approach to mapping a wildfire hazard DPA is to identify all properties within a buffer distance of the forest interface. Buffer distances of 100 or 200 m are commonly used to help address the risk of ember spotting from a nearby wildfire into a neighbourhood. When designing a DPA map for wildfire risk, it is important to recognize that the level of wildfire threat changes over time as forests grow and die or land uses change. For this reason, it is desirable to commission specific mapping that identifies the long-term interface of the community based on the vision in the Official Community Plan.



Photo 12. Example of properties within a wildfire DPA.

Guidelines for development in the DPA must be adopted as a schedule to the Official Community Plan. Local government can set basic requirements in relation to wildfire risk while respecting the character of the development, including landscaping, and the siting, form, exterior design and finish of buildings and other structures as well as restrict the type and placement of trees and other vegetation in proximity to the development. Guidelines are often based on NFPA 1144, with elements of NFPA 1141 and FireSmart adapted as needed to address outstanding issues with subdivision design and vegetation management.

If desired, local governments may require a professional wildfire risk assessment that provides site context and advice to local government on appropriate standards for design and construction, which may vary the guidelines. Codified guidelines are less flexible to site circumstances but provide greater certainty to applicants within the DPA and may be administered without requiring a professional report. Risk assessment reports can help to establish wildfire threat on private land and may improve the public acceptance of any change to development control by allowing for more consideration of individual circumstances.

DPAs, unlike subdivision control, apply to new construction as well as subdivision application. While their purpose is the same – to improve the physical environment of homes in the community as it relates to wildfire risk – DPAs allow established neighbourhoods to be renewed with FireSmart construction over time. This strategy of gradually transitioning existing communities toward FireSmart through the permitting of new construction should be carefully explained if it is promoted as a solution to long-term fire risk. Any amendment to an Official Community Plan requires a broad base of public support.

Interagency Cooperation

The Regional District of Nanaimo (RDN) is not the only actor in wildfire management within the project area; in fact, several agencies and authorities influence wildfire in the community and work to protect Electoral Area B (EA B) from catastrophic loss. It takes the collaborative efforts of multiple stakeholders working together to achieve a fire-resilient community.

Actors include the range of local firefighters, representatives of the BC Wildfire Service (BCWS), First Nations, RDN departments in addition to Emergency Services, and land managers like BC Parks. In many cases, these organizations already have extensive contact with each other, though not in the frame of strategic planning to manage community wildfire risk. The RDN's role as the provider of emergency management and planning services to EA B means that it can act as an intermediary between different agencies and groups that together prepare EA B for wildfire and take a strategic approach to assessing roles and resources.

Factors for Success

Identifying Actors and Roles

Emergency response responsibilities are divided in the province. Recognizing who needs to be present during conversations about wildfire preparedness is critical. The following agencies and groups have important roles in preparing and responding to wildfire in EA B:

- **The RDN** – conducts emergency and evacuation planning, initiates and staffs an Emergency Operations Centre during a wildfire, declares local states of emergency and exercises local emergency powers to direct residents out of a fire zone. The RDN also manages properties in the community and regional parks system.
- **BCWS** – before a wildfire, supports wildfire risk reduction through projects on provincial crown land and joint training; collaborates with local fire departments on FireSmart projects. During a wildfire, acts as the official fire suppression response to a wildfire in areas of EA B without local fire protection districts (e.g. Mudge and DeCourcy).
- **Gabriola Volunteer Fire Department** – conducts FireSmart outreach and programming for residents of Gabriola Island, during a wildfire provides first suppression response within its protection district (Gabriola Island).
- **Mudge Island Citizens' Society** and **DeCourcy Island Community Association** – non-governmental organizations for residents of their respective islands, providing FireSmart information and informal fire response. During a wildfire provide limited firefighting services on their respective islands and may arrive before BCWS at an ignition.
- **Islands Trust Gabriola Local Trust Area** – has limited involvement in emergency planning and response but has a strong influence on community resiliency and preparedness through development control and community planning functions.
- **Canadian Coast Guard** and **Royal Canadian Marine Search & Rescue** – provide marine rescue services and on-water support for humanitarian aid during emergencies on the BC coast when called on by the Province.
- **Snuneymuxw Nation** – Electoral Area is within their traditional territory and has two (unpopulated) small reserves on Gabriola Island. Provide strategic emergency planning to their

Nation and reserves. Before and during a wildfire can consult BCWS and emergency responders on social, economic, and cultural values threatened by fire or suppression activities.

- **RCMP Gabriola Detachment** – located in Gabriola townsite, provides police services to Gabriola, Mudge, DeCourcy, and outlying islands in EA B, as well as Valdes Island in the Cowichan Valley RDN.
- **BC Parks** – before a wildfire, supports hazard assessment and abatement as appropriate in park properties, regulates sources of ignition associated with recreation. Maintains fire bans during periods of higher fire danger, and year-round in Pirates Cove Marine Provincial Park (DeCourcy Island).
- **Emergency Management BC** – before, during, and after a wildfire supports local government response.
- **Ministry of Forests, Lands, Natural Resource Operations and Rural Development** – provide support to BCWS projects in crown land Wildfire Risk Reduction planning.
- **Ministry of Transportation and Infrastructure** – maintain public roads in unincorporated areas, responsible for subdivision application approval.
- **BC Ferries** – provides scheduled vehicular ferry service to Gabriola Island and will need to assist evacuation in the low likelihood event of a whole island evacuation.

Not all of these actors will be relevant to every discussion in a community about fire resiliency. The RDN should strive to maintain positive relationships with representatives of these organizations and more. Matching issues and interested parties when planning FireSmart activities can be part of any communications plan.

Regular Communications Through a Semi-Annual or Annual Meeting

While most of these organizations communicate with each other to different degrees, there is not currently a schedule for these communications or a shared sense of strategic planning for wildfire among all organizations. FireSmart and the BCWS recommend the organization of a working group or committee for fire resiliency which means on at least an annual basis, such as in advance of the wildfire season. Establishing regularity to communications builds trust among organizations and helps promote momentum for fire preparedness planning.

Setting Expectations for Interagency Cooperation

With so many actors involved in emergency response, it is important to set goals, scope, and limitations on any regular communications. This is largely the goal of any regular committee or working group established to bring representatives of the different emergency responders and land managers together. A committee charter can be used to establish the rules and organization of a working group's activities and acts as a contract between partners to build trust and promote coordination of emergency planning functions.

Initiatives to Consider

Liaise with the Islands Trust to provide information on wildfire threat and risk

At a minimum, the RDN should liaise with representatives of the Islands Trust planning department and local Trustees to provide the Community Wildfire Resiliency Plan. This conversation can focus on the significance and components of wildfire threat and risk, the Action Plan from the Community Wildfire Resiliency Plan, and the importance of development considerations in shaping a FireSmart community for the long term. Official Community Plans for Gabriola, Mudge, and DeCourcy Islands do not presently contain policies or language showing consideration of wildfire hazard.

Advocate for an Interagency Fire Response and Preparedness Working Group

Currently, there is no event that brings together all the relevant authorities and organizations for planning fire response and preparedness. Because of the development of mutual aid agreements and good working relationships existing between many fire departments in the RDN, it may be valuable to bring together the RDN's emergency planning staff, local fire departments, and the BCWS with other key actors to discuss response needs in the different Electoral Areas and major preparedness activities, such as proposed or ongoing fuel management. This could also be a forum for the RDN and local fire departments to learn from one another about ongoing FireSmart initiatives. Many fire departments, including Gabriola Volunteer Fire Department, are already leading extensive wildfire awareness and FireSmart programming in their protection areas. This would be an event primarily for designated first responders and organizations running FireSmart programming across the Region and support strategic decision making by presenting a coordinated front on FireSmart and fuel management priorities. This group could also develop tabletop planning exercises for a major wildfire event.

The RDN is well-positioned to coordinate such a meeting because of its existing relationships with the fire departments and role as the primary local government for unincorporated areas. It may be desirable to include observers from community groups outside the existing fire departments and service areas, such as community firefighting volunteers from the Mudge Island Citizens' Society and DeCourcy Island Community Association. Recommended timing for this event would be annually, with meetings taking place in November or April. These dates are suggested to correspond with the period after the typical funding application deadline for the Community Resiliency Investment (October) when the RDN will have an idea of which fuel management projects and other initiatives it intends to pursue, or the period (March) when CRI funding announcements are generally made. These dates are also immediately before and after wildfire season, and are a forum to share preparedness strategies, and debrief the previous wildfire season.

Develop a Community FireSmart and Resiliency Committee

A Community FireSmart and Resiliency Committee, in contrast to a working group for fire response and preparedness, would be locally focused on EA B and bring together emergency responders with community representatives and the RDN to plan and implement FireSmart initiatives in areas of identified need. FireSmart BC proposes that these committees represent a missing link for fire preparedness in British Columbia between emergency planners and fire suppression staff and the communities they serve. The intent of developing a Community FireSmart and Resiliency Committee is to ensure that planners and emergency staff are building resiliency in the community in line with local expectations and interests. The Community Resiliency Investment program has made funding available for this initiative through its FireSmart Community Funding and Supports stream.

Like the working group, the committee can be an annual or semi-annual body. Its purpose would be to act as a sounding board for the initiatives planned by key staff in the RDN, BCWS, and local fire departments. It may be valuable to have some or all representatives from the authorities identified in the factors for success, as well as additional representatives of stakeholder groups as the RDN sees fit. Additional members could include representatives of specific neighbourhoods, industries or businesses, or demographic groups.

The tasks of such a committee could include:

- Adopt terms of reference for the committee.
- Provide a review of the RDN's CRI funding applications.
- Suggest initiatives for inclusion in the funding applications.
- Share capacity for home assessments or other continuing programs among organizations.
- Coordinate Community FireSmart Days and advocate for FireSmart planning in priority neighbourhoods.
- Research alternate funding sources for priority projects not supported by CRI.
- Advocate for FireSmart and proposed activities among members' communities and organizations.
- Provide feedback on the implementation of FireSmart initiatives in the spirit of continued learning.
- Represent the interests of a diverse community in advancing FireSmart locally.
- Liaise with the BC FireSmart Committee to provide learning and feedback on program design and availability.

The RDN's role would be to convene the committee and support its operation by providing start-up support (administration time and initial grant application) and to develop a draft Terms of Reference to be discussed during the first meeting. The structure of the committee may be served by having a multi-member executive to share responsibilities after the first meeting and avoid capacity issues in participating organizations. An executive composed of one representative from each of the RDN, Gabriola Volunteer Fire Department, and a rotating seat held by a representative of the Mudge Island Citizens Society and/or DeCourcy Island Community Association (tasked with representing the interests of areas outside the fire protection boundary) may provide sufficient representation and distribution of

effort. The scheduling of an annual meeting would logically occur in September when applications for CRI funding are being prepared.

Provide cultural sensitivity training to better partner with Indigenous communities

Ensuring that all communities receive an equitable standard of service and care during a wildfire is an important public duty. Just under 3.6% of the population of EA B self-identified as indigenous (“aboriginal identity”) on the 2016 Census³³. Although this rate is lower than British Columbia or Canada as a whole, it represents a population within EA B roughly equivalent to the permanent population of Mudge and DeCourcy Islands. The Snuneymuxw Nation has a core interest in these lands and waters, which are part of their traditional territory. As a discipline involving land management, wildfire prevention can affect indigenous cultural values, and Snuneymuxw Nation should be involved in the planning of vegetation management. The islands have several known sites of archaeological value and many dozens more of continuing cultural significance. Ensuring emergency responders are trained to provide culturally sensitive assistance to indigenous residents during a wildfire and to have positive proactive relationships with representatives of Indigenous nations is an important aspect of reconciliation.

For these reasons, Community Resiliency Investment supports providing cultural safety and humility training to emergency management personnel involved in both wildfire prevention and suppression. The RDN can ensure, as a start, that at least one staff member in its Emergency Operations Centre has this cultural training any time the services of the Emergency Operations Centre are required. Similarly, it is important that RDN’s representative to any community committee or working group have this training.

³³ Statistics Canada. 2017. Nanaimo B, RDA [Census subdivision], British Columbia and Canada [Country] (table). Census Profile. 2016 Census. Statistics Canada Catalogue no. 98-316-X2016001. Ottawa. Released November 29, 2017. www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E (accessed December 3, 2021).

Cross-Training

This discipline is intended to develop the level of ability and knowledge among emergency managers and first responders in Electoral Area B (EA B) so that all actors can understand additional roles in wildfire management. Cross-training means bringing the knowledge of one role together with the knowledge of another and is a major component of facilitating interagency cooperation in the long term. The Community Resiliency Investment program recognizes the value of a variety of training for emergency responders but focuses investment on a set of selected courses mostly dealing with suppression training and FireSmart implementation.

More broadly, the spirit of cross-training applies to parts of local government that are not directly responsible for emergency management or wildfire response. For example, the Regional District of Nanaimo (RDN) is fortunate to have park operators with experience in wildland fire and fuel management. This facilitates the implementation of FireSmart initiatives in parks because emergency managers and RDN parks staff can come to the table with a shared understanding of basic project goals and objectives. Identifying opportunities to increase the awareness of FireSmart and wildfire preparedness across RDN departments is an objective of this section.

Cross-training can also describe initiatives to extend FireSmart training and certifications to the backbone of community wildfire resiliency – community members themselves. Residents are able, through FireSmart BC or FireSmart Canada programming, to attain training to become recognized Neighbourhood Champions. These are roles that are embedded in communities and provide advocacy for wildfire preparedness at a grassroots level.

Factors for Success

Identify Needs

Because of the dedication of community members, each of the main islands has a significant existing base of knowledge and training in wildfire preparedness and response. On Gabriola Island, the Gabriola Volunteer Fire Department has a robust training regime to meet provincial requirements for registered departments. While these requirements are focused on providing consistent and safe service for structural firefighting, the Gabriola Department goes above and beyond them in preparing for an interface wildfire. Several of its 38 members have received training in wildland fire suppression and the Incident Command System. In speaking with the Department, ensuring all members have access to the same standard of wildland training is desired, as is support for achieving S-231 Engine Boss certification for a subset of department members. This training allows members of the Fire Department to serve in higher capacities as contract firefighters for the BC Wildfire Service (BCWS) during the fire season.

On Mudge and DeCourcy, firefighting takes the form of volunteer fire brigades not registered with the Office of the Fire Commissioner. Although Community Resiliency Investment funding for wildland training is limited to registered fire departments, these organizations have successfully trained several community volunteers in fire suppression and incident command. Mudge Island Citizens' Society has supported several members to achieve S-100 (Basic Fire Suppression and Safety) certification. On DeCourcy, the Volunteer Fire Rescue Society has over 20 volunteer members trained with S-100 and another two volunteers trained to ICS 400 (Advanced Incident Command System).

Identify Funding Eligibility

Direct funding opportunities for training within the Community Resiliency Investment Program are limited to certain courses and professional roles for enrolment. For example, only volunteers with Fire Departments registered with the Office of the Fire Commissioner can access the suite of courses related to fire suppression. The following courses can be funded for members of the Gabriola Volunteer Fire Department:

- **SPP-WFF1 Wildland Firefighter Level 1** – This course, designed by the Office of the Fire Commissioner, provides training to structural firefighters in the specifics of wildland firefighting and enables structural firefighters to participate in the Province’s Structural Protection Program, or field deployments during the fire season. This course replaces S-100 and S-185 for structural firefighters participating in wildland deployments with the BCWS.
- **S-100 Basic Fire Suppression and Safety** – This course, designed by the BCWS, is the minimum basic standard for any person to participate as a wildland firefighter in British Columbia.
- **S-185 Fire Entrapment Avoidance and Safety** – This course, designed by the BCWS, provides basic knowledge of entrapment avoidance and survival techniques during a wildfire.
- **S-231 Engine Boss** – This course, designed by the BCWS, trains firefighters with wildland experience to lead an engine and crew during an interface event and allows contract firefighters to act in higher capacities while on deployment.
- **ICS 100 Incident Command System Level 100** – This course, offered by the Justice Institute, introduces the Canadian Incident Command System to emergency management staff and local first responders. CRI can fund this course for members of volunteer fire departments and certain emergency management personnel. All members of the Gabriola Volunteer Fire Department currently have this training.

Additional training opportunities are available for emergency management personnel to enrol in ICS-100. This ensures that emergency responders and staff manning an Emergency Operations Centre understand the same language of site and scene control. Emergency management staff can also receive training in the Province’s Wildfire Risk Reduction Basics Course, which supports interagency cooperation between local government and the BCWS on fuel management projects outside the designated wildland-urban interface (WUI).

Emphasize community preparedness

While community members and residents unattached to the local government or registered fire departments have few opportunities to participate in suppression training, there are avenues to access preparedness training within the FireSmart frame. Residents may be able to access training as Neighbourhood Champions, which provides them with the knowledge to engage with their communities on preparedness issues and potentially take a leading role in establishing a neighbourhood FireSmart committee to consider the development of a FireSmart neighbourhood plan (discussed under *Education*). To support grassroots efforts, training local government staff as Local FireSmart Representatives is possible through the funding program. A FireSmart Coordinator hired by the RDN to implement wildfire resiliency initiatives should ideally have this training or Wildfire Mitigation Specialist training. All three staff in the RDN's Emergency Services Department are currently certified as Local FireSmart representatives. Internally, the RDN can also ensure its parks and planning departments receive basic training in FireSmart so they can support resiliency initiatives.

Initiatives to Consider

Collaborate with the Gabriola Volunteer Fire Department to access additional training for members

Verify that all members have received S-100 and S-185 training or equivalent SPP-WFF1, and support the Fire Department to nominate members for S-231 Engine Boss training. This would ensure all members, who will be the first responders to a wildfire on Gabriola, have the same knowledge of wildland suppression and enable all members to participate in structural protection deployments with the BCWS. Engine Boss training supports higher roles for contract members in the Province's Structural Protection Program, valuable interface firefighting experience that can be brought back to EA B.

Support RDN Emergency Services staff to become Local FireSmart Representatives or facilitators

Currently, three staff members of the RDN's Emergency Services department are certified Local FireSmart Representatives. As staff are added to the department, or as outreach is conducted within communities, it could be valuable for a staff member to be a designated facilitator for the LFR workshop. This would enable the RDN to use in-house talent to build up FireSmart awareness and capacity in its outer communities. Alternately, the RDN could seek this qualification when hiring for additional emergency staff or the role of a regional FireSmart Coordinator.

Help interested community members access Neighbourhood/Community Champion training

Every member of the public who contacts local government or their local fire department looking for information about wildfire resiliency is a potential neighbourhood champion. This role is for self-directed leaders who want to learn more about the principles of FireSmart and the Neighbourhood Recognition process so that they can organize in their communities for fire preparedness. The RDN can help direct people to this program. One community in the RDN, Spider Lake (Electoral Area H) achieved Neighbourhood Recognition in 2019. There are opportunities for the RDN to connect interested residents of EA B with residents in Spider Lake, as well as support potential champions to participate in an introductory workshop. These workshops are given by Local FireSmart Representatives and could be held by the RDN if sufficient interest is present in several communities.

Assess future potential for a Home Partners Program approach to FireSmart assessment

The Home Partners Program is another means to provide homeowners with personalized property assessments. While Local FireSmart Representatives are trained to develop neighbourhood recognition, the Home Partners Program is focused on delivering targeted assessments to individual properties within an area, regardless of neighbourhood FireSmart activity. The focus on individual property rather than reducing neighbourhood level fire risk means delivery of the program depends on FireSmart certified “Wildfire Mitigation Specialists”. Specialists conduct home assessments in the program, providing a personalized report to property owners that contains specific discussion about the features of their home and how the fuel environment on their property is likely to behave during a wildfire event. The Home Partners Program could be suited to communities in EA B, where many properties are seasonally occupied and are difficult to involve in neighbourhood efforts.

Training for the Wildfire Mitigation Specialist role can be funded through the Community Resiliency Investment program. Due to the limited application of this credential outside the Home Partners Program and high workshop fee, it may be reasonable to enhance the RDN’s offerings of neighbourhood-focused FireSmart services before considering developing or hiring a qualified Wildfire Mitigation Specialist.

Emergency Planning

This FireSmart discipline addresses the Regional District of Nanaimo's (RDN) own preparedness and examines connections between the Community Wildfire Resiliency Plan and the RDN's emergency planning mandate. The primary purpose of this section is to consider how wildfire can be incorporated into pre-incident planning conducted by the RDN and appropriate levels of readiness during the fire season. This discipline also includes related interagency actions such as coordinating joint training and scenario exercises.

Wildfires are complex and dynamic events that have the potential to combine multiple emergencies within communities. Wildfires rapidly change behaviour depending on winds, weather, the fuel environment, and topography. Respecting the dynamism of wildfire is the first step to making a successful plan.

The RDN prepares emergency plans for its Electoral Areas, declares states of local emergency (SoLE) and issues evacuation alerts, orders and rescinds, and coordinates an Emergency Operations Centre during periods of need. Emergency planning, including evacuation planning, by the RDN focuses on rapid situation assessment, rather than prescriptive plans that may quickly be overcome by situational uncertainty. For example, the RDN's evacuation planning relies on field assessments to understand all possible routes, rather than focusing on a single preferred route that may be non-functional in a large emergency. During a wildfire emergency, multiple routes and resources may quickly become unpassable or unsafe or need to be reserved for emergency responders.

Local emergency and evacuation plans cover the general initiation of an Emergency Operations Centre, the declaration of orders and alerts affecting residents and properties, and the RDN's relationship with supporting organizations like Emergency Management BC. The role of the Community Wildfire Resiliency Plan is to provide wildfire-related guidance for pre-incident planning and to propose levels of service for emergency readiness, called "Wildfire Preparedness Condition Level" by the Province.

Factors for Success

Wildfire Preparedness Condition Level

Within the RDN's Emergency Services department, adopting a guide to emergency service levels in relation to wildfire danger can help prioritize limited departmental resources during fire season. This guide will associate RDN staffing and activities with the levels of fire danger, with more action to prepare for wildfire being appropriate whenever fire danger rises above low. Fire danger can be monitored daily on the BC Wildfire Service (BCWS) website. Developing an appropriate guide to Community Wildfire Response Condition Level is beyond the scope of this Community Wildfire Resiliency Plan, but the RDN can work towards implementing a level of service based on the example below, adapted from the BCWS's example.

Table 19. Sample Guide to Wildfire Response Condition Level.

Preparedness Level/ Fire Danger Rating	Action Guidelines
I Low	<ul style="list-style-type: none"> Staff monitor fire danger rating weekly
II Moderate	<ul style="list-style-type: none"> Staff monitor fire danger rating daily
III High	<ul style="list-style-type: none"> Staff on normal shifts Notify the proposed Community FireSmart and Resiliency Committee of preparedness level. Establish weekly communications with local fire responders regarding preparedness concerns. Promote wildfire awareness and reporting mechanisms on social media channels. Publish fire danger rating on RDN website. Consult with RDN Parks on potential area closures in zones of high and extreme wildfire threat.
IV Extreme	<ul style="list-style-type: none"> EOC and parks staff on standby. Notify the proposed Community FireSmart and Resiliency Committee of preparedness level. Weekly communications with local fire responders regarding preparedness concerns. Weekly communications with parks department staff over internal preparedness. Promote wildfire awareness and reporting mechanisms on social media channels. Publish fire danger rating on RDN website. Consider area closure notices in park zones of high and extreme wildfire threat. Prepare area closure notices.
V Ongoing fire(s)	<ul style="list-style-type: none"> Issue area closures in all parks and publicize with media release and RDN website. Mobilize EOC if evacuation is possible, or if fire requires additional support from Emergency Management BC. Contact BC Ferries and private charters to request assistance if whole island evacuation is a possible outcome. Issue Evacuation Alerts and Orders based on fire behaviour prediction as appropriate and publicize with media release and RDN website. Assist evacuated residents with support access and emergency lodging.

	<ul style="list-style-type: none"> • Daily EOC communications with local fire responders, BCWS, and parks department. • Daily EOC public updates
--	--

Initiatives to Consider

Coordinate a tabletop scenario exercise with the members of the proposed Fire Response and Preparedness Working Group

The RDN may be able to facilitate a joint training exercise between members of local fire departments, regional emergency staff, and the BCWS. This exercise would gather participants and present a wildfire scenario, which then allows all participants to confirm their roles and follow through a chain of action during the hypothetical wildfire event. The RDN could take the lead in coordinating such a meeting and developing the tabletop exercise, which should include details about the scenario’s location, time, and context as well as cues for participation by each of the relevant actors. This working group is also the ideal community to develop and maintain an annual fire season pre-incident plan.

Prepare an inventory of structural protection capacity and deployment

To support pre-incident planning, the RDN can coordinate a structural protection inventory among its Electoral Areas, including the quantity, type, and estimated protection capacity of each unit, its location, and the responsible fire department. This activity is supported by Community Resiliency Investment and provides important information to pre-incident planning. Structural protection units refer to mobile sprinkler systems that can be quickly set up to douse a home in water, thus reducing the likelihood of ember ignition. Structural protection units are only able to cover a limited area and are limited in number in the RDN and Electoral Area B (EA B) particularly. Concerns with summer water supply on the islands also contribute to concerns about the scalability of this kind of equipment; however, these units can play an important role in protecting homes during a wildfire.

Conduct a community info session about emergency preparedness before a wildfire

The purpose of this event would be to introduce the community to emergency planning concepts based on the Emergency Management BC Wildfire Preparedness Guide. Promoting the guide is supported by the Community Resiliency Investment program. This event could be a way to encourage residents to prepare for a major wildfire event by having a household or family plan for communications, evacuation, and provisions. The event could naturally address questions about logistics or evacuation planning from the public.

Establish a guide for Emergency Services preparedness levels during wildfire season

The RDN can help allocate the limited resources of the Emergency Services department during fire season by developing and following a guide to Wildfire Response Condition Levels (Table 19), tied to fire danger reporting updated daily by the Province. The table presented previously in this section can be used as a sample of the content and actions to be considered by the Emergency Services department in defining its level of service for different fire danger ratings. Actions should be refined in consultation with emergency response partners from the EA B community.

Identify “Clean Air Refuges” for use by vulnerable populations during periods of heavy smoke

There may not always be fire where there is smoke. While the focus of the Community Wildfire Resiliency Plan is on preparing for a wildfire within the boundaries of EA B, wildfire smoke impacts can range far and wide and have impacted the community during fire season. Sustained heavy smoke has adverse health effects and presents a different kind of wildfire emergency. The RDN can seek to identify potential partners in EA B, such as commercial centres, faith-based facilities or community buildings with suitable HVAC systems that are open to the public, where residents who need a breath of fresh air can find it. Identifying community partners for such a program could be incorporated into the wildfire emergency preparedness condition guide.

Pre-Incident Plan

The pre-incident plan is a body of knowledge prepared by fire suppression personnel about the resources and risks of a wildfire event in their communities. In EA B, this knowledge is kept by the local fire department and local brigades. While the RDN does not have authority over fire suppression in EA B, emergency planners benefit from understanding the core elements of a pre-incident plan. The RDN has compiled some of this information in its internal protocol for emergency response. A pre-incident plan should also address the following issues for wildland fire suppression:

Site Command

- First responder (BCWS or Gabriola Fire)
- Incident command and delegation
- Management constraints
- Interagency agreements
-

Site Operations

- Air and water access
- Control line locations
- Natural barriers
- Safety zone options
- Staging area locations
- GPS locations for key points

Site Logistics

- Location of utilities and de-energization
- Communications protocols
- Roads, trails, and access

Site Planning

- Topographic maps
- Vegetation and fuel maps
- Community base map
- Hazardous values
- Archaeological/cultural values
- Protected or rare environmental features

Preparing a pre-incident plan is logically an opportunity to simulate a wildfire response effort. Developing the plan can be part of joint training exercises coordinated between local fire suppression personnel, the BCWS, and the RDN. Such a meeting would be within the scope and core purpose of a proposed Fire Response and Preparedness Working Group, as discussed in *Interagency Cooperation*.

Vegetation Management

Fires require three elements: a source of ignition, a supply of oxygen, and a supply of fuel. In the context of a wildfire, manipulating the fuel environment is often an effective way to reduce wildfire threat or risk. This is what vegetation, or fuel, management does, from the small-scale of FireSmart on an individual property to the large-scale of fuel management on the forest land base.

This discipline addresses opportunities to mitigate wildfire risk by altering both natural forest vegetation and the cultivated landscaping around homes and critical infrastructure. Considerations for this section are divided into two categories corresponding to the common forms of implementation: FireSmart landscaping focused closely on homes and infrastructure, and broader fuel management in forest areas. This is done partly to reflect the real difference in approach between the two scales.

Managing Vegetation through FireSmart

FireSmart vegetation management is intended to reduce the risk of ignition to a specific building or piece of infrastructure, assuming a fire has occurred in the area. Accordingly, FireSmart vegetation management focuses heavily on achieving guidelines in the Non-Combustible Zone (0-1.5m) and Zones 1 (1.5-10m), 2 (10-30m) and 3 (30-100m) around a home or piece of infrastructure. Goals for management vary with the distance from the structure. In the Non-Combustible Zone, the emphasis is placed on using non-combustible or fire-resistant building materials and covers to reduce the likelihood of ignition by direct flame. Within Zone 1, emphasis is placed on creating an area free of hazardous fuels like coniferous trees and woody debris and using fire-resistant landscape construction (decks and outbuildings), while goals for Zones 2 and 3 emphasize proper spacing, pruning, and removal of some underbrush. The goal is to prevent a structure ignition and create defensible space around the home where firefighters can work in. Vegetation management for FireSmart is often guided by an assessment report prepared by a Local FireSmart Representative or Wildfire Mitigation Specialist, though some homeowners may wish to undertake FireSmart treatments on their own. The expertise of a Registered Professional Forester is recommended for projects where management includes areas of native forest vegetation.

Supports are available through the Community Resiliency Investment program for FireSmart activities on private land in residential areas and for publicly owned critical infrastructure. On private land, only planning and assessment program costs are covered, with the homeowner expected to cover the cost of implementing recommendations. While this can seem daunting, the Local FireSmart Representative can help homeowners understand which actions may be “quick starts” to improve resiliency, and which are appropriate to save until funding or time are available. To help, the RDN can apply for funding to offer limited rebates to homeowners who complete activities. Piloting a rebate program with a limited request for funding may help assess the general level of interest for this in the community.

A FireSmart Assessment Program for RDN Critical Infrastructure

Local government can apply for funding to implement the recommendations from a FireSmart assessment for publicly owned critical infrastructure up to a maximum of \$50,000 per eligible structure. FireSmart assessments often identify a need for vegetation management to mitigate wildfire vulnerability. This is available only for structures critical to wildfire response (such as a reception centre, water infrastructure, communications towers, electrical infrastructure) having a completed FireSmart

assessment scorecard at the time of application. Reassessment with the appropriate scorecard following the mitigation works is also a covered cost for publicly owned critical infrastructure.

Fuel Management for Forest Landscapes

Fuel management in the wider landscape is not as focused on preventing the ignition of specific homes or structures. Instead, fuel management is about strategically altering the characteristics of a forest to transition it towards lower wildfire threat and thereby reduce the general risk to the community. Sometimes, fuel management is used to produce future fire suppression opportunities such as anchor points or safety zones, locations to initiate defensive back-burns, or improved access to a remote area of a community. Directions for how many trees to remove and retain, as well as how to protect other values in the forest landscape, are contained in a fuel management prescription prepared by a Registered Professional Forester and reviewed by the BC Wildfire Service (BCWS). The intent of fuel management is generally to support healthy forest development while reducing wildfire risk. Fuel management is only supported through CRI on public land.

Fuel management is completed through three phases:

1. Identify areas for fuel treatment within a Community Wildfire Resiliency Plan or other high-level strategic plan.
2. Develop a detailed Fuel Management Prescription which identifies objectives and strategies to reduce wildfire risk.
3. Operational implementation of the Fuel Management Prescription.

This Community Wildfire Resiliency Plan is the first step in identifying and prioritizing candidate areas for fuel management prescription development. Fuel management is a process of starting wide and narrowing down potential treatment areas as constraints are identified and areas are further ground-truthed. The areas shown on the map in Figure 17 in this section form a discussion piece to be used in pursuing a fuel management program and do not compel or imply fuel management to occur. The process from the initial identification of a treatment area to implementation on the ground typically takes several years.



Photo 13. Example of a forest before fuel management.



Photo 14. In the same area as above, post fuel treatment.

Identifying potential treatment areas

Areas on public lands that were identified as high risk and are within 100m of moderately dense interface communities were visited in the field. Fuel plots were established in representative areas to determine wildfire threat. Assessments of the fuel condition were completed following the provincial assessment system using the 2020 Wildfire Threat Assessment Guide³⁴. This is the provincial standard for field assessments of fuel hazard in the WUI and is used to plan fuel hazard mitigation works. Fuel types are scored under this system which is used to help prioritize the areas for fuel hazard mitigation funding under the Community Resilience Investment Program.

The fuel component of wildfire threat is driven by the density and continuity of fuel on the forest floor, in the canopy, and the ladder fuels that connect the two. The highest threat fuel types are composed of dense coniferous trees with high vertical and horizontal continuity, with high fuel loading on the forest floor in the form of dead logs and branches.

Interface fuel treatments change the composition of a forest to reduce the wildfire threat, thereby reducing the wildfire risk. This involves reducing the overall fuel load and disrupting both the vertical and horizontal continuity to create fuel strata gaps. The overall objective of the fuel treatment prescriptions is to change the fire behaviour potential of these stands from a crown fire to a surface fire under the most dangerous weather conditions (the 90th percentile weather conditions). This allows suppression resources to be able to act on the wildfire and defend the adjacent values. The detailed strategies for reducing fire behaviour potential are detailed in a fuel management prescription, which is developed by a Registered Professional Forester with wildfire management experience. Potential strategies include tree thinning, spacing, pruning, surface debris removal, or creating fuel gaps. Treatment areas should be adjacent to the values at risk, a target of at least 100m wide and located up against man-made and natural fuel breaks when possible.

³⁴ Ministry of Forests, Lands, Natural Resources Operations, and Rural Development. (2020) *2020 Wildfire Threat Assessment Guide and Worksheets*. Retrieved from www2.gov.bc.ca/assets/gov/public-safety-and-emergency-services/wildfire-status/prevention/fire-fuel-management/fuels-management/2020-wildfire-threat-assessment-guide-final.pdf.



Figure 16. Comparison of surface and crown fire behaviour.

Many of the interface treatment areas are located partially within the Regional District of Nanaimo (RDN) managed community and Regional parks. Completion of these treatments will require consultation with RDN parks staff. There is potential for fuel management to align with park management goals. For example, removing dead and downed trees near facilities for hazard reduction also reduces fuel loading and satisfies FireSmart. It is recommended that RDN’s new Parks and Trails Strategy integrate wildfire management objectives compatible with environmental goals. This includes policies mentioned in the *Legislation and Planning* section for regular wildfire hazard assessment and could include setting a level of service for wildfire hazard abatement on park lands. Some examples of wildfire hazard reduction strategies that may integrate with parks management are:

- Remove dead and dying trees proactively to improve public safety hazard and wildfire hazard.
- Create an assessment program for Parks facilities that integrates tree hazard and wildfire hazard assessments.
- Replace trees that require removal with non-flammable trees. Explore the use of novel species that are more fire-resistant (for example, larch or non-native deciduous trees).

Potential Treatment Areas

Figure 17 shows the location of potential treatment areas identified by this CWRP. These areas are described and provided with a priority rating for development in Table 20.

The limited public land base results in areas that are small by BCWS standards and may provide marginal benefits for wildfire threat and risk reduction. Areas can only be identified within the eligible WUI perimeter defined by the BCWS; outside of this area, the Wildfire Service identifies fuel management opportunities directly through the Crown Land Wildfire Risk Reduction program. These are the areas closest to moderate population density. Some, though not all, overlap with lands the RDN is the owner or manager of. Developing strong interagency relationships is a key part of implementing multi-jurisdiction fuel management. The involvement of the BCWS is required for nearly all fuel management projects in some capacity.



Figure 17. Map of potential fuel management areas in EA B

Table 20. Areas with the highest potential for fuel management in EA B.

Treatment Polygon ID	General Location	Jurisdiction	Local Fuel Threat (Ha)			Total Area (ha)	Priority	Treatment Rationale / Constraints
			Moderate	High	Extreme			
707PRK	NW 707 Community Park	RDN	20.7	131.4	0.1	152.5	High	<p>A fuel management prescription is currently being developed for a portion of this area. Designating this section of the park as a potential treatment area is meant to ensure consistency with ongoing work and enable future work as desired. This area is characterized by high threat C-3 fuels upwind of homes in the Gabriola townsite. This treatment helps prevent fire spread from the centre of the island toward the Gabriola townsite.</p> <p>Preliminary constraints: Area has level to gently rolling ground and no significant steep slopes. There is very little overland water flow within the treatment area. As part of a Community Park, there is an established trail network crossing through the treatment area that would need to be rehabilitated or conserved during treatment. There are no known archaeological or cultural sites within the treatment area. Fuel management prescription must consult with First Nations on cultural feature identification. Fuel management prescription should address how treatment supports the 707 Community Park Management Plan.</p>
DCAN	Descanso Bay Regional/ Cox Community Parks	RDN	41.9	0.5	0	42.4	Low	<p>Continuous C-5 fuels in the park. Low to moderate loading of surface fuels, rising to up to 50% cover in small patches with high cedar composition. Alternative to fuel management would be trailside treatment by minor brushing and pruning to reduce ignition risk. Treatment would reduce wildfire threat in the vicinity of the RDN's Descanso Bay campground and around Taylor Bay Road, the primary access route to the north shore of Gabriola Island.</p> <p>Preliminary constraints: Area has high recreational value. Recreational access and values to be conserved. The area contains high-value mature trees. The area contains small portions of blocky or steep terrain, particularly below Taylor Bay Road. The area is surrounded by private residential land and treatment may affect privacy and/or views.</p>

Treatment Polygon ID	General Location	Jurisdiction	Local Fuel Threat (Ha)			Total Area (ha)	Priority	Treatment Rationale / Constraints
			Moderate	High	Extreme			
SEYM	Seymour Rd, south Gabriola	Crown federal/provincial	39.5	0.1	0	39.6	Low	<p>A mix of C-5 and M-2 fuels on federal and provincial land. Near stand edges, advanced ladder fuels reduce strata gap to conifer canopy. Moderate levels of surface fine fuels. Treatment would form a buffer between private residences and upwind forests in the centre of Gabriola Island.</p> <p>Preliminary constraints: The area contains federal land being held for treaty negotiations with Snuneymuxw Nation. The area contains portions of the BC red-listed ecological community, <i>Pseudotsuga menziesii</i> / <i>Mahonia nervosa</i>. The area contains informal trails used by mountain bikers and hikers.</p>
NORW	Norwich Rd, north Gabriola	Crown provincial	16.7	3.3	0	20.0	Low	<p>Coniferous fuels with moderate surface fuel loading on short, steep slopes form an escarpment between Lock Bay and the north shore of Gabriola Island. Upwind of north shore communities, this is a small area where treatment could reduce wildfire potential on slopes, primarily by reducing ladder and surface fuels. Manual treatment may be necessary for some portions due to steep terrain.</p> <p>Preliminary constraints: The area contains steep slopes and may not be suitable for mechanical treatment. The area is surrounded by private residential land and treatment may affect privacy and/or views.</p>

Action Plan & Implementation

This section takes discussion from the preceding sections on FireSmart Disciplines and summarizes recommendations for the Regional District of Nanaimo (RDN) to consider pursuing. Successful implementation of the Community Wildfire Resiliency Plan requires a strategy for implementation, tracking mechanisms for success, and a schedule for revisiting issues left unresolved. The Action Plan follows the SMART criteria for outlining potential initiatives:

- **Specific:** Target exactly what is to be achieved
- **Measurable:** quantify or suggest an indicator of progress
- **Assignable:** specify who will be responsible for implementation
- **Realistic:** state what results can reasonably be achieved
- **Time-Bound:** state expected time for completion. Note that some recommendations must be implemented on a recurring basis annually or biannually. For example, an annual social media campaign to raise awareness.

Plan monitoring and updates

While priorities and timelines are assigned below, the RDN may, with feedback from its community, decide some initiatives are of greater importance than others. The risk environment will continue to change beyond the completion of the plan and require adjusting expectations and resource allocation for building wildfire resiliency programming. This is a natural part of the implementation process of any plan. For these reasons, the Community Wildfire Resiliency Plan and this Action Plan should be revisited from time to time to ensure they are meeting the needs of Electoral Area B. A formal review after five years is recommended, with at least annual reviews of the Action Plan.

Tracking and Reporting

There are funding sources available to help implement many of these recommendations, subject to a competitive application program open to all local governments. UBCM manages the Community Resilience Investment (CRI) Program which offers up to 100% funding for a range of wildfire mitigation initiatives. Many of the recommendations made in this report are eligible for CRI funding. Estimated costs for implementing these recommendations are in addition to existing operating budgets. The availability of grant funding is subject to provincial CRI program requirements and may vary by year. Typically, up to \$25,000-\$50,000 is available per year for each local government area. The Action Plan provides notes to help prioritize different potential initiatives in the context of limited funding.

Initiatives pursued by the RDN in the Action Plan should become part of the Emergency Service department's annual progress review. The Action Plan can be recreated and modified to add columns for noting whether items are in progress or have been completed, as well as capture specific measurable outcomes that can help justify the Region's wildfire resiliency initiative.

Following the [Action Plan](#) (p.111), Table 22 provides a sample tracking and reporting tool.

Table 21. Action Plan.

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
Renewing the Plan and Building Resiliency						
Objective: View the Community Wildfire Resiliency Plan as a Living Document and incorporate wildfire resiliency into strategic decisions						
1. Conduct a formal review of the CWRP contents every five years. Review the Action Plan every year.	RDN Emergency Services	High	\$30,000 per update	Continuing program capacity for wildfire preparedness within the Emergency Services department.	Maintain annual tracking and monitoring information on initiatives in the Action Plan	CRI funding eligible (CWRP updates)
2. Advocate for wildfire resiliency to be incorporated in the RDN's plans and processes	RDN Emergency Services	High	staff time	Good relationships between Emergency Services and other units of the regional government.	Acknowledgement of wildfire hazard and resiliency issues in new corporate documents	
3. Establish a FireSmart Coordinator position within RDN Emergency Services	RDN Emergency Services	High	\$60,000-\$70,000 per year (one year contracts)	Develop a job plan (title, responsibilities, priority initiatives, manager, term) Funding for this position can be supported by CRI up to 100% of salary.	Fill this position and establish a job plan for the first contract year	CRI funding eligible
Education						
Objective: Promote FireSmart as a strategy for wildfire preparedness and demonstrate the Region's commitment to wildfire resiliency in the community						
4. Publish the CWRP, risk maps, and highlights on the RDN's website	RDN Emergency Services	High	Staff time	IT support	Successful publication no more than one month after receipt by the Board of Directors	
5. Create a FireSmart assessment program for residents outside the Gabriola Fire Improvement District	Local FireSmart Representative / FireSmart Coordinator	High	See Item 3. Incidental expenses beyond FS Coordinator salary.	Coordination with GVFD, MICS, and DICA as required. Trained LFR within RDN	Offer an annual opportunity to residents outside the protection district to have their property assessed	CRI funding eligible
6. Expand participation in Voyent-Alert!	RDN Emergency Services	High	Staff time	IT Support Outreach with local organizations Community advertising	Registrations as a percent of the population.	
7. Promote FireSmart Neighbourhood Planning in priority neighbourhoods	Local FireSmart Representative / FireSmart Coordinator	Medium	\$3,000-\$5,000	Coordination with GVFD, MICS, and DICA as required. Trained LFR within RDN	Number of households represented, participating	CRI funding eligible

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
					Offer neighbourhood champion workshop to regional residents.	
8. Host a Community Clean Up Day in Descanso Bay campground	RDN Parks, Local FireSmart Representative / FireSmart Coordinator	Medium	\$5,000	Coordination with RDN Parks to designate clean-up areas, desired outcomes	Number of participants Weight of vegetation/debris removed Reduce surface fuel loading near the campground	CRI funding eligible
9. Collect feedback from the community on an ongoing basis via advertising the Wildfire Resiliency Initiative and Get Involved page	RDN Emergency Services	Medium	Staff time	IT support Coordination with social media	Number of questions asked Number of contacts with residents Number of survey responses (Get Involved)	
Legislation and Planning						
Objective: Ensure RDN bylaws and policies support wildfire resiliency						
10. Explore a program to reduce or eliminate green waste tipping fees for FireSmart projects at the regional landfill	RDN Engineering and Utilities RDN Emergency Services	High	Cost to be estimated by further study	Coordination between departments Baseline studies Forecast demand by price. Operational capacity and training	Green waste by weight associated with a completed FireSmart assessment Fees deferred	Tipping fees: CRI funding eligible.
11. Create a FireSmart Assessment program for publicly owned critical infrastructure	RDN Engineering and Utilities	High	\$25,000-\$30,000	Coordination with RDN Emergency Services. CRI funding can be used to conduct the assessments	Complete FireSmart inventory of eligible publicly owned critical infrastructure.	Assessments: CRI funding eligible.
12. Harmonize the existing Wood First and Green Building policies with FireSmart principles, such as supporting fire-rated wood products.	RDN Engineering and Utilities RDN Emergency Services RDN Planning and Development	Medium	Staff time	Coordination between departments	Adapted policies reflect recognition of FireSmart building design and principles, and recognize that fire-rated wood building elements have their place in FireSmart design.	Review and revision may be CRI funding eligible depending on scope.
13. Adopt a target level of service for wildfire	RDN Parks	Medium	Staff-time	Parks Operational capacity	Level of service for wildfire hazard	Operational budget implications vary with

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
hazard assessment in regional and community parks					assessment of park lands established in new Parks and Trails Strategy	the level of service adopted.
14. Begin recording wildfire threat information on park service request records and calls.	RDN Parks	Medium	Staff time	RDN Emergency Services and GIS to provide wildfire threat mapping. Parks to orient staff to mapping.	>90% of relevant service requests on park land are attached to a wildfire threat rating for the area.	
Development Considerations						
Objective: Advocate for FireSmart community planning with the Islands Trust						
15. Provide the Community Wildfire Resiliency Plan to the Islands Trust for information.	RDN Emergency Services	Medium	Staff time		Islands Trust Councilors and planning staff have received the Community Wildfire Resiliency Plan	
Interagency Cooperation						
Objective: Ensuring wildfire response is effective						
16. Initiate a region-wide Interagency Fire Response and Preparedness Working Group	RDN Emergency Services BC Wildfire Service (BCWS)	High	\$2,000 per meeting	Participation of local fire depts, BCWS, regional emergency responders. Emergency Services Operational Capacity	Host initial meeting Host tabletop exercise for incident planning	CRI funding eligible
17. Develop an EA B-specific Community FireSmart and Resiliency Committee	FireSmart Coordinator	High	\$2,000 per meeting	Develop terms of reference, network participants, support participation	Host initial meeting Approve draft terms of reference	CRI funding eligible
18. Provide cultural sensitivity training to Emergency Services staff to support positive partnerships with indigenous people and communities	RDN Emergency Services Human Resources	Medium	Staff time & facilitation fee	Identify available training	One on duty or on call EOC staffer with cultural sensitivity training at all times during an emergency	CRI funding eligible
Cross-training						
Objective: Ensuring emergency responders have a variety of training and experience						
19. Identify training opportunities on future CRI funding applications	FireSmart Coordinator	Medium	Staff time	Coordination with GVFD to identify training opportunities eligible under the CRI funding	Full participation in training by members who want it	CRI funding eligible Training for GVFD members led by GVFD.

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
20. Support additional RDN staff to become Local FireSmart Representatives	RDN Emergency Services	Medium	Staff time		At least two people in RDN Emergency Services to have active LFR certification.	CRI funding eligible. Support this training for new FireSmart Coordinator or hire with credential
21. Host a neighbourhood champion training workshop for interested community members	RDN Emergency Services	Medium	\$5,000 per event	Successful fostering of a FireSmart neighbourhood planning program	Two new neighbourhood champions trained in priority identified areas, one in other areas.	CRI funding eligible
22. Train RDN staff or Local FireSmart Representatives to be Wildfire Mitigation Specialists	RDN Emergency Services	Low	\$8,500 - \$10,000	Expression of interest from GVFD	Certification of six to eight community members as WMS.	CRI funding eligible
Emergency Planning						
Objective: Enhance emergency response capacity						
23. Establish a guide for Emergency Services preparedness levels during wildfire season	RDN Emergency Services	High	Staff time	Administrative capacity in ES.	Established Guide to Wildfire Preparedness Condition Levels	Sample for development provided in Emergency Planning section
24. Participate in pre-incident planning for wildfire events with local suppression experts	Regional Fire Response and Preparedness Working Group	High	Staff time. See item 16.	Interest/participation of GVFD, BCWS	Complete annual pre-incident plan and discuss with the regional working group for fire response in a pre-season meeting	CRI funding is eligible when developed as part of a working group of Community FireSmart and Resiliency committee
25. Conduct a community information session about emergency preparedness and evacuation during a wildfire	RDN Emergency Services	Medium	\$5,000 per event,	Conclusion of the evacuation planning process for EA B	Host event Number of attendees	CRI funding eligible Must align with EMBC Wildfire Preparedness Guide.
26. Identify “Clean Air Refuges” for use by the public during smoke events	RDN Emergency Services	Low	Staff time	Partnership with community businesses and facilities. Identification of suitable buildings.	Identify locations that the public can visit for clean air during periods of heavy smoke	
Vegetation Management						
Objective: Modify fuel environments to reduce risk around infrastructure and communities						

Recommendation/Action	Lead(s)	Priority	Cost (Est.)	Resources Required	Metric for Success	Notes
27. Continue to develop fuel management planning in 707 Community Park	RDN Parks RDN Emergency Services	High	Competitive bid (implementation)	Community outreach and support Consultation Coordination between ES and Parks management	A thorough analysis of fuel management options in the park.	CRI funding eligible
28. Implement recommendations from FireSmart assessments of critical infrastructure	RDN Engineering and Utilities	High	TBD based on assessment outcomes. See item 11	Administrative capacity in RDN. Partnership with Engineering to allocate and prioritize assets for implementation	Completed FireSmart activities and updated scorecards	CRI funding is eligible when the initial FireSmart assessment has been completed. Up to \$50,000 per structure.
29. Liaise with BC Parks to request hazard assessment and abatement in Pirates Cove Marine Provincial Park	RDN Emergency Services	Medium	Staff time	Correspondence with BC Parks	A positive response from BC Parks	
30. Consider potential fuel treatment in identified areas outside of 707 Park	RDN Emergency Services RDN Parks BCWS	Low	Varies by treatment area.	Coordination with BCWS	Maintain options to pursue fuel treatment in identified areas.	

Appendices

Appendix A: Glossary of Terms

Term	Definition
Area of Interest (AOI)	The geographic study area for a Community Wildfire Protection Plan, within which the extent of the boundaries of the Wildland Urban Interface are determined.
Community Wildfire Resiliency Plan	A plan adopted by a local government or First Nation to identify wildfire threat and risk throughout the study area, examine policy and planning responses, and assess emergency response capacity while providing action item recommendations for building community resilience, supported by the Province through the Community Resiliency Investment Program.
Critical Infrastructure	Assets, structures, or features that underpin the health and safety of the community and allow governance to take place
Crown fuels	Forest fuels occurring above the level of the ground, on tree stems or in tree canopies, including live and dead branches attached to trees, bark, and foliage.
Fire Return Interval	The time between fires in a defined area, typically measured at the landscape scale.
FireSmart	A term for that describes living with the risk of wildfire while reducing the adverse effects of wildfire. Also refers to a program of disciplines for mitigating the risks of wildfire
Fuels	Those elements of a forest that can burn, including organic material on the forest floor, logs, dead branches and needles, shrubs and herbs, and the bark, wood, and foliage of live trees.
Fuel management	Coordinated action to reduce wildfire risk by modifying the structure and density of forest fuels.
Fuel management prescription	A document that identifies fuel management strategies to reduce wildfire risk in a defined area, while also ensuring other values are protected.
Fuel treatment	The implementation of a fuel management prescription, which may involve the physical modification of fuels by heavy machinery or ground workers.
Interface	A pattern of urban development where contiguous development directly abuts native vegetation.
Intermix	A pattern of urban development where buildings are closely placed within and among trees.

Landscape Unit Plan	A plan prepared by the Province that provides objectives for resource management within a defined area, including policies related to forest biodiversity and wildlife habitat.
Official Community Plan	A local government plan for an electoral area(s) or municipality, mandated by provincial legislation, that shows how land use will be planned and how local government will meet other provincial policy objectives. Official Community Plans may also include additional policies based on local needs and interests.
Suppression	Actions taken in response to fire to control the spread of the fire or reduce it in area or severity.
Surface fuels	Forest fuels found on top of the organic layer of the soil and below the crowns of trees, typically including understory vegetation, dead branches, needles, and logs.
Wildfire	A form of natural landscape disturbance involving the combustion of vegetation.
Wildfire risk	The probability of a wildfire occurring combined with the consequences or impacts it would cause.
Wildfire season	The period of the year during which wildfires generally take place due to weather and fuel conditions. In BC, this is typically April – September.
Wildfire threat	Classification of potential fire behaviour based on fuel conditions, weather conditions, slope, aspect, and other biophysical factors.
Wildland Urban Interface (WUI)	The geographic area where homes and buildings meet continuous areas of natural vegetation.

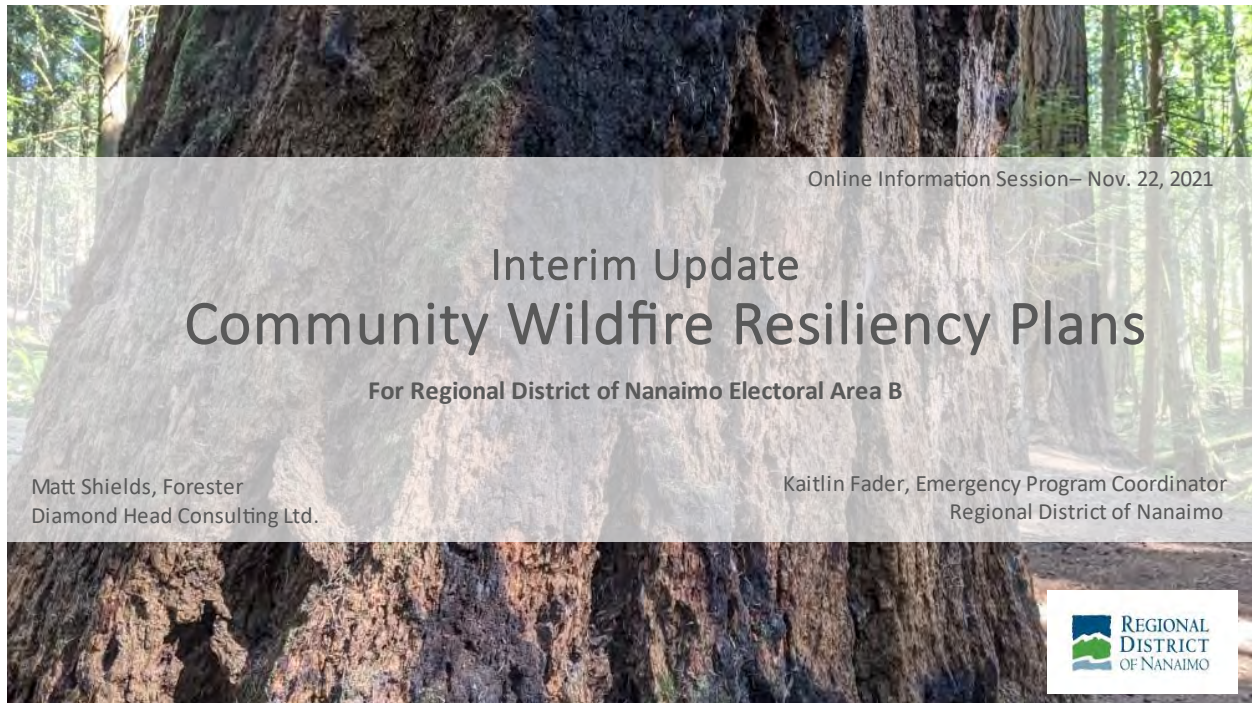
Appendix B: Public Engagement

Public engagement for the plan consisted of information and feedback solicited via the RDN’s Wildfire Resiliency Initiative Get Involved webpage, as well as two community events hosted online via Zoom on August 26th 2021 and November 22nd 2021. Because of the COVID-19 pandemic, engagement for the plan was strictly online only. Webinar presentations included an open-ended Q & A with attendees. Presentations were recorded and published on the RDN’s Get Involved page for the project via YouTube. An interactive web-based “StoryMap” was also prepared and shared via the Get Involved page to introduce community members to the project.

Advertisements for the Get Involved page and the web events were prepared and published by the RDN several times during the life of the project. Web events were also advertised in community newspapers and radio in the Oceanside area.

Engagement with the public revealed several common concerns across the RDN’s electoral areas, particularly regarding the implementation of FireSmart landscaping. Several recommendations regarding the development of FireSmart programming for neighbourhoods of higher relative risk, reducing barriers to green waste disposal, and providing more capacity for FireSmart assessment programs reflect this feedback.

The following images are sample presentation slides from the web event of November 17, 2021, which provided an “interim update” to the community on the findings of the local wildfire threat assessment.



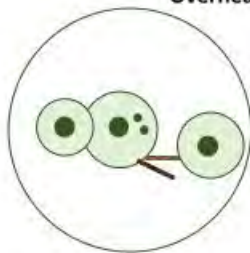


Forest Fuels Glossary

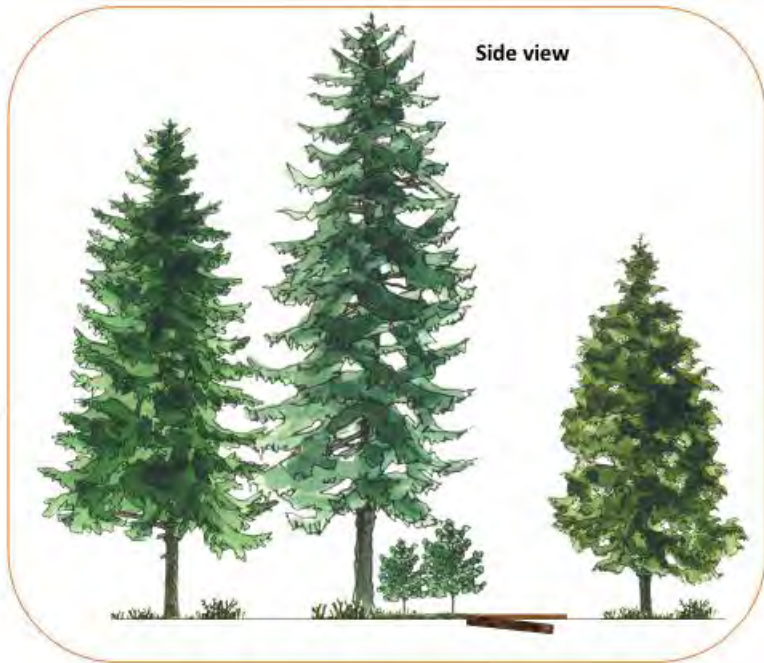
- 1. Surface fuel
- 2. Litter/fuel
- 3. Downed fuel
- 4. Downed coarse
- 5. Fine woody fuel
- 6. Grasses/forbs
- 7. Herbaceous
- 8. Sparse dry forest
- 9. Coniferous
- 10. Deciduous

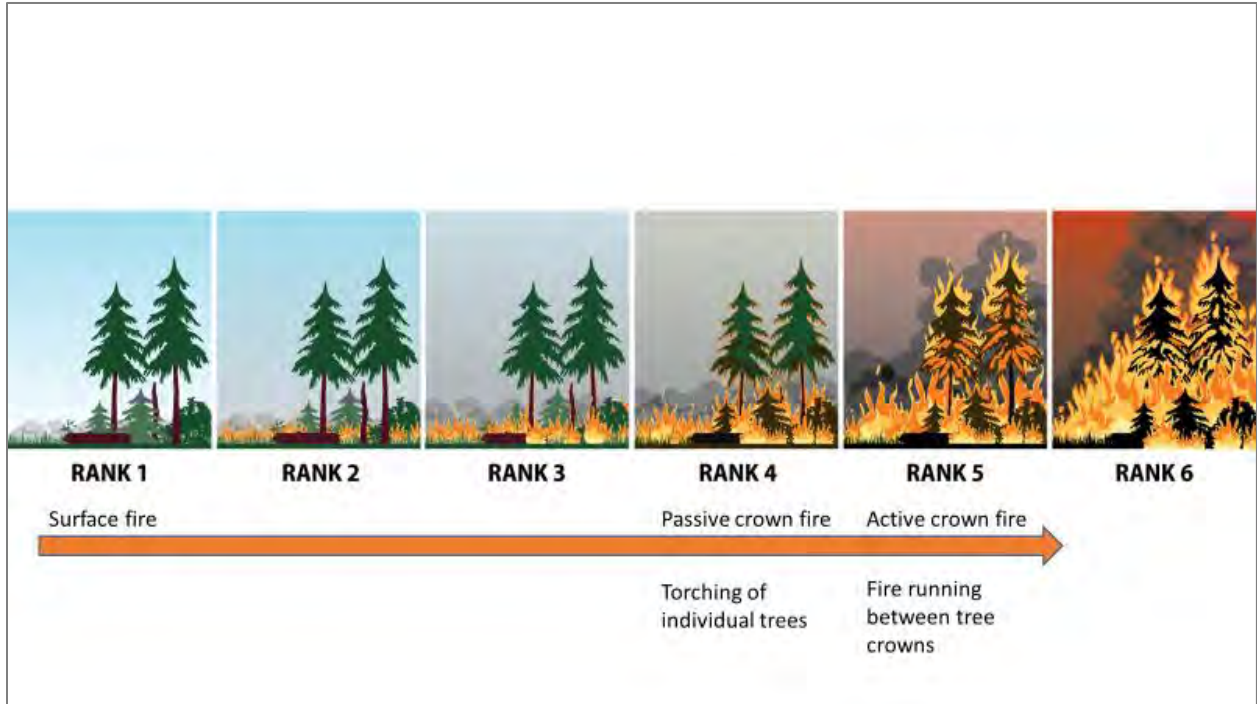
11. Fuel type

Overhead view



Side view





7 Disciplines of FireSmart

- Education
- Community Planning
- Development Considerations
- Interagency Co-operation
- Emergency Planning
- FireSmart and Cross Training
- Fuel Management

FireSmart BC Homeowner's Manual
Reduce the potential impacts of wildfire on your home
[Download](#)
Download this as a PDF

*The CWRP is a tool for building a FireSmart community
(Sandwell Provincial Park area)*

Appendix C: Local Wildfire Threat and Risk Process

This section provides a summary of the local wildfire threat and risk assessment, including field reviewed fuel characteristics, local fire spread patterns, topographical considerations, and proximity of fuel to the community. This appendix describes the methodology used to determine wildfire risk. The findings of this analysis have been integrated into the main body of the report in the Wildfire Risk Assessment section.

The local wildfire risk assessment process involves:

1. Verification of local fuel types to develop a fuel type map
2. Assessment of fire spread patterns
3. Consideration of topography
4. Stratification of the WUI based on relative wildfire threat
5. Classification of wildfire risk areas

Fuel Type Attribute Assessment

Fuel typing falls into sixteen national benchmark fuel types that are used by the Canadian Fire Behaviour Prediction System³⁵ This system divides fuels into five major groups and 16 more specific fuel types. These groups are used to describe fuels according to stand structure, species composition, surface, and ladder fuels, and the organic (duff) layer. The current Canadian Forest Fire Behaviour Prediction (FBP) System does not include coastal forests in their fuel type descriptions³⁶, therefore the fuel type that most closely represents forest stand structure was identified.

Different fuel types are associated with different levels of wildfire threat (wildfire behaviour potential). Therefore, accurate fuel typing is a critical input to the wildfire behaviour and threat assessment mapping. Conifer fuel types typically have the highest wildfire behaviour potential and are the most likely to support continuous crown fire and spotting potential. Different conifer fuel types have different crown fire and spot fire potential.

³⁵ Natural Resources Canada. (April 2021) FBP Fuel Type Descriptions.
<https://cwfis.cfs.nrcan.gc.ca/background/fueltypes/>

³⁶ Perrakis, Daniel D.B., Eade, George. (2018). British Columbia Wildfire Fuel Typing and Fuel Type Layer Description. Victoria, B.C. Candian Forest Service, Pacific Forestry Centre.

C-3 and C-5 - Conifer Fuel Types

There are seven possible conifer-dominated fuel types (Figure 18), only five of which are typically encountered in British Columbia. Two of these fuel types, C-3 and C-5, are commonly found in the AOI. Both characterize second-growth conifer stands. C-3 includes a higher density stand with lower crown heights, while C-5 is lower in density and has higher crown heights.

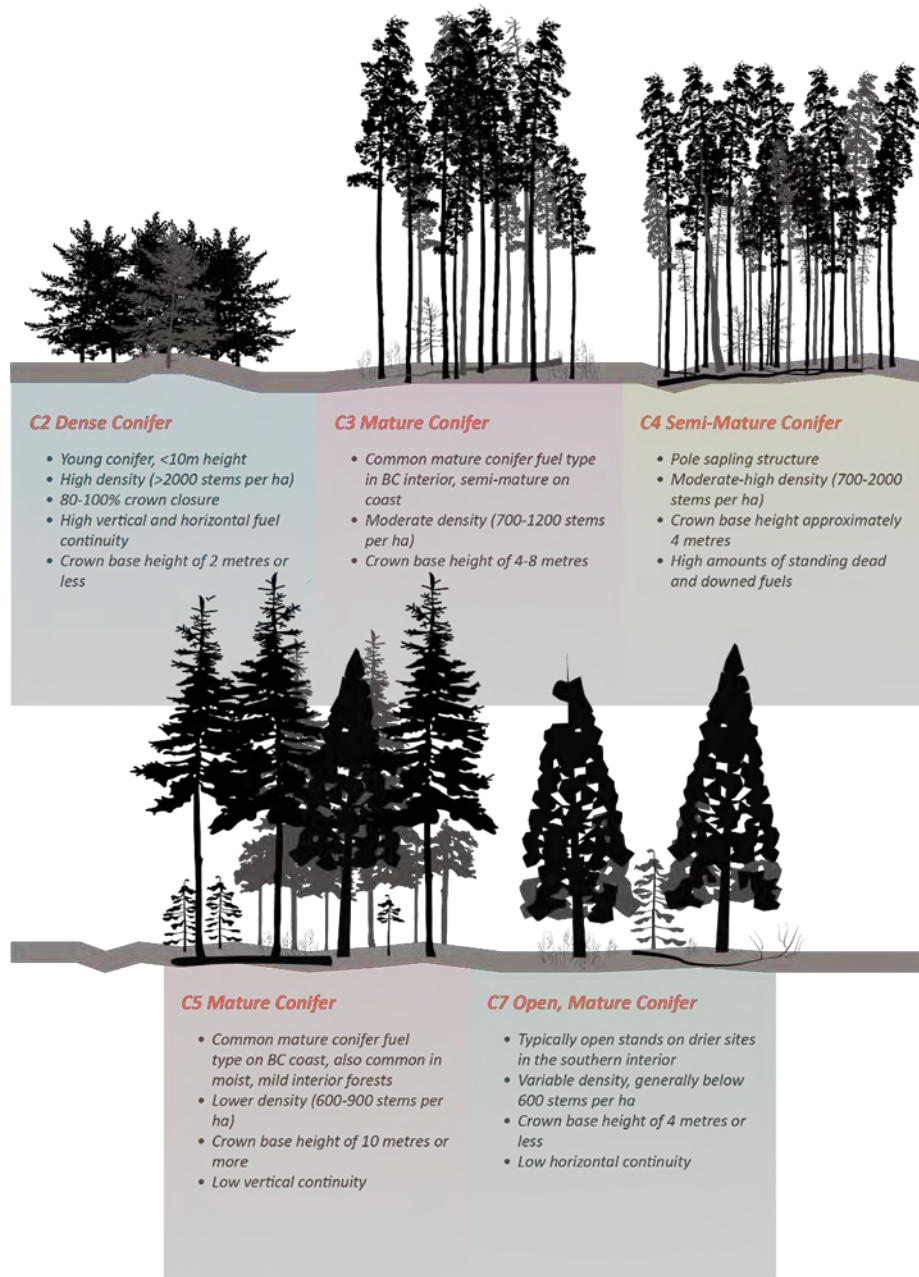


Figure 18. Characteristics of the five most-common conifer fuel types in BC.

C-3 and C-5 are prevalent within the AOI.



Photo 15. Example of a stand classified as C-3 fuel type.



Photo 16. Example of a stand classified as C-5 fuel type.

Fuel type M-1/2 – Mixed stands

This fuel type is found throughout the study area, often around riparian areas or areas historically disturbed. They are characterized by stands comprised of a mix of coniferous and deciduous species. The conifer component in these stands is mostly a mix of Douglas-fir, western redcedar and western hemlock. The deciduous component varies and includes bigleaf maple and red alder. In a few locations, the broad-leaved evergreen tree arbutus contributes to the deciduous component of the stand. Fire behaviour potential in these stands increases with and is highly dependent on the number of coniferous trees present.



Photo 17. Example of a stand classified as M-2 fuel type

Fuel type D-1/2 - Deciduous

This fuel type consists of stands that are generally moderately stocked and dominated by deciduous trees. Within the AOI, there is little area classified as this fuel type. These stands occur primarily in areas that have historically been disturbed. They can include a small number of conifer trees, usually in patches or as single trees. Dead and down round wood fuels are a minor component of this fuel complex. During the summer months, the principal fire-carrying surface fuel consists chiefly of deciduous leaf litter and cured herbaceous material. Areas dominated by shrubs are also included in this type. These are dense plant communities with few trees and a variety of shrub species. These deciduous stand and shrub communities will all have a relatively low fire behaviour potential.



Photo 18. Example of a stand classified as D-1/2 fuel type

Fuel type O-1a/b – Grass

This fuel type consists of grass cover with minimal tree cover. This fuel type is applied to unmaintained, native grasses, rather than large maintained lawns or irrigated crops which are much less flammable. Grass fuels are dominated by fine fuels and are very responsive to moisture inputs or deficits. As such, wildfire behaviour varies widely based on recent weather conditions. Under dry and windy conditions, grass fuels can support extreme rates of spread and fire intensity. However, small amounts of moisture can drastically limit wildfire spread or behaviour. Therefore, the wildfire behaviour potential in these areas is dependent on the degree of curing, which is typically quite high during the wildfire season.



Photo 19. O-1a/b fuels in the foreground. Note the contrast with irrigated, maintained grass in the rear.

Fuel types were provided in the Provincial Strategic Threat Analysis (PSTA) dataset. The PSTA fuels layer is conducted at a landscape level and typically appears coarse when viewed at a small scale. The PSTA fuels data is derived from existing provincial data and algorithmic interpretation of orthophotos. When examined at a local scale for a CWPP, errors are evident. These are often due to recent disturbances, such as logging or land clearing for development. Another source of error is very fine differences in fuel types that are difficult to capture in a large-scale analysis, such as selection cut harvesting, or tree mortality from disturbance.

An updated fuel types layer is required to provide an accurate fire behaviour and wildfire threat map. The following process was used to update the fuel type layer, which has been developed in consultation with the BCWS fuels specialist (Dana Hicks, pers communication):

1. DHC reviewed the fuel type layer with the latest ortho imagery. Identified obvious errors at this scale. This included areas identified as forest but have recently been cleared. In some areas, the VRI-derived fuel type was classified as grass or slash, but the polygon in the aerial imagery is clearly treed. These were classified using air photo interpretation and referencing the nearest treed polygons.
2. Areas were identified for ground-truthing. This focuses on areas adjacent to values and communities as priorities.
3. Fieldwork was conducted to ground-truth the fuels layers. Polygons adjacent to values were visited by the forester and the accuracy of the fuel typing layer was confirmed. Where errors were encountered, the fuel layer was updated and representative photos were taken.
4. Finalize the spatial fuels layer.

Fire Spread Patterns

Initial Spread Index (ISI) is a rating of the expected rate of spread of a fire. ISI is derived from combining wind speed with the Fine Fuel Moisture Index (FFMC), which measures the moisture content of the most easily ignited fuels. High winds, FFMC, and ISI will result in an increased rate of spread and wildfire intensity and are therefore reviewed together. Data for FFMC and ISI is recorded at local BC Wildfire Service (BCWS) weather stations. In addition, local weather stations record wind speed and direction. This data is then assessed under typical wildfire conditions to determine rates of spread potential, potential wildfire intensity, and spread direction.

Topography

Steep slopes significantly increase wildfire spread through increasing radiant and convective heat. Aspect on steep slopes will also affect wildfire spread, as south-facing slopes will be much warmer and drier than other aspects. Areas with steep, vegetated slopes below them are at higher risk than flat areas with similar fuel loading.

Table 23. Slope percentage and fire behaviour implications.

Slope Percent Class	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, increasing the 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.

Table 24. 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 increased 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 third of slope	Impacted by extreme rates of spread. At risk to large continuous fire run, preheating and flames bathing into the fuel.

Local Wildfire Threat Classification

Integrating fuels, fire spread patterns, and topography provides an assessment of local wildfire threat, or the wildfire behaviour potential under severe wildfire conditions. Severe wildfire conditions are defined as the 90th percentile weather conditions over the last 10 years. These are the times when wildfire is most likely, and suppression conditions are most challenging. This analysis highlights the locations most likely to support high or extreme wildfire behaviour that may be beyond the suppression capability of BCWS or local fire departments.

Proximity of Fuel to the Community

Fuel closest to the community usually represents the highest hazard. To capture the importance of fuel proximity, the wildland-urban interface (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 three areas (Table 25):

1. Areas within 100 meters of the WUI (WUI 100)
2. Areas from 101 to 500 meters from the WUI (the WUI 500)
3. Areas 501 to 2000 meters from the WUI (the WUI 2000).

Table 25. Proximity to the Interface

Proximity to the Interface	Descriptor*	Explanation
WUI 100	(0-100 m)	This Zone is always located adjacent to the value at risk. Treatment would modify the wildfire behaviour near or adjacent to the value. Treatment effectiveness would be increased when the value is FireSmart.
WUI 500	(101-500m)	Treatment would affect wildfire behaviour approaching a value, as well as the wildfire’s ability to impact the value with short- to medium-range spotting; should also provide suppression opportunities near a value.
WUI 2000	(501-2000 m)	Treatment would be effective in limiting long-range spotting but short-range spotting may fall short of the value and cause a new ignition that could affect a value.
	>2 000 m	This should form part of a landscape assessment and is generally not part of the zoning process. Treatment is relatively ineffective for threat mitigation to a value unless used to form a part of a larger fuel break/treatment.

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

WUI threat classes of High or Extreme are depicted in Figure 13. These are identified through a combination of both wildfire behaviour and proximity to communities or values. High WUI Threat Class areas are those with High or Extreme wildfire behaviour and are within 500 m of a value or community. Extreme WUI Threat Class areas are those with High or Extreme wildfire behaviour and are directly adjacent to a value or community.

Local Wildfire Risk Classification

The 2012 wildfire risk methodology was used to determine wildfire risk. This method intersects the updated wildfire threat with the proximity to values to determine the WUI interface threat class, which represents wildfire risk. This highlights areas of high or extreme wildfire threat and classifies their risk based on stratified distances. Areas of very low, low, or moderate wildfire threat are dropped from this analysis, as these areas have a high likelihood of successful suppression by the BCWS and/or local fire department. Areas of high wildfire risk are within 500m of a value and pose a high or extreme wildfire threat. Areas of extreme risk are directly adjacent to a value and pose a high or extreme wildfire threat. Area summaries and maps are provided in the Wildfire Risk Assessment section of this document.

Appendix D: CRI Map Submissions

ELECTORAL AREA B

Map 1: CWRP Area of Interest (AOI)

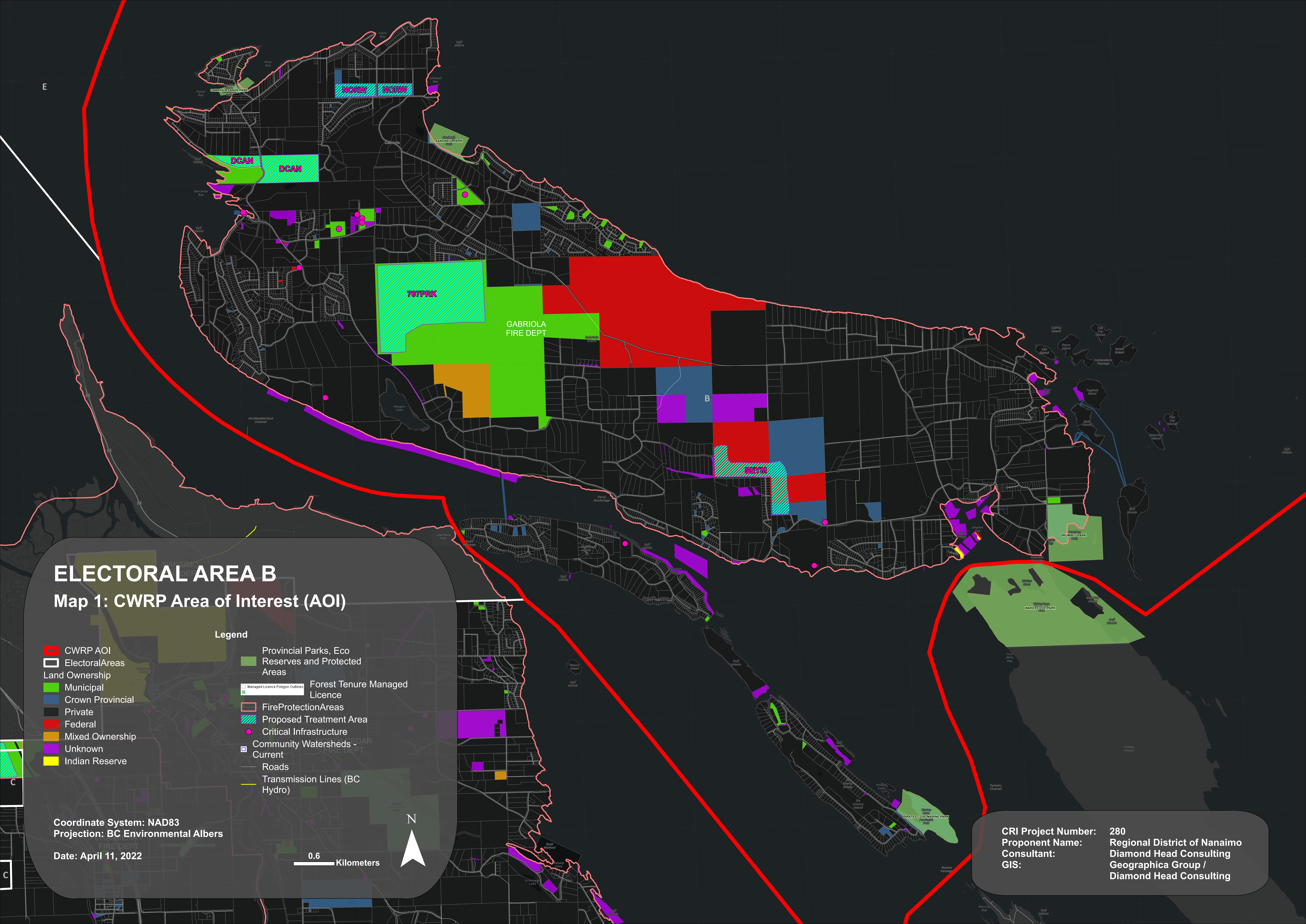
- Legend**
- CWRP AOI
 - Electoral Areas
 - Land Ownership**
 - Municipal
 - Crown Provincial
 - Private
 - Federal
 - Mixed Ownership
 - Unknown
 - Indian Reserve
 - Provincial Parks, Eco Reserves and Protected Areas
 - Managed Licence Polygon Outlines
 - Forest Tenure Managed Licence
 - Fire Protection Areas
 - Proposed Treatment Area
 - Critical Infrastructure
 - Community Watersheds - Current
 - Roads
 - Transmission Lines (BC Hydro)

Coordinate System: NAD83
 Projection: BC Environmental Albers
 Date: April 11, 2022

0.6 Kilometers



CRI Project Number: 280
 Proponent Name: Regional District of Nanaimo
 Consultant: Diamond Head Consulting Geographica Group / Diamond Head Consulting
 GIS:



ELECTORAL AREA B

Map 2: Local Fire Risk

- Legend**
- Transmission_Lines
 - Roads
 - ElectoralAreas
 - FCFS WUI 1-km buffer
 - CWRP AOI
 - Local Wildfire Risk Rating
 - Extreme
 - High
 - Local Wildfire Threat Rating
 - Very Low
 - Low
 - Moderate
 - High
 - Extreme
 - NO DATA

Coordinate System: NAD83
 Projection: BC Environmental Albers
 Date: April 11, 2022

0.6 Kilometers



Wildfire Threat Rating	Area (ha)	Wildfire Risk Rating	Area (ha)
Extreme	0.68	Extreme	80.4
High	312.48	High	163.5
Moderate	1363.8		
Low	6.76		
Very Low	4		
No Data	4088.7	No Data	4088.7

CRI Project Number: 280
 Proponent Name: Regional District of Nanaimo
 Consultant: Diamond Head Consulting
 GIS: Geographica Group / Diamond Head Consulting

ELECTORAL AREA B

Map 3: Proposed Fuel Treatment Units

- CWRP AOI
- Wildland Urban Interface
- Electoral Areas
- Proposed Treatment Area

Legend

- Land Ownership
 - Municipal
 - Crown Provincial
 - Private
 - Federal
 - Mixed Ownership
 - Unknown
 - Indian Reserve
 - Provincial Parks, Eco Reserves and Protected Areas
- Managed Licence Polygon Outlines
 - Forest Tenure Managed Licence
- Transmission_Lines
- Roads
- PRPTRTtable

Coordinate System: NAD83
Projection: BC Environmental Albers

Date: April 11, 2022

0.6 Kilometers



PROPOSED_TREATMENT_ID	AREAHA
DCAN	42.4
SEYM	39.6
NORW	20
707PRK	152.5

CRI Project Number: 280
Proponent Name: Regional District of Nanaimo
Consultant: Diamond Head Consulting Geographica Group / Diamond Head Consulting
GIS: